Republic of Armenia

Reducing Poverty and Improving Shared Prosperity Through Better Jobs, Skills, and Education

May 24, 2017

Education Global Practice
Europe and Central Asia Region

Document of the World Bank
### Abbreviations and Acronyms

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>AMD</td>
<td>Armenian Dram</td>
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<tr>
<td>ANQA</td>
<td>National Center for Professional Education Quality Assurance</td>
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<tr>
<td>ATC</td>
<td>Assessment and Testing Center</td>
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<tr>
<td>CBA</td>
<td>Central Bank of Armenia</td>
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<tr>
<td>CIS</td>
<td>Commonwealth of Independent States</td>
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<td>ECE</td>
<td>Early Childhood Education</td>
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<td>EU</td>
<td>European Union</td>
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<td>FBP</td>
<td>Family Benefit Program</td>
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<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
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<td>GoA</td>
<td>Government of Armenia</td>
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<tr>
<td>HEI</td>
<td>Higher Education Institution</td>
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<td>HDI</td>
<td>Human Development Index</td>
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<td>LFS</td>
<td>Labour Force Survey</td>
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<td>LMIC</td>
<td>Lower Middle Income Country</td>
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<td>MoES</td>
<td>Ministry of Education and Science</td>
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<td>MoF</td>
<td>Ministry of Finance</td>
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<tr>
<td>NaCET</td>
<td>National Center for Educational Technologies</td>
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<tr>
<td>NSS</td>
<td>National Statistical Service of Armenia</td>
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<tr>
<td>OECD</td>
<td>Organization for Economic Cooperation and Development</td>
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<tr>
<td>PER</td>
<td>Public Expenditure Review</td>
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<tr>
<td>STEM</td>
<td>Science, Technology, Engineering, and Mathematics</td>
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<tr>
<td>TIMSS</td>
<td>Trends in International Mathematics and Science Study</td>
</tr>
<tr>
<td>UEE</td>
<td>Unified Entrance Exam</td>
</tr>
<tr>
<td>VET</td>
<td>Vocational Education and Training</td>
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Acknowledgements

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Executive Summary

This report evaluates Armenia’s current education and skills development challenges. The analysis was based on recent World Bank economic and education studies of Armenia and data from the National Statistical Service of Armenia’s 2014 Labour Force Survey, the National Center for Educational Technologies (NaCET), and Assessment and Testing Center (ATC). The findings are expected to feed into the Systematic Country Diagnostic (SCD) for the Government of Armenia (GoA) on ways to improve the quality and relevance of the education system to reduce poverty and improve shared prosperity.

Armenia is in a unique crossroads as a developing middle income country; requiring education and skills development as vital for its next phase of development. Following the unprecedented level of economic growth, poverty reduction and social development and a range of first level reforms until the onset of the global financial crisis in 2008-2009, Armenia has since struggled to revive and kick-start the economy by introducing a second tier of reforms. Concurrently, the social and economic outlook is challenged by a dire fiscal situation and negative impact of an aging population and migration outflow of talent and human resources. Structural changes in the economy have led to improved productivity in much-needed sectors of the economy, including industry, agriculture, and service. Nevertheless, Armenia is faced with multiple challenges centered around low level of social and economic development, worsening levels of poverty often correlated with the level of education (the lower the level of education, the higher level of poverty and severity of poverty), a shrinking labor force and increasing dependency ratio, while the need to boost the innovative capacity of the human capital foundation is greater than ever through education and skills training.

Education and skills mismatch with emerging labor market needs. While Armenia stands out in the South Caucasus region for high educational attainment with a tertiary gross enrollment rate of 52.9 percent in 2015 (as compared to 43 percent in Georgia1), a majority of employers report that the education system does not produce the high level of cognitive, non-cognitive, and job-related skills required of workers; is especially true in the growing sectors of the economy, such as the information technology and high-technology industry, therefore, adversely affecting productivity and competitiveness. Concurrently, one in four workers remain engaged in low-productivity employment and despite high educational attainment among females, female employment rate is close to 50 percent – among the lowest in Europe and Central Asia; more than 60 percent of youth aged 15 to 24 are unemployed. This implies that a significant amount of educational resources is wasted. Thus, Armenia is described by numerous mismatches and challenges that constitute serious impediments to reviving the economy. A comprehensive education and workforce development system that is gender sensitive and produces skills that are adequate and relevant to the labor market is key.

1 World Bank database, 2015.
Issues with quality persist in education, particularly in STEM education. General education, has reached significant access, nevertheless, schools are inefficiently used, teaching has been downgraded to a part-time profession, and Unified Entrance Exam (UEE) and TIMSS assessments reveal students perform least well in STEM. Additionally, even though Armenia has a higher tertiary enrollment rate than other CIS countries, there is a high attrition rate and low enrollment in STEM subjects. Strengthening quality assurance systems and reforming pedagogies, curricula, and teacher training and support in delivering more innovative, student-centered approaches would help to improve student motivation and learning outcomes in STEM.

Early childhood development research shows that investment in early childhood education (ECE) leads to long term educational and economic gains, nevertheless, the provision of ECE in Armenia is comparatively low, and especially for children under 3 years and among rural children who stand the greatest chance of long term social exclusion. Lack of widespread financial support of local community-led initiatives, have led to low coverage of ECE in Armenia, especially in rural areas and participation of children under 3 years old in ECE in Armenia is among the lowest in region. Studies have shown that that the brain is almost fully developed by the age of 3, and failure to stimulate learning during this developmental phase leads to irreparable neurological underdevelopment later in life that can lead to the social exclusion of the most vulnerable populations. Therefore, provision of national ECE programs is critical for breaking inter-generational poverty and improving the skills level of the poorest.

A spatial analysis of Armenia’s population, reveals a statistically significant association between rural dwelling and incidence of lower educational levels and lower higher earning job prospects. People who lived in rural areas are less likely than their urban counterparts to go to university and they are also more likely to work in a low productivity employment, typically agricultural work, although low productivity is pandemic to secondary cities as well. Further, in Armenia, higher education is associated with significantly higher earnings; yet, in Armenia’s 2014 Labour Force household survey, only 11 percent of rural dwellers reported attending higher education as opposed to 27 percent of urban dwellers. This suggests that the government must do more to increase access to tertiary education for those located in rural areas.
Introduction

This education report is a compliment to the 2017 World Bank led Armenia Systematic Country Diagnostic (SCD), which focuses on how to improve shared prosperity and reduce poverty in Armenia. This report collates information from recent education studies addressing issues with skills development and gender and spatial differences in educational level and quality. Concurrently, this study will try to link key macroeconomic and demographic issues to issues related to the education sector. Thus, this study will provide an overview of the external and internal issues related to improving education and be central with regards to the direction set out in the SCD linking these to poverty and shared prosperity.

This study is organized into four main sections intended to provide a comprehensive analysis of Armenia’s education landscape. It will begin with an overview of Armenia’s current social and economic context and the factors that have contributed to it. Next, it will dive deeper into the relationship between education and the economy and unique spatial aspects associated with income and education inequalities. It will then assess the key challenges within the education system that are contributing to Armenia’s current state of affairs. Finally, the study will present policy recommendations based on the information analyzed. In doing so, the aim will be to equip the Republic of Armenia with a strong set of evidence-based education policies and strategies that will promote broad-based prosperity and poverty reduction and move Armenia forward in the next stage of development.
1. Country Context

Following the unprecedented level of economic growth, poverty reduction and social development and a range of first level reforms until the onset of the financial crisis in 2008-2009, Armenia has since struggled to revive and kick-start the economy by introducing a second tier of reforms. Concurrently, the social and economic outlook is challenged by a dire fiscal situation and negative impact of an aging population and migration outflow of talent and human resources. Overall the country context can be gauged by looking at the World Economic Forum’s Inclusive Growth and Development Report 2017 (which measured the accumulated levels and five-year trends for the inclusive growth and development of 109 countries). The analysis is based on seven pillars, consisting of three “education and skills” (i.e. access, quality, and equity), two “basic services and infrastructure” (i.e. basic and digital infrastructure and health services and quality of life), two “corruption and rents” (i.e. business and political ethics and concentration of rents), two “financial intermediation of real economy investment” (i.e. financial system inclusion and intermediation of business investment), two “asset building and entrepreneurship” (i.e. small business ownership and home and financial asset ownership), two “employment and labor compensation” (i.e. productive employment and wage and non-wage compensation), two “fiscal transfers” (i.e. tax code and social protection). These indicators offer a more comprehensive analysis of the state of shared economic prosperity of countries than Gross Domestic Product (GDP) per capita alone. Armenia’s overall inclusive development was ranked 50th out of 70 in the developing economies category.

Although Armenia has experienced gains in key growth and development indicators, it has decreased in other critical areas of inclusive development. Figure 1 shows that in the past five years, Armenia experienced a 10.6 percent increase in growth and development markers, particularly in GDP per capita (4 percent) and employment (3 percent). At the same time,
according to the World Economic Forum report, wealth inequality has risen 10.2 percent and marginal gains have been made in median income (0.8 percent) and net income inequality (-0.6 percent). In other words, Armenia’s recent economic progress has been unevenly distributed.

**Investment in education and the right skills is key to a more productive, broad-based and sustainable economy for Armenia.** While Armenia stands out in the South Caucasus region for high educational attainment with a tertiary gross enrollment rate of 52.9 percent in 2015 (as compared to 43 percent in Georgia), a majority of employers report that the education system does not produce the high level of cognitive, non-cognitive, and job-related skills required of workers; is especially true in the growing sectors of the economy, such as the information technology and high-technology industry, therefore, adversely affecting productivity and competitiveness. Concurrently, one in four workers remain engaged in low-productivity employment and despite high educational attainment among females, female employment rate is close to 50 percent – among the lowest in Europe and Central Asia; more than 60 percent of youth aged 15 to 24 are unemployed. This implies that a significant amount of educational resources is wasted. Thus, Armenia is described by numerous mismatches and challenges that constitute serious impediments to reviving the economy. A comprehensive education and workforce development system that is gender sensitive and produces skills that are adequate and relevant to the labor market is key.

Concurrently, the above situation as mentioned is and will be further worsened by the demographic outlook for Armenia as discussed in the following.

**Demographic trends forecast a shrinking population and thus urgent need to mobilize more of Armenia’s working-age population through education and skills training.** The Armenian population has been rapidly aging since the country’s independence from the Soviet Union in 1991, and the total population has been almost flat since the late 1990s at around 3.2 million. Given the sharp drop in the crude birth rate from 22.6 per 1,000 persons in 1990 to 10.6 in 2000, and recent steady decline from 14.2 in 2007 to 13.2 in 2014, the total population is expected to start declining. In particular, the working-

![Figure 2: Age pyramid of population percentage, 2016](image)

Source: World Bank staff calculation based on data from *Health, nutrition, and population statistics.*
age population\textsuperscript{2} is expected to decrease significantly by 8 percent in 2030 and 15 percent in 2050 because the younger generation will not be able to replace the retiring population, as illustrated in Figure 2. This implies that Armenia needs to maximize the potential of its working-age population by providing them with the education and skills relevant for the changing economy that is moving towards greater efficiency and innovation.

Recent findings show that higher levels of educational attainment are associated with reduced poverty rates (Table 1). According to the National Statistical Service’s Social snapshot and poverty in Armenia 2016 report, the incidence of poverty in 2015 was highest among persons with elementary and primary education (54.4 percent). Additional levels of education, even incomplete secondary was associated with lower poverty rates. Poverty was lowest among those with tertiary education – around 1.8 times lower than the national average for population over 16 years of age, and 3.5 and 2.8 times lower than among those with elementary and primary or incomplete secondary education. This trend was consistent in 2008 as well as for incidences of extreme poverty. Therefore, the findings strongly suggest that higher levels of educational attainment is a key input in lifting people out of poverty despite the structural problems mentioned above. We will return to this issue later.

Table 1: Armenia poverty rate by educational level (for population 16 years and over), 2008 & 2015

<table>
<thead>
<tr>
<th>Educational level</th>
<th>2008</th>
<th></th>
<th>2015</th>
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<tr>
<td></td>
<td>Extremely poor</td>
<td>Poor</td>
<td>Extremely poor</td>
<td>Poor</td>
</tr>
<tr>
<td>Extremely poor (referenced population)</td>
<td>Percent, poor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elementary and primary</td>
<td>4.2</td>
<td>36.1</td>
<td>6.9</td>
<td>54.4</td>
</tr>
<tr>
<td>Incomplete secondary</td>
<td>3.2</td>
<td>40.1</td>
<td>5.2</td>
<td>43.5</td>
</tr>
<tr>
<td>General secondary</td>
<td>1.7</td>
<td>30.2</td>
<td>1.8</td>
<td>33.4</td>
</tr>
<tr>
<td>Specialized secondary</td>
<td>1.0</td>
<td>21.9</td>
<td>1.7</td>
<td>24.6</td>
</tr>
<tr>
<td>Tertiary</td>
<td>0.4</td>
<td>14.7</td>
<td>0.3</td>
<td>15.7</td>
</tr>
<tr>
<td>Total</td>
<td>1.6</td>
<td>26.6</td>
<td>1.8</td>
<td>28.8</td>
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</tbody>
</table>


\textsuperscript{2} Working age in Armenia is 15-63 years for which 63 is the pensionable age, but for data calculation purposes it includes ages 15-64.
Higher education and training are also among the crucial pillars for strengthening competitiveness for economic growth. According to the World Economic Forum’s *Global Competitiveness Report 2016-2017*, which analyzed the global competitiveness of 138 countries, higher education and training were considered as one of the twelve competitiveness pillars and a means for enhancing efficiency (Figure 3). Armenia’s overall competitiveness was ranked 79th in 2016-2017, which is a marked improvement from its 85th rank in 2014-2015 and performs comparatively to other countries in Eurasia. For Armenia, which is a lower-middle income country and now in Stage 2 (efficiency-driven economy)—to sustain and accelerate the growth of recent years and become an upper-middle income country, it is an urgent need to derive an increasing share of growth from productivity improvements rather than from physical factor accumulation. Strengthening higher education and training—where Armenia lags behind more advanced countries—among other pillars are essential for such a transition.

**Armenia’s scores for twelve pillars compared with more developed economies**

*Figure 3: Global Competitiveness, 2016-2017*


**Armenia is in a unique crossroads as a developing middle income country for which reforming education and skills will prove critical.** Structural changes in the economy have led to improved productivity in much-needed sectors of the economy, including industry, agriculture, and service. Nevertheless, Armenia is faced with multiple challenges centered around stagnant of low level of social and economic development, worsening levels of poverty often correlated with the level of education (the lower the level of education the higher level of poverty and severity of poverty), a changing demographic (shrinking labor force and increasing dependency ration), while
the need to boost the innovative capacity of the human capital foundation is greater than ever. In sum, Armenia is faced with the following challenges:

1. Despite relatively high attainment level of about half the population, their skills are incompatible with the demands of the labor market and to compound the problem many the female higher education graduates drop out of the labor market implying a significant waste of scarce public resources;

2. Only about half of the female population and just over a third of youth ages 15 to 24 are engaged in the labor market, thus contributing too little in terms of economic activity and fiscal revenue generation and far from compensating for the declining population;

3. There is a positive correlation between poverty and educational attainment;

4. Investment in human capital with a better alignment of quality, relevance and flexibility is critical for boosting competitiveness, efficiency and higher value added production.

In the following chapter, we will look at some of the current microeconomic or rate of return arguments for investing in skills and higher educational attainment before considering the spatial aspect of poverty and education in Armenia.

2. Education’s Relationship with the Economy

An essential part of economic growth apart from capital is labor and learning (in turn boosting productivity, technological adaptation and knowledge generation). Labor relates to the cognitive and non-cognitive skills endowed and applied by workers which in turn is related to the level of productivity and innovation both as a driver for growth, but also as an essential element to meet labor markets specific need for skills. Greater productivity levels and higher value added jobs will be reflected in higher wages. Learning and knowledge in a society in turn can have an exponential impact on economic growth depending on the overall level of human capital foundation and the ability to transmit knowledge between institutions, businesses and the markets. In short, the overall education level and knowledge matter (the more knowledgeable people you are surrounded with, the more innovation and knowledge exchange is taking place). Concurrently transmitting knowledge and research and placing these into a commercial and productive use is also critical and depends on the institutional and technological linkages within a society and with the global world. While there are benefits to the public and economy in general investing in the individuals’ education as is well known also carries an economic or financial return as will be discussed in the following.

A. Returns to investment in education and skills

Education plays an indispensable role in developing skills that are at the core of improving individuals’ employability and productivity; ultimately, contributing to countries’ economic growth. Recent research has demonstrated that not only cognitive skills—individual's ability to think such as memory, attention, planning, and language—but also non-cognitive skills that influence the overall behavior of a person—such as emotional maturity, empathy, interpersonal skills, and verbal and non-verbal communication—are increasingly shown to have a
positive impact on labor market outcomes\(^3\) (World Bank, 2015a). Education is the means by which these skills are developed and refined.

**Studies show that education in early childhood (0 to 8 years old) leads to the development of skills proven to result in more long-term success for the individual and overall greater productivity.** A 2013 survey from the World Bank on Armenia’s skills, employment, and productivity revealed that adults who participated in early education programs had a higher probability of using reading and computer skills at work and using them with higher intensity (i.e. using them daily and reading longer documents) than those who did not participate in early education (World Bank, 2015a). These adults also scored higher on socioemotional traits, including extraversion, conscientiousness and grit, which are associated with behavioral traits shown to matter for a range of outcomes in life, including employability and labor market outcomes (World Bank, 2015a). The differences were statistically significant after controlling for gender, educational attainment, mother’s education, father’s education, number of household shocks experienced by age 12, household socioeconomic status at age 15, and indicator variables for age groups. The early childhood education (ECE) findings in Armenia are consistent with the international literature, which show that handicaps developed early in life are difficult if not impossible to remedy later, but that effective early childhood education programs can have a very high payoff (World Bank, 2015a).

**Moreover, investment in early childhood development (ECD) leads to positive externalities beyond labor market gains.** Figure 4 below demonstrates the social and economic effects of ECD over the course of an individual’s lifetime. Apart from the increase in socioemotional well-being and income tax revenue, there is an increase in consumption and mother productivity, which stimulate the economy, and increases in child mortality, civic participation, and family planning. Meanwhile, there are decreases in teen pregnancy and crime and decreases in government spending on crime and health. In terms of education, there are decreases in government spending as a result of decreases in repetition, however, there are increases in spending due to reduced dropout rate and increased completion rate, however, this increase in spending is offset by increases in market gains.

\(^3\) The World Bank, 2011, *Putting higher Education to Work: Skills and Research for Growth in East Asia.*
Figure 4: Social and economic outcomes as a result of investment in ECD

Incremental increases in education are linked to incremental increases in earnings in Armenia. There is evidence supporting a payoff for workers who invest in acquiring education, albeit with caveats present in both theory and estimation. Figure 5 below shows that on average, an incremental increase in education is positively associated with an incremental increase in earnings. It is important to note, that vocational education, both preliminary and middle, did not follow this general pattern, suggesting a potential mismatch between skills acquired in these types of institutions and labor market demands. Further, income gains were marginal between persons who completed lower secondary and those who completed upper secondary. Individuals with
higher education reported the greatest monthly earnings and earned over 20,000 AMD more each month than individuals with any other education level. The findings suggest that higher levels of education seem to translate to higher levels of skills that are valued by employers in Armenia, especially in terms of higher education.

**Figure 5: Average monthly wage by educational attainment (in AMD)**

![Average monthly wage by educational attainment (in AMD)](source)


**Skills seem to matter as much as education in terms of earnings.** The attainment of certain job-related activities, such as high computer use at work and high solving and learning activity, and certain socioemotional skills, including grit, risk aversion, and hostility bias seem to positively correlate with higher hourly earnings (Figure 6). On the other hand, agreeableness, more careful decision-making and more contact with clients are associated with lower hourly earnings. This last part aligns with the idea that service-related jobs (those where workers are more prone to have more contact with clients and use this second group of skills) tend to pay less on average in the labor market (World Bank, 2015a). These findings reinforce the point that skills complement education as correlate with earnings.
The findings prove that investment in education and skills yields a sizeable rate of return to an individual’s development and consequently, productivity in Armenia’s economy. On average, higher levels of educational attainment are associated with higher earnings in Armenia with tertiary education having the greatest immediate payoff in the labor market. However, early childhood education is also very important as it is associated with long-term effects to development that are nearly irreversible. This indicates that investment in quality education, particularly in early childhood and tertiary education leads to the strong cognitive, socioemotional, and job-related skills that are demanded by employers in Armenia. Thus, is not surprising that not only in Armenia, but across the world increasing the achievement level and attainment level of people is directly correlated with poverty and income levels. Thus, apart from positive externalities, it makes good microeconomic sense to boost the educational level the key caveat being a clear focus on relevance and quality as well as creating the labor market opportunities (like for women) to avoid scarce public educational resources being wasted.

B. A Spatial analysis of education and employment

Using the National Statistical Service of Armenia’s latest Labour Force household survey 2014, statistical analyses of educational level and employment on spatial (rural vs. urban, and by marz) differences were investigated. The purpose was to determine whether there were any spatial differences in these areas that could indicate areas for specific targeted interventions. The findings revealed some notable rural/urban differences in employment and
education outcomes in Armenia. That is to say, where someone resides in Armenia is associated with marked differences in employment and reported education levels.

In terms of education, inequitable access to tertiary education is a problem for rural communities in Armenia. On average, students from urban areas in Armenia achieve higher levels of education than their rural counterparts (Figure 7). Nearly a third of urban students pursue higher education, compared to 11 percent of rural students. 25 percent of rural students do not progress beyond basic education as opposed to 18 percent of urban students. Nearly half (45 percent) of urban students progress in their education beyond upper secondary, while most rural students only achieve an upper secondary education. Factors likely contributing to the lower education level for rural students are low participation and achievement in the UEE for rural students, which impacts their ability to graduate from the 9th grade and pursue higher education and the cost of tertiary education, as scholarships are primarily merit-based and typically are awarded to students from wealthier and urban families (World Bank, 2013). These inequities in access limit the skill level and earning potential of the most vulnerable. Therefore, it is necessary for the GoA to make sure that rural students receive equal access to quality education and financial assistance to pursue higher education.

Figure 7: Percentage of education level

Source: World Bank staff calculation using NSS LFS data.

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4 Education level in this spatial analysis is defined as the level of education respondents of the LFS 2014 survey reported (Question #15).
In terms of employment, highly skilled and higher earning jobs are disproportionately concentrated in urban areas, especially in Yerevan and Kotayq. High-skilled employment includes positions where the median education level is that of a university degree and includes white-collar managers, professionals, and legislators, whereas, low-skilled employment includes occupations, such as craft and other trade workers, skilled agricultural workers, and elementary occupations, where the median education level is secondary education. As shown in Figure 8, 57 percent of jobs in Armenia are found in urban areas, especially in Yerevan and Kotayq and of which more are highly skilled jobs. In contrast, most common employment among rural workers are lowest skilled and lowest earning occupations, including skilled agricultural work, which constitutes 58 percent of work found in rural communities and operates almost entirely in the informal labor market. Even so, most jobs are concentrated disproportionately in Yerevan and Kotayq and 88 percent of workers are employed in low-skilled work.

Figure 8: Number of employed by occupation type and marz, 2014

![Figure 8: Number of employed by occupation type and marz, 2014](image)

Source: World Bank staff calculation using NSS LFS data.

The spatial analyses of Armenia’s population, reveals a statistically significant association between rural dwelling and incidence of lower educational level and lower higher earning job prospects. People who lived in rural areas are less likely than their urban counterparts
to go to university. They are also more likely to work in a low productivity employment, typically agricultural work, although low productivity is pandemic to secondary cities as well. This finding suggests that the government must do more to increase access to tertiary education and higher earning jobs for all Armenians with special consideration for those located in rural areas. Obviously, this will require additional fiscal resources or increased efficiencies and we will now consider some of the current fiscal and public expenditures on the social sectors in view of considering options for increasing investments or improving efficiencies in education in Armenia.

C. Fiscal environment: education and social sector expenditures

**Strategic fiscal policies are critical to achieving strong economic performance, especially in times of economic downturn.** Supply and demand of goods and services are highly sensitive to the ways in which governments choose to invest scarce public funds like on education and social sectors. Consequently, fiscal policies can improve or hinder economic growth. For this reason, fiscal policies become especially important in times of economic downturn. Strategic fiscal policies should not only aim to correct economic imbalances and stimulate growth, but it should also seek to raise the living standards of all members of society in the short and long-term as this in turn fuels sustained economic development.

**Even though public spending has increased significantly, the allocation of public resources raises concerns over efficiency and its impact on education investment.** The general public expenditure increased by more than 5 percent during the 2012–2015 period and reached 29.4 percent of GDP in 2015. Nevertheless, the upward spending revisions were spread over all major economic items. Social transfers, the acquisition of goods and services, grants, as well as labor costs (salary increases for civil servants) absorbed the brunt of the adjustment (Figure 9). Increasing by 1 percentage point of GDP, social allowances and pensions accounted for the largest fiscal increases – areas that will likely be further burdened in the future with the aging population. At the same time, interest payments surged from 1.0 percent of GDP in 2013 to 1.5 percent in 2015, due in part also to the devaluation of the local currency. Subsidies also picked up, reaching 0.7 percent of GDP. In 2015, capital spending increased for the first time since 2009, reaching 2.9 percent of GDP, as authorities made efforts to improve the execution of the capital budget, however as a reflection of the dire fiscal constraint counterpart funding like for the Education Sector Improvement Project has been reduced for 2017 (World Bank, 2016b). Armenia’s fiscal policy appears to be equitable, but the small scope of public programs limit their potential effects on the population’s welfare and inequality has risen (the Gini index rose from 0.24 in 2008 to 0.28 in 2014) (World Bank, 2016b). Moreover, efficiency scores of social spending reveal that the same outcomes could be achieved with 50 to 60 percent of the current category spending (World Bank, 2015d). Thus, showing that there is room for more efficiency in the social services spending.
While a strong social protection system is responsible for preventing poverty, education, a critical area of social expenditures, remains low. Social protection, in particular the Family Benefit Program (FBP), has played a prominent role in reducing poverty. In 2012, social protection lifted 14 percent of the population out of poverty (World Bank, 2016b). Among households below the poverty line with or without FBP cash transfers, the former spent more on education than the latter (US$11.1 for recipients vs. US$6.7 for non-recipients measured in 2005 PPP dollars) and more on miscellaneous items (US$194 vs. US$21) (World Bank, 2016b). If we extend the comparison to those below the upper poverty line, the results are preserved and amplified for the education expenses: family benefit recipients spend almost three times more in education than non-recipients (7 vs. 18.5) (World Bank, 2016b). Nevertheless, spending on education accounts for only 11 percent of the category spend and 2.4 percent of GDP. Although it has increased by 0.1 percentage point from 2013, it has not regained its highest level of 3.4 percent last seen in 2009 (Figure 10). Meanwhile, social security and environmental protection take the lion’s share of the category spend and in 2015 increased by 0.5 percent and 1.1 percent, accordingly.

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5 The simulations also show that the average percentage shortfall in consumption expenditure for the population, from the poverty line, would increase by 3.5 percent without the transfer.
Armenia spends approximately 1 percent point less on education than the LMIC average and around 3 percent points less than the CIS and EU averages. Armenia spent 2.4 percent of GDP, compared to 3.5 percent spent by LMICs and 5.3 percent by CIS countries, and 5.2 percent by the EU countries. This is a major finding and while an adjustment may be slower in giving the strong correlation between chronic poverty and educational attainment, the need to invest in the renewal of skills to boost productivity, innovation and technological development would strongly suggest an effort by the government to invest more in education. However, such an investment should be accompanied by measures to ensure that the educational investment generate labor market outcomes and employment.

A further review on spending by levels of education shows that Armenia spent 16 percent per pupil as a percent of GDP per capita in primary education, more than the 14 percent spent by LMICs and far less than the 24 and 23 percent spent by the CIS and EU countries, respectively (Figure 11). In secondary education, Armenia spent 18 percent per pupil as a percent of GDP per capita, which was the same as the amount spent by LMICs but less than the 25 and 28 percent spent by the CIS and EU countries, respectively (World Bank, 2015d). Armenia’s 8 percent spend in tertiary education is also significantly lower than that of CIS and EU countries.
Despite relatively low social spending, Armenia performs fairly efficiently as compared to CIS and LMIC group averages, but still has some room for improvement. In terms of poverty as measure by HDI, on average, Armenia performs better than LMICs and CIS, but lags behind EU. The adult literacy rate in Armenia outperforms LMICs and is on par with both CIS and EU countries (World Bank, 2016b). In terms of gross primary enrollment and net secondary enrollment ratio and completion rate, Armenia outperforms LMICs, is on par with CIS countries, and is lagging behind the EU countries. When it comes to lower secondary completion rate and tertiary gross enrollment, Armenia performs better than LMICs, but lags behind both CIS and EU countries. Figure 12 shows Armenia’s relatively good performance in primary and secondary education.

**Figure 11: Government spending in the social sectors as percentage of GDP, 2015**

Despite relatively low social spending, Armenia performs fairly efficiently as compared to CIS and LMIC group averages, but still has some room for improvement. In terms of poverty as measure by HDI, on average, Armenia performs better than LMICs and CIS, but lags behind EU. The adult literacy rate in Armenia outperforms LMICs and is on par with both CIS and EU countries (World Bank, 2016b). In terms of gross primary enrollment and net secondary enrollment ratio and completion rate, Armenia outperforms LMICs, is on par with CIS countries, and is lagging behind the EU countries. When it comes to lower secondary completion rate and tertiary gross enrollment, Armenia performs better than LMICs, but lags behind both CIS and EU countries. Figure 12 shows Armenia’s relatively good performance in primary and secondary education.

**Figure 12: Government spending in the social sector as percentage of GDP, 2015**
In sum, Armenia should consider rationalizing its social protection spending to increase efficiencies within the category spending and potentially allocate additional funds for education to reach comparable levels of other CIS/EU countries. It will have to align with social services expenditures of other CIS/EU countries if it is to succeed to kick-starting its social and economic development once again. Increasing funding for education would also in large part focus on boosting productivity levels in Armenia—one of the only ways to counter the declining population, workforce as well as staying competitive.

D. Productivity and the labor market

Recent years have been marked by growth in key sectors of the Armenian economy, fueling the demand for highly educated and skilled and technical workers. Following a recent burst in the construction bubble, structural transformations have shifted more jobs in other areas of the economy. The sector that benefited the most from this shift was services, which experienced a 6.9 percent average annual growth rate in GDP (Figure 13). Agriculture and industry also experienced some productivity growth, each averaging 3.3 percent annual gains. Services now employs the greatest percentage of the population at approximately 47.7 percent. Additionally, since 2006, the information technology and high-technology sector has become one of the fastest growing sectors in Armenia. The driving factor behind Armenia’s competitiveness was the availability of relatively cheap and competitive human resources. Due to the growing number of IT companies in Armenia, demand for IT specialists will continue to increase. Per conservative estimates, if the market and productivity continue to grow with an average rate of 18 percent and 1 percent respectively, the absorption potential of additional IT specialists will grow at a rate of 17 percent annually and reach 15,000 by 2017 (World Bank, 2014a). This level of growth requires a higher level of knowledge and skills.
Creating more productive and high-earning jobs can only benefit the economy if these jobs can be filled quickly by capable Armenian workers. Armenia stands out in the region with a high tertiary education enrollment of 52.9 percent and even higher 91.6 percent enrollment in general education in 2015, but as mentioned earlier this high attainment level hides the fact that the lion’s share of this are female graduates that do not enter the labor market. Further, 90 percent of employers struggle to find workers with the right skills (World Bank, 2015a). According to Figure 14, employers have the most difficulty hiring blue-collar workers (i.e. craft and related workers), followed by low-skilled white-collar (i.e. sales and service workers), and highly skilled white-collar (i.e. professionals). The most sought after skillsets are cognitive and job-related skills, followed by socioemotional skills. Yet, employers believe the education system, particularly vocational and secondary education, are not sufficiently preparing workers with these skills. The increased GDP growth in the services and industry sector, has only fueled the demand for blue-collar and low white-collar workers, which is why equipping workers with practical and updated skills will only help to increase labor market efficiency and overall productivity.
Figure 14: Percentage of firms that had problems hiring workers

Making the most efficient use of the working age population is vital for maximizing productivity and improving living standards. Participation in the formal labor market in Armenia has increased slightly with an average annual growth rate of 1.8 percent, nevertheless, Table 2 shows it still lags slightly behind its neighbor Georgia at 63.8 percent. Contributing to this low participation rate is low female labor participation (54.5 percent), which is significantly lower than that of males (73.1 percent) even though females make up most the population and outpace males at nearly every level of education, including higher education\(^6\). Such gender imbalance stems largely from the persisting influence of gender stereotypes, which is not unique to Armenia, but is characteristic to many developing economies and OECD countries (World Bank, 2016a). Youth are also another demographic group that are more likely to be excluded from the labor market in many of the developing and OECD countries. Although their participation rate is slightly higher than in Georgia, it is still markedly low at 37.1 percent.

\(^6\) Based on gross enrollment figures from the National Statistical Service 2016.
Labor market participation not only stimulates greater economic productivity, but it also reduces poverty. Specifically, the lack of employment increases the risk of being poor or extremely poor. This is evidenced by the fact that the 2015 poverty rate among households with no employed members was 35.2 percent, which was 6.5 percentage points higher than the national average (See Table 5 in Annex) (NSS & World Bank, 2016). Therefore, it is critical to encourage the participation of more women and youth in the Armenian economy through education and skills preparation, which we will discuss in the next chapter.

### 3. Challenges in the Education Sector

**A. Recent education reforms and outcomes**

Since the late 1990s, education, particularly general secondary education, has been a priority sector for the government of Armenia; thus, considerable progress has been made to improve the access to and quality of general education. Armenia has achieved nearly universal enrollment rates for primary (grades 1-4) and lower secondary (5-9 grades) education. In addition, implementation of the per capita financing mechanism in which the allocation of a given amount of budgetary resources between schools depends on the number of students enrolled, resulted in substantial efficiency gains, increased student-teacher ratios, and enhanced school autonomy in the mid-2000s (World Bank, 2012c). In terms of quality, an array of reforms have taken place. The government developed the National Curriculum Framework, standards, and syllabi, and extended the general education system from 10 to 12 years with an introduction of high schools that offer specialized streams (see Figure 26 in Annex for education structure). It
established the Assessment and Testing Center (ATC), which enhanced the capacity to assess student performance and introduced a transparent UEE for universities and colleges. Additionally, nearly all schools in Armenia now have access to the internet and the government is planning to develop more e-contents to maximize the benefit of internet access (World Bank, 2012c).

**Teacher management is another core area of reforms.** There has been improvement in the transparency of the teacher hiring process. While up to 2011 teachers were hired by the school principals without a competitive selection process, now teacher vacancies are announced publicly, and a selection committee comprised of the school council, MoES representative and other members make the selection. Teacher salaries are differentiated by the following factors: teaching load, geographic area, education level, years of service, as well as by the ranking (1-4) obtained. Every five years, teachers go through a mandatory pre-attestation training. In 2015, the full cycle of training was completed, i.e., all teachers in the country went through the pre-attestation training. Those who took part in 2011 will go through the next cycle of training. Funded by the GoA, the training focuses on knowledge of education-related laws, but does not examine the use and effectiveness of teaching skills.

**While there has been considerable investment and reform in general education, inefficiencies due to low public investment exist in other areas of education, including: early childhood, vocational, and tertiary education.** In 2015, public expenditure on education was 2.4 percent of GDP, which was lower than the OECD average of 5 percent of GDP, and it made up 8.7 percent of total government expenditure 7. While the education spending to GDP continued increasing in 2015 to restore the 2012 level, at the same time the share in total spending has declined because of the fiscal stimulus implemented in 2015, which significantly elevated the overall level of public spending (Table 3).

| Table 3: The dynamics of the actual budget expenditures allocated to the education sector, 2011-2015 |
|---------------------------------------------------|---|---|---|---|---|
| Budget expenditures on education, bln. AMD | 106.1 | 102.8 | 103.1 | 115.8 | 122.2 |
| Budget expenditures on education to total budget expenditures, % | 10.8 | 10.2 | 9.0 | 9.4 | 8.7 |
| Budget expenditures on education to GDP, % | 2.8 | 2.4 | 2.2 | 2.3 | 2.4 |

Source: World Bank staff calculation based on NSS data.

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7 Source: Ministry of Finance of Armenia.
Figure 15 shows public spending is lower in pre-primary (0.5 percent), vocational (7.3 percent), and tertiary (9.1 percent) education. Consequently, early childhood education coverage is very low with rural areas most disadvantaged; vocational education threatened to become obsolete with investments barely above 5 percent of education spending, and tertiary spending less than a third of the 30.2 OECD average spending on tertiary education. Meanwhile, general education, which is already performing efficiently, constitutes 66 percent of the current education budget.

**Figure 15: Gross enrollment and education spending as percentage of total education expenditure by education level**

<table>
<thead>
<tr>
<th>Education Level</th>
<th>2015 Gross Enrollment Rate (%)</th>
<th>% of Education Spending</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-primary</td>
<td>28.6</td>
<td>0.5</td>
</tr>
<tr>
<td>General</td>
<td>96.3</td>
<td>66</td>
</tr>
<tr>
<td>Preliminary VET</td>
<td>7.2</td>
<td>2.1</td>
</tr>
<tr>
<td>Secondary VET</td>
<td>10.9</td>
<td>5.2</td>
</tr>
<tr>
<td>Tertiary</td>
<td>52.9</td>
<td>9.1</td>
</tr>
</tbody>
</table>

Source: World Bank staff calculation based on NSS data.

To improve efficiency and sustain progress in the realm of education, Armenia should continue to apply per-capita financing; it should consider rationalizing some of its general education budget to allocate more to underserved, critical areas of its education system, including early childhood, vocational and tertiary education. The following sections will shed more light on the existing inefficiencies in the Armenian education system and opportunities for improvement.

**B. Inefficiencies and learning outcomes in the education system**

**Early childhood education**

For over a decade the national government, and in partnership with local and international organizations, has established programs in each of the essential ECD sectors, including education. In 2009, the government introduced the National Strategy for Child and Adolescent Health and Development, a multisectoral ECD strategy to collectively tackle education, health, nutrition, and child and social protection. Some of the government-led interventions, such as the Expanded Programme on Immunization, Prenatal Health Programme and Breastfeeding Promotion Programs operate nationally. Alongside the government, many
development partners, such as Children of Armenia Fund, Save the Children, UNICEF, the World Food Programme (WFP), the World Bank, World Vision, the World Health Organization (WHO), and the Global Alliance for Vaccines and Immunization (GAVI) to list a few, are active in ECD, implementing complementary capacity building activities in the effort to improve ECD in Armenia (World Bank, 2012b). In education, the government passed the Law on Preschool Education, adopted in 2005, which grants children the right to receive preprimary education from a preschool institution, family or private instruction. It has also implemented a preschool education reform strategy, the “School Readiness Program,” which aims to improve the school readiness of children entering primary school. It was first piloted and later enhanced under the first and second World Bank-funded Education Quality and Relevance Projects (EQRPs) in 2004-2009 and 2009-2014; and continues to be implemented under the Education Improvement Project supporting the government of Armenia’s efforts to increase preschool enrollment, focusing on vulnerable populations (including minority ethnic groups and children of disabilities), as a means of improving school readiness of 5 and 6 year old children entering primary education.

The investments made in preschool education as part of the Bank supported education improvement project seem to have a positive impact on the school readiness of children benefiting from the micro-projects. The government has recently commissioned a School Readiness Study to evaluate the impact of the preschool education micro-projects on child development implemented in the frames of the Bank supported Education Improvement Project in Armenia. According to the results of this study, students which have been exposed to preschool education perform better on multiple dimensions measured by the Early Development Instrument (EDI) vis-à-vis to the students in the control group, who have not been participated in preschool education (RA, 2016). As shown in Figure 16 below, students participating in preschool projects score 34 percent higher in logic and critical thinking, and 27 percent higher in early reading vis-à-vis their peers without preschool exposure.
Despite the recognition and desire to increase coverage of preprimary education, access remains very low, particularly in rural areas of Armenia due to limited financial support of local ECE programs. Despite the Strategic Programme for Reforms in Pre-School Education for 2008-2015, which aimed to raise the enrollment rate for upper preschool age group (5 to 6 years old) up to 90 percent, especially of the most vulnerable children, there remain 400 communities across the country lacking preprimary facilities (UNESCO, 2015). This is in part due to the insufficient financing for ECE as funding for kindergarten is the responsibility of local communities and funded by the community budget. However, many communities have not been able to provide kindergarten services primarily due to lack of funding. The government, through the World Bank-funded Education Quality and Relevance Project, finances initial investment to establish a preschool program in the existing educational institutions (i.e., schools and kindergartens). In addition to the initial investment, under the decree signed by the Minister of Finance and Minister of Education in December 2011, the central government finances recurrent costs for the program offered in school facilities as part of per capita school financing. Every year, the Government allocates state budget to preschools based on the number of students and newly opened groups (Saber, 2012). However, due to the co-financing requirement for the introduction of a program, the poorest communities have not been able to participate in the program to date.
Another factor contributing to low ECE coverage is the fact that ECE is not compulsory for children ages 0 to 5. Total preschool gross enrollment rate is significantly low at 28.6 percent and much less in rural areas, which account for 16.6 percent of preprimary enrollment (Figure 17). While Armenia’s access to preprimary education is comparable to other developing countries in the region, it is much lower than that of OECD countries whose enrollment rates average approximately 79 percent⁸.

Moreover, children under 3 years are not expected to attend preprimary, even though, ECD research indicates that development effects are driven by the impact of ECD interventions on a child’s brain development and a child’s brain is almost fully developed by age 3. Thus, the findings suggest that it is very difficult to compensate for undeveloped neural connections later in life (Education Commission, 2017). Compared to other countries in the region, Armenia has one of the lowest ECE gross enrollment ratios for children 0 to 2 age at 6.1 percent (Figure 18). A lack of mechanisms to enforce preprimary education and emphasize the importance of ECE for all children under 5 years, explain in part the low coverage of ECE in Armenia (World Bank, 2012b).

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⁸ OECD enrollment is based on 2014 figure, which is the latest available data in the World Bank Databank.
Two countries that have been able to address similar challenges to ECE financing and coverage as Armenia are Bulgaria and Mexico. Learnings from their successes and lessons are worthy of consideration for Armenia. See Box 1 below for more information.
Box 1. International ECE interventions for Armenia

- **Bulgaria**: The Bulgaria Social Inclusion Project (SIP) aims to reach children from poor households and ethnic minorities who receive fewer years of schooling, including preschool education. While two years of preschool for 5 or 6-year-olds is in principle compulsory, many children from poor families, rural areas, and minorities, do not attend. In 2007, a $59 million World Bank loan was provided to the Government of Bulgaria (GoB) to promote social inclusion in ECE through a national school readiness program. The Social Inclusion Project (SIP) includes integrated social and childcare services with family-focused social services for children aged 0–3, and their parents, as well as formal kindergarten and childcare services for children aged 3–6. The project targets low-income and marginalized families, including children with disabilities and other special needs. Two main features and lessons from this project are worth emphasizing for Armenia:
  - Municipalities were supported through finance and capacity building. Based on their needs, municipalities chose projects that they then managed locally from a menu of community subprojects, including both early childhood care and education (ECCE) services and infrastructure investments. To determine the eligibility of the municipalities as well as priority expenditures in each municipality, the project used targeting criteria, including the relative share of children and families on social assistance, municipal demand, efficiency requirements, and a sufficient number of potential beneficiaries and community stakeholders. In the design and early implementation phases, the project had success in working with and addressing the needs of local municipalities. Adapting to municipal demand was crucial. For example, when municipalities noted that conditionality clauses were unreasonable, the project was redesigned to better fit municipal demand. The project also promoted local capacity building for improved management and coordination. As of 2012, 133 municipal staff members had been trained in improved project management areas, including multisectoral cooperation, subcontracting and cooperation with nongovernmental organizations (NGOs), and accessing funding.
  - The project intends to increase parental demand for services through fee reduction (conditional on participation in employment programs) and transportation to the centers. The project compensates municipalities for reduced kindergarten fees so that it will be more affordable for low-income parents to send their children to kindergarten. Parents can access reduced kindergarten fees only if they also enroll in training and employment programs, which helped generate demand for those programs. In addition, transport is offered to parents to increase the accessibility to ECCE services.

- **Mexico**: ECD component of the Compensatory Education Project, the Mexican agency, Consejo Nacional para el Fomento Educativo (National Council for Education Development; CONAFE) has been serving hard-to-reach populations using innovative and low-cost service-delivery models. Recognizing the importance of helping children start off right, CONAFE launched in 1998 Educación Inicial to improve child development and school readiness for 0–4-year-olds and their parents. One of the largest programs in the Latin America and the Caribbean region, Educación Inicial reaches an estimated 400,000 children and their parents. The World Bank Compensatory Education Project (CEP) ($100 million) aimed to increase the breadth of the program to include 172 of the poorest and hardest to reach municipalities in the country. CEP included an ECD component ($30 million) that was designed to strengthen the Educación Inicial program. CONAFE’s approach uses existing assets, such as preschools and public spaces, for meeting areas and a network of volunteers to teach the parenting education classes. This community-based approach has been successful and cost effective in improving parenting practices and contributes to children’s comprehensive development and school readiness. The measures help ensure that high-quality services were provided to CONAFE’s target population, while keeping costs to a reasonable $112 per child per year, thereby allowing the government to serve large numbers of beneficiaries in a sustainable manner. Two interesting features and lessons from this project are emphasized below for Armenia:
  - Early stimulation interventions were emphasized. An evaluation conducted in 2009 revealed that while CONAFE’s approach was demonstrating good results, the model was not fully exploiting the opportunity for providing direct early stimulation services. The latest generation of Educación Inicial trained volunteers interacting directly with the children during the sessions, to both maximize the presence of the volunteer and provide more hands-on training to parents. Special early stimulation sessions for children below four were also incorporated, in an effort to maximize impact.
  - ECD programs were adapted with to better serve marginalized groups, such as Mexico’s indigenous population through the consultation of indigenous leaders and members of the community.

Given the research indicating the importance of early childhood education in an individual’s neural development and long term success, it is imperative that Armenia seek to expand the provision of ECE nationally. The ongoing Education Improvement project, which includes expanding ECE coverage and learnings from international contexts with similar ECE challenges, set a good precedent for Armenia to systematically implement ECE across the country.

Although general education performs relatively efficiently in Armenia, its unrelentingly low student-to-teacher ratio reveal opportunities for improved efficiency. In Armenian general education, total student enrollment of nearly 360,000 in 2010/11 was 100,000 lower than five years earlier (World Bank, 2012c). In 2015/16, the total student enrollment was 364,398. While enrollment declined by more than 22 percent between 2005/06 and 2010/11, the size of the teacher workforce and the number of schools remained largely flat. In 2010/11, Armenia’s 1,365 general education state schools employed 39,021 teaching staff, compared to 1,367 schools employing 40,069 teachers in 2005/06 (World Bank, 2012c). In 2015/16, there were 38,690 teachers employed in general education schools of the country. Therefore, the average student-to-teacher ratio in Armenia—which was already low at 11.5—further declined to 9.2 by 2010/11 and in 2015/16 it was 9.4. The government has responded by decreasing the teaching load to part-time, however, this could have implications on teacher quality due to lower average take home salaries and possibly less motivation to participate in professional development.

Regional strategies could serve as good examples for Armenia to increase efficiency in general education while ensuring quality remains in-tact. Nearly all countries in Central and Eastern Europe have seen falling enrollment in primary and secondary education in recent years because of region-wide demographic changes and have developed cost-cutting policies that preserve the quality of education. Key strategies include per-capita financing, which uses formula-based allocations to give schools incentives for finding more efficient ways of providing education services. By implementing this strategy, countries like Bulgaria, Romania, and Slovakia successfully reduced the number of teachers and schools in line with declining student enrollments.

Romania has adopted a hub-and-satellite model, which allow younger children to be taught in one location (e.g., a small village school), while those in older grades attend a nearby hub school that serves several neighboring villages. Meanwhile, other countries have adopted the practice of multi-grade teaching in rural areas that puts students of different ages in the same classroom with one teacher. Armenia can consider applying some of these strategies to improve the efficiency and quality of its general education system.

Teaching is becoming an aging profession in Armenia, which could have consequences on teacher quality in general education. The number of teachers working that are past retirement age, match that of the youngest cohort of teachers just graduating from education

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9 National Statistical Service: http://www.armstat.am/file/article/soc_15_2.pdf
10 Ibid
12 Ibid
13 Ibid
programs (Figure 19). There is a slight skew towards older teachers, with more than half of teachers employed above 45 years of age. These figures are comparable in both rural and urban areas. Meanwhile, the number of graduates entering the teaching profession has declined by 49 percent since 2012 (Table 4). The insufficient flow of teachers at retirement age exiting the teaching profession not only perpetuates the already low student-to-teacher ratio, but could mean that less teachers will have little or no updated pedagogical skills. Therefore, it is essential for the GoA to ensure that the aging teacher workforce is equipped with timely and relevant in-service trainings.

**Figure 19: Percentage of teachers by age, 2015/16**

![Percentage of teachers by age](image)

Source: NaCET.

**Table 4: Number of graduates of HEIs with Education degree, 2009-2015**

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</thead>
<tbody>
<tr>
<td>Total Number of Graduates</td>
<td>4624</td>
<td>2495</td>
<td>3138</td>
<td>2306</td>
<td>2289</td>
<td>2201</td>
<td>1167</td>
</tr>
</tbody>
</table>

Source: NaCET.

**Student achievement, particularly in STEM point to issues with quality in general education.** An analysis of average national scores for the UEE, which is a mandatory exam not only for graduation from general education, but also for university admission shows that on average, students receive passing scores of 8 or above out of a 20-point scale across all subjects measured, however, national achievement ranges widely from 49 to 81 percent (Figure 20). Following Russian Language, average student scores are lowest in Physics, Mathematics, Chemistry, and Biology with scores ranging from 57 to 65 percent. Females tend to outperform males in every subject measured except for Chemistry in which males achieve 0.3 points higher. Further, students from urban areas tend to outperform rural students in ten out of the fourteen subjects measured, including all STEM subjects, especially Biology and Math, with 1.3 and 1.0
points. These demographic nuances in UEE performance act as barriers to upper and tertiary education and enrollment in STEM studies, especially for the socially vulnerable. Regular monitoring of UEE results will help GoA develop more targeted interventions.

**Figure 20: National UEE average scores, 2015/16**

By international standards, student achievement in mathematics and science in Armenia is also lagging. Armenia most recently participated in the Trends in International Mathematics and Science Study (TIMSS) in 2003, 2007, and 2011. Per TIMSS data, mean scores of Armenia’s 4th and 8th grade students in Math and Science show a sharp increase from 2003 to 2007, followed by a more pronounced decline from 2007 to 2011 (Figure 21). Given the dramatic difference in mean scores between 2007 and 2011, which is an unusual trend, comparison for Armenia has been confined to 2003 and to 2011 only by IEA, which also shows decline from 2003 levels for both subjects and grades. The achievement level for Armenia in TIMSS 2011 lags behind those of the comparator countries outperforming only Georgia in this group and is slightly below the international average of 500 (Figure 22). In terms of gender equity in student achievement, girls outperform boys both in science and math in both grades. These findings indicate that near
universal access to general education has not necessarily translated into high student achievement that is widespread. Regular participation in such international student assessments will help Armenia to benchmark its success and use learnings for better policy-making.

Figure 21: Armenia TIMSS performance, 2011

Source: IEA.

Figure 22: Distribution of TIMSS Grade 4 Math achievement, 2011

Source: IEA.

According to international surveys like TIMMS, traditional teaching styles still dominate math and science teaching in most countries compared to other subjects, whereas student-centered learning is relatively rare. Moreover, there is still a clear need for more contextualization of STEM content in schools, as research shows this to have a positive impact on student motivation and is especially critical in math. Therefore, it is imperative for Armenia to reform STEM pedagogies, curricula, and provide teachers with sufficient training and support to
deliver more innovative, student-centered learning to improve student motivation and learning outcomes in STEM.

**STEM is also an important focus in higher education as it is essential in supporting Armenia’s transition into an innovation economy.** Armenia lags behind more developed economies in innovation\(^{14}\). Education, particularly in the science, technology, engineering and mathematics fields are critical for the advancement of innovation. Nonetheless, enrollment in STEM in tertiary is very low in comparison to non-STEM subjects (Figure 23). In 2015, only 22 percent of tertiary students enrolled in a STEM program although STEM accounts for approximately 66 percent of all tertiary programs. In addition, total enrollment in STEM decreased by 2 percent from 2014 despite overall tertiary enrollment increasing by 3 percent. It is also important to note that while women make up a higher proportion of students enrolled in tertiary education, in 2015, only 16 percent of them enrolled in STEM as opposed to 28 percent of males. This gender difference in STEM also persists in postgraduate programs. More efforts to increase STEM enrollment and retention is critical to develop the highly skilled workforce Armenia needs to support the growing high-tech sector. Special consideration should be placed on building partnerships with the private and social sector to create a pre-university pathway to STEM that is subsidized and attracts more female students.

**Figure 23: Number of tertiary students enrolled in STEM and non-STEM by gender, 2014-2015**

![Bar chart showing number of tertiary students enrolled in STEM and non-STEM by gender, 2014-2015](image)

<table>
<thead>
<tr>
<th>Year</th>
<th>Women</th>
<th>Men</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>18%</td>
<td>30%</td>
<td>48%</td>
</tr>
<tr>
<td>2015</td>
<td>16%</td>
<td>30%</td>
<td>46%</td>
</tr>
</tbody>
</table>

Source: World Bank staff calculation based on ATC data.

Notwithstanding recent reforms, Armenia’s higher education system struggles with efficiency and quality due to weak governance and financing system. In 2005, the GoA became a signatory of the Bologna Process, an allegiance currently among 48 European countries that began in 1999 and aims to improve the quality of higher education. Since then, the GoA has established several quality assurance programs, including most recently establishing the National Framework of Education Qualifications and developing the higher education financing strategy in 2011. Nevertheless, financing and governance remain a challenge and include the following issues: input-based institutional financing with limited incentives for quality improvement, over-prescription of specializations without responding to the labor market demand, inefficiency in the entire higher education system comprised of many small institutions with extremely low student-staff ratios, lack of autonomy and accountability; inequity and slow growth of higher education enrollment; separation of university and research institutions (World Bank, 2013). Because of these quality issues, public perception of HEI management is poor and could explain the 30 percent attrition rate among HEI students.\(^\text{15}\)

To enhance the quality, equity, and efficiency of Armenia’s higher education system, the government of Armenia recently implemented the Competitive Innovation Fund (CIF), however, without substantially increasing public funding, it may not result in a marked impact on quality. To overcome the challenges in the HEI system, the CIF was implemented in 2014 as part of the ongoing Bank supported Education Improvement Project. The Fund aims to improve the quality and efficiency of higher education, stimulate research and innovations in higher education, as well as improve managerial capacities in HEIs and establish interactive links between HEIs and various fields of economy. Six universities were awarded grants for the implementation of their projects, which launched in December 2015. The project may produce sufficient experience and platform for introducing a performance-based financing instrument in Armenia. However, to sustain improvements to quality, competitiveness, and equity, the GoA must further invest in higher education.

Closer evaluation of Armenia’s education system at every level, reveals several barriers to the efficient provision of quality education. Beginning from early childhood education, lack of publicly-funded ECE programs and financial support of community-led initiatives, have led to low coverage of ECE in Armenia. General education, has reached significant access, nevertheless, schools are inefficiently used, teaching has been downgraded to a part-time profession, and UEE and TIMSS assessments reveal students perform least well in STEM. Additionally, even though Armenia has a higher tertiary enrollment rate than other CIS countries, there is a high attrition rate and low enrollment in STEM subjects.

C. Gender aspects and its impact

Gender is another area requiring urgent education policy reform in Armenia. Policy documents have explicitly identified gender equality as an education priority, yet they have not

\(^{15}\) Based on HEI data from NaCET.
been realized in practice. The recent adoption of the *Gender Policy Concept Paper* in 2010 and the *Law on Securing Equal Rights and Equal Opportunities for Women and Men* in 2013 identify priority areas for education reform to promote gender equality. In particular, the *Gender Policy Concept Paper* identifies the primary directions of gender policy in the education sphere, which include forming an egalitarian notion of gender relations, drafting new education curricula and manuals directed at the creation and implementation of principles of gender equality, as well as at overcoming traditions that encourage patriarchal gender stereotypes, and integrating gender education into the curricula as a mandatory component at all levels of the education system (World Bank, 2016a). While the articulation of gender policy is an impressive step towards promoting gender equality in the education sector, this commitment has not yet been fully translated into state education standards and curricula, programs, teacher guides, and textbooks that reflect the principles of gender equality (World Bank, 2016a).

**Data collected from studies show that gender stereotypes exist in the education system and the broader Armenian culture.** Recent surveys on gender found that traditional gender stereotypes exist among high school teachers and students. Approximately half of the teachers believed that “women and men should keep traditional professions” and “there are some professions that women should not have.” Conversely, more than half felt that males could work in any profession that they wanted. These findings suggest that many teachers subscribe to stereotypical views about gender, which in turn impacts the opportunities that are presented to girls. The survey also found that teachers treat male and female students differently. 54 percent of teachers believe that boys and girls are essentially different and should be treated differently. Students confirmed that they face different treatment and discrimination by their teachers. Furthermore, the survey also revealed that teachers lacked an understanding of what constitutes a gender-equality approach to teaching and learning. These survey findings indicate that teachers may lack knowledge of and skills in integrating gender perspectives into curriculum and that they may be victims of traditional gender stereotypes themselves (World Bank, 2016a).

**Issues with gender stereotypes also persist in higher education and impacts female students’ career choices.** In higher education, where women constitute the majority of students, traditional gender roles persist. A 2013 survey of male and female students at Yerevan State University, revealed that despite over 90 percent of young people believing “a woman should have a good education,” only 46 percent of men and 62 percent of women felt that it was important for women to have a successful career. Moreover, notwithstanding success in school access and academic achievement, gender patterns exist in the type of study programs Armenian students pursue at the postsecondary level. Young women tend to dominate the “traditionally female” areas of study (i.e., education, social sciences, and health), which lead to work in lower-paid public sector jobs. Meanwhile, young men tend to concentrate in technical fields (i.e., energy, transport, and construction), which generally correlate with jobs in higher-paying sectors. Furthermore,

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16 Source: Center for Gender and Leadership Studies, 2014.
many young women who complete higher education do not become employed after graduation either because their qualifications do not meet labor market demands or because they are expected to take on family responsibilities after they marry (World Bank, 2016a).

**Gender equality is not only a means to economic development, it is also a human right.** In Armenia, women not only attain higher levels of education, but they also outperform males in national and international examinations. Nevertheless, gender stereotypes in the education system and broader Armenian context have led to significantly lower female participation in the labor force (between 14 and 17 percentage points lower than men’s) and lower earning potential. Underutilization of women in the labor force is highly inefficient. Moving beyond the economic argument, it is important to acknowledge gender equality as key to achieving a broader principle of improving the quality of life of individuals, families, and communities. Above all, gender equality is a fundamental human right. Serious efforts are necessary to ensure a more balanced and fair representation of gender roles in schools and ultimately in the workplace.

**D. Skills characteristics and skills demanded by the economy**

There is clear indication from the feedback of Armenian employers that the current education system is not meeting the skills significant for most occupations. According to results from a World Bank survey on skills and employment in Armenia, skills that are highly desired by employers for both white-collar and blue-collar occupations include cognitive and job-related skills, followed by socioemotional skills (see Figure 27 in Annex for description of skills measured) (World Bank, 2015a). However, 90 percent of employers report difficulty hiring highly skilled workers, which seems that regardless of Armenia’s highly educated population, graduates today do not seem to be equipped with the adequate skills. To address this skills mismatch, the finding suggests that cognitive, socioemotional and relevant job-related skills should be better integrated into Armenia’s education system.

Among the high-tech sectors, cognitive, socioemotional, and job-related skills are used with not only more frequency, but also with more intensity. The frequency and intensity of use of cognitive skills, job-related skills, and socioemotional skills are much higher among individuals working in high-innovation sectors than among those in low-tech sectors (Figure 24). High-tech is classified as high-tech manufacturing and knowledge-intensive services, while low-tech is classified as medium low-tech manufacturing and less knowledge-intensive services. For instance, based on this classification, the agricultural and construction sectors are considered as low-tech sectors. A 2013 analysis of Armenia’s high-tech sectors, revealed that 50 percent of workers in high-tech use reading skills with high frequency, compared with 30 percent of those in low-tech; 47 percent of individuals working in high-tech reported a high use of computer skills, compared with 23 percent of low-tech workers (World Bank, 2015a). These workers also reported using more socioemotional skills, including having contact with people outside work and using

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thinking and learning skills more frequently. Overall, individuals in high-tech sectors demonstrate greater use of higher order skills on the job than workers in low-tech sectors (World Bank, 2015a).

Figure 24: Intensity of use of reading and computer skills among high and low tech workers

Today, few vocational and technical education programs have been able to provide the required skills for modernizing Armenia’s economy or to ensure the levels of employment needed. Under the Soviet Union, the earlier vocational education system in Armenia had been adequate for providing skills that would lead directly to employment opportunities in the centrally planned economy. However, globalization and Armenia’s sustained economic growth over the years demands for vocational training to be relevant and adaptable to the changing economy. A closer look at enrollment figures across all preliminary and secondary vocational schools in Armenia demonstrates the mismatch between what students are learning and its relevance to Armenia’s current labor market (Figure 25). Given global trends, the information technology and high technology sector is one of the fastest growing sectors in Armenia, nevertheless, the size of these programs are underwhelming. For instance, few students in preliminary vocational schools enroll in computer and energy degrees, 9 percent and 1 percent respectively. Moreover, apart from the service industry, other growing sectors, such as agriculture and manufacturing, which would benefit from more highly trained workers, account for only 4 percent and 3 percent of enrollment, accordingly and such majors do not seem to be an option in secondary vocational schools. The major with the highest enrollment is service (25 percent), followed by art and design (20 percent) in preliminary vocational schools; health and sport (37 percent) and an undisclosed other category (19 percent). Gross enrollment rates for vocational education are already the lowest of any education level in Armenia; continued failure to meet the skills needs of the current labor market could render vocational education obsolete.
Armenia’s existing national workforce development system lacks the structure to effectively produce skills relevant to the current labor market needs. The National Center for Vocation and Education Training (VET) Development and the National Council for VET Development were established years ago, as a national initiative to develop Armenia’s workforce. Nevertheless, issues with management affect the platform’s ability to run effectively. First, the quality assurance system is not enforced uniformly across the workforce development policies. For instance, training providers are regulated, but they have limited accountability in meeting quality standards, since there is almost no monitoring and evaluation (World Bank, 2015a). The workforce development system relies heavily on government resources and there are no incentives to use them efficiently or to base them on performance (World Bank, 2015a). Further, even though the system is being updated and policies are being implemented to diversify the pathway for skill acquisition, the VET system is still seen as one limited to vertical movement toward tertiary education and training is almost entirely developed without close collaboration or input from the industry (World Bank, 2015a). This results in the VET’s inability to meet skills development needed from the labor market. Regulation of the National Center for VET Development and National Council for VET Development should be improved to ensure greater accountability and standardization, and to provide workers with the cognitive, socioemotional, and job-relevant skills relevant to Armenia’s job market.

Lack of highly qualified workers and youth unemployment is a global issue, nevertheless, in countries providing an increased level of professional development alongside educational qualifications seem to fair better employment outcomes. Austria’s dual VET program stands out in the region. The program, which is similar to the dual VET program in Germany and Switzerland, harnesses theoretical knowledge with apprenticeship starting in general education. The program has proven successful as it gives apprentices real-world skills development. It also serves as beneficial for companies as these apprentices are tasked with producing valuable work for their employers and the employers are directly helping to shape the skills of the existing and future labor market. As a result of this program, EU statistics show that...
while the average youth unemployment rate within the EU was about 20.3 percent in 2015, the youth unemployment rate in Austria was 10.6 percent (Eurostat, 2015). However, for this dual VET program to be successful, coordination of apprenticeships and education plans between the business community and government is important.

In Asia, Singapore stands out with a robust professional development program that heavily utilizes information technology. One of the most important drivers of the changes in the training system was the government’s commitment to increase the creativity and innovative capacity of its workforce. Part of this has been accomplished by saturating Singapore education and training institutions with information technology (IT) and mobile e-learning (Tucker, 2012). In 2002, the country’s Institute for Technical Education launched its eStudent and eTutor systems, which provides an interconnected personalized, interactive, multimedia, and collaborative learning environment, as well as an administrative support system that can be accessed from any point at any time of day or week (Tucker, 2012). 20 percent of the ITE curriculum, mostly the part consisting of the theory part of the curriculum, is delivered through the internet. This, makes the learning available not just to those on campus, but also to those located anywhere.

Armenia can leverage these international examples to better integrate their existing VET program with general education and the private sector to offer apprenticeships like the dual VET program instituted in Austria and other European countries. Nevertheless, for this program to be successful, coordination of school curricula and on the job training must be well planned between the government, private sector and the national VET institutions in Armenia and strive to meet the skillsets of the emerging labor market needs using the most cutting edge technological approaches.

4. Policy Recommendations

In the context of the preparation of the SCD for 2017, this report aimed to provide a comprehensive analysis of the current economic and labor market challenges, including poverty and the implications for the education system – both internal and external factors that must be overcome for Armenia to realize holistic growth and development in the future. Developing effective policies and investing strategically in areas of the economy and human development through education and skills that promotes inclusive and sustained and accelerated growth is critical. To this end, the following short and long term policy options and strategies could be considered by the government:

Short-term recommendations:

1. General education rationalization.
   - To maintain efficient spending in general education without compromising on quality, Armenia should continue to provide per-capita financing.
   - Any savings from general education can then be applied to other critical and underserved areas of education, including early childhood, vocational and tertiary education.
o To tackle multiple efficiency challenges in general education, such as low (9.2) student-to-teacher ratio, expected student population decline, and part-time teaching profession, Armenia should consider introducing hub-and-satellite schools, multi-grade teaching, and training teachers to teach multiple disciplines. These practices have been successfully introduced in the region in countries with similar contexts as Armenia and learnings from their implementation could prove valuable for Armenia.

2. **Promoting social inclusion through ECE.**
   o The provision of quality preschool education should be expanded, especially for children under 3 and in rural communities. The ongoing Education Improvement Project, which includes expansion of ECE coverage as one of its objectives, is a good precedent and experience for implementing ECE systematically across the country.
   o Lessons learned from countries with similar ECE challenges, such as Bulgaria and Mexico could offer additional opportunities for Armenia to provide local municipalities with more financial and capacity-building support and parental demand through a conditional fee reduction program.

3. **Redefining teacher education and training to provide educators with the tools to teach higher order skills in the classroom.**
   o To address the skills mismatch of the labor force and ensure that the aging teacher workforce is equipped with the most timely and relevant pedagogical practices, the GoA needs to update its teaching program curricula and in-service trainings to incorporate more pedagogical guidance on strengthening the use of cognitive, socioemotional, and technical skills in the classroom and at all levels of education and in rural areas in particular. These core skill groups have been proven to not only lead to educational achievement, but also long term economic prosperity.

4. **Gender mainstreaming in general and higher education**
   o To tackle gender stereotypes in the education system, which have been shown to negatively correlate with women’s career path, the GoA should explicitly and more consistently address gender in the educational standards, curricula, syllabi, teacher’s guides and trainings, and textbooks so that they are more gender-balanced.

5. **Creating a clearer pathway to STEM education.**
   o To increase student performance in STEM, the GoA should reform the STEM curricula, pedogies, and materials and train teachers to incorporate more innovative and student-centered learning, which has been found to motivate student learning.
   o To increase enrollment in STEM in higher education, partner with HEIs and private and social sectors to provide secondary students with competitive and subsidized
pre-university academic preparation and university scholarships for STEM. Special emphasis should be placed on attracting more female students to STEM.

6. **Strengthening higher education financing reforms.**
   - Learnings from and further investment in the Competitive Innovation Fund can provide the GoA with the tools and experience to introduce a model for performance-based funding in higher education systematically.

7. **Increasing access to tertiary education in rural areas.**
   - To close the spatial disparities (urban vs. rural) in education and help more rural secondary students attain tertiary education, the GoA should provide more financial assistance to these students in the form of need-based scholarships, which are currently lacking in Armenia or a combination of merit and need-based.

8. **Improving the quality of existing the VET institutions.**
   - For greater accountability, standardization, and integration with the labor market, reform and improve regulation of the National Center for VET Development and the National Council for VET Development.
   - In addition, more integration of cognitive, socioemotional, and ICT skills in pedagogy and curriculum will help to meet the needs of Armenia’s emerging IT and high-tech sector.

**Long-term recommendations:**

1. **Social sector expenditure rationalization.**
   - Considering Armenia’s constrained fiscal space, increasing and diversifying investment in education through the rationalization of the social expenditure is key to improving efficiencies within these sectors. Armenia continues to spend a significantly smaller amount on education (about 50 percent) of other CIS/EU countries; while education/human capital formation is not the only catalyst for changing the country fundamentals and ability to reduce poverty and shift the economy towards greater productivity levels, innovation and technological development, it is an essential part.

9. **Increasing regular participation in national and international educational assessments.**
   - To tackle low STEM achievement, the GoA should continue to administer the UEE and regularly participate in international assessments, such as TIMSS to use learnings for better policy-making.

2. **Modernizing workforce development system.**
   - A dual VET model that begins in general education and partners with the private sector to provide students with apprenticeship, similar to what has been
implemented in European countries, including Austria, Switzerland, and Germany, should be explored in Armenia’s context.
References


NSS. (2017). Data women in STEM study_Armenia [Data file]. Compiled and provided by NSS at the World Bank’s request.


Table 5: Armenia poverty rate by number of employed household members, 2008 and 2015

<table>
<thead>
<tr>
<th>NUMBER OF EMPLOYED HOUSEHOLD MEMBERS</th>
<th>2008</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Extremel y poor</td>
<td>Poor</td>
</tr>
<tr>
<td>No employed members</td>
<td>5.7</td>
<td>46.6</td>
</tr>
<tr>
<td>1 employed member</td>
<td>2.8</td>
<td>32.5</td>
</tr>
<tr>
<td>2 employed members</td>
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<td>26.0</td>
</tr>
<tr>
<td>3 and more employed members</td>
<td>1.1</td>
<td>24.9</td>
</tr>
<tr>
<td>Total</td>
<td>1.9</td>
<td>29.5</td>
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Figure 26: The education system in Armenia

<table>
<thead>
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<th>Age</th>
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<tbody>
<tr>
<td>24</td>
<td>1</td>
<td>PhD (3 years)</td>
<td>Pre-Primary: Kindergarten (3 years)</td>
</tr>
<tr>
<td>23</td>
<td>2</td>
<td>Master (2 years)</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>3</td>
<td>Bachelor (4 years)</td>
<td>Pre-Primary: Daycare Nurseries (3 years)</td>
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<td>21</td>
<td>4</td>
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<td>19</td>
<td>6</td>
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<tr>
<td>18</td>
<td>VII</td>
<td></td>
<td></td>
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<tr>
<td>17</td>
<td>VI</td>
<td>Upper Secondary (3 years)</td>
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<tr>
<td>16</td>
<td>V</td>
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<td>15</td>
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Figure 27: Description of cognitive, socioemotional, and job-relevant skills measured

<table>
<thead>
<tr>
<th>Cognitive skills</th>
<th>Direct measurement of reading literacy based on the Survey of Adult Skills Instruments</th>
<th>▪ Reading proficiency</th>
</tr>
</thead>
</table>
|                                                                                  | Indirect assessment (self-reported) on individuals’ use of foundational skills—at work or in daily life | ▪ Reading  
▪ Writing  
▪ Numeracy |
| Socio-emotional skills                                                          | Personality traits                                                                     | ▪ Openness  
▪ Conscientiousness  
▪ Extraversion  
▪ Agreeableness  
▪ Neuroticism  
▪ Grit |
|                                                                                  | Behavior                                                                               | ▪ Hostile attribution bias  
▪ Decision making |
| Risk and time preference                                                         | Qualifications required for the job and job learning times                              | ▪ Computer use  
▪ Contact with clients  
▪ Solving and learning  
▪ Autonomy and repetitiveness  
▪ Physical tasks |
| Job-relevant skills                                                              | Indirect assessment of skills used at work                                             | ▪ Computer use  
▪ Contact with clients  
▪ Solving and learning  
▪ Autonomy and repetitiveness  
▪ Physical tasks |