

# ARMENIA

## **SOCIAL SECTORS AND POVERTY IN ARMENIA: FROM EQUITY IN ACCESS TO EQUITY IN QUALITY**

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**March 15, 2006**

Human Development

ECA Region

This article was prepared as a background paper for the 2006 Armenia Poverty Assessment



### **ABSTRACT**

Armenia has been able to sustain good health and education indicators (meeting European standards) with relatively low levels of expenditure as compared to other countries in the region. However, the education and health sectors in Armenia face several challenges and constraints in terms of equity and efficiency. Access to high-quality education is almost an exclusive privilege of the elites due to significant affordability constraints. As such, performance and learning inequities between the poor and non-poor users are noticeable. The quasi-privatization of the health sector in Armenia has substantially increased private expenditures on health. While public resources are mainly used to maintain a large stock of doctors, hospitals, and clinics, most of the cost for health services and treatment is borne by users. This trend has contributed to a steady reduction of health service utilization, especially among the poor. The article is structured as follows: section 1 introduces the social sectors in Armenia and analyzes the links between health/education outcomes (and public spending) and poverty. Section 2 analyzes the disparity between poor and non-poor users in terms of access/quality of education services, learning environment, and performance. Section 3 describes some of the current inefficiencies in the health sector and their effect on service delivery and analyzes inequities on health utilization (and affordability) between poor and non-poor users.

## **SOCIAL SECTORS AND POVERTY IN ARMENIA: FROM EQUITY IN ACCESS TO EQUITY IN QUALITY**

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### **INTRODUCTION**

Since 1994, a series of successfully implemented structural reforms have led to significant economic growth in Armenia. Large migration flows and rapid and sustained growth between 1994 and 2004, have contributed to higher real wages, stable employment, and higher levels of transfer income in the form of public (social services) and private transfers (domestic and foreign remittances). Although economic growth had little impact on poverty alleviation in the second half of the 1990s (see World Bank 2002), accelerated pro-poor growth since 1999 has led to significant poverty reduction. Between 1999 and 2004 the proportion of the population in Armenia living in poverty declined by more than 20 percentage points (from 55.1 to 34.6 percent; see World Bank, 2006).

On the education and health fronts, Armenia has also been regarded as a good performer as it has been able to sustain good health and education indicators (meeting European standards) with relatively low levels of expenditure, compared to other countries in the region. Nevertheless, investment in health and education has increased significantly since 1997 and currently the level of spending in the social sector is comparable to what Armenia enjoyed before the fall of the Soviet Union. Investment in education (health) increased from 8.9 (5.5) percent of total public expenditure in 1997 to 13 (6.2) percent in 2004. Since most of these resources have been used to maintain large and outdated health and education systems, Armenia still confronts significant challenges (and lack of investment) in relation to the efficiency, equity, and quality of service provision.

The education sector in Armenia faces several challenges and constraints, such as a shirking school-age population, a large (and depreciated) school infrastructure, a large and outdated teaching force, and generally a poor learning environment in schools (most schools lack proper heating, electricity, and equipment). Furthermore, access to quality education (such as out-of-school programs, private lessons, and post-secondary education) is almost an exclusive privilege of the elite and the cost of quality education (especially college tuitions and private lessons) is not affordable for the poor or the middle class. As such, performance and learning inequities between the poor and non-poor users are quite noticeable. Furthermore, the opportunity cost of post-secondary education is large and returns to education are still low. As such, education outcomes, such as standardized tests scores and tertiary enrollment, are heavily correlated with socio-economic condition.

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\* This article was prepared as a background paper for the 2006 Armenia Poverty Assessment. The authors benefited from valuable feedback, support, and comments from Arup Benerji, Aleksandra Posarac, and Edmundo Murrugarra. All disclaimers apply.

The quasi-privatization of the health sector in Armenia has substantially increased private expenditures on health. While public resources are mainly used to maintain a large stock of doctors, hospitals and clinics, most of the cost for health services and treatment is borne by users. This trend has contributed to a steady reduction of health service utilization, especially among the poor. Poor users are considerably less likely to use services when sick than non-poor users even in cases of severe illness. Although some public intervention in the form of social assistance (free health services for the poor) is in place to mitigate decreasing usage among the poor, the initiative falls short in terms of coverage.

This paper is structured as follows. Section 1 introduces the social sectors in Armenia and analyzes the links between health/education outcomes (and public spending) and poverty. Section 2 analyzes the disparity between poor and non-poor users in terms of access/quality of education services, learning environment, and performance. Section 3 describes some of the current inefficiencies in the health sector and their effect on service delivery and analyzes inequities on health utilization (and affordability) between poor and non-poor users. The appendix contains a description of the data used for analysis and further documentation of the results.

## 1. SOCIAL SECTORS AND POVERTY IN ARMENIA

### 1.1. Health and education outcomes in Armenia have significant links with poverty.

Households having a sick member are 9 to 13 percent more likely to feel poor than similar households with no sick members. Also, households with better educated heads and spouses are less likely to be and feel poor. Households headed by individuals holding a university degree consume on average 31 percent more than those headed by individuals with less than lower secondary education (the reference category). Furthermore, households having a head/spouse with some tertiary education are less likely to feel poor (by 10 percent nationally and by 21 percent in urban areas) than households having a head/spouse with less than basic secondary education.

**Table 1.1: Health and education indicators influence perceptions of poverty.**

	<i>All</i>	<i>Urban</i>	<i>Rural</i>
	<i>Change in the Probability of feeling in poverty in %</i>		
<b>Health indicators</b>			
Households having a sick member	10.8	11.3	12.6
Households having a head who feels sick	10.6	10.4	13.8
Households having a spouse who feels sick	10.3	9.2	11.1
<b>Education indicators</b>			
Households whose head has basic secondary education	N.S.	-9.4	N.S.
Households whose head has upper secondary education	-6.6	-19.6	<u>-8.1</u>
Households whose head has some tertiary education	-10.7	-21.5	-10.1
Households whose spouse has basic secondary education	N.S.	N.S.	N.S.
Households whose spouse has upper secondary education	<u>-7.7</u>	N.S.	N.S.
Households whose spouse has at least some tertiary education	-12.9	N.S.	N.S.

Source: Authors using Armenia ILCS 2004 data. Estimates are obtained using a probit model. The full specification is presented in Table A0 in the appendix. N.S: coefficient is not significant

**1.2. Users perceive that not being able to ensure good health and education are main problems.** More than 60 percent of all healthcare users claim that not being able to ensure good health constitutes a main challenge. This result holds true across quintiles and between direct users, (individuals receiving treatment), potential users (individuals who claim to be sick), and indirect users (households with sick individuals). Not being able to ensure good education seems to be less of a concern. In particular, only 15 to 25 percent of all users consider education as a life priority. Interestingly, users in the richest quintiles (as proxied by head and spouses having a member in school) seem to be more concerned with their capacity to meet education needs than users in lower quintiles. This may be explained by the fact that richer households are more likely to spend resources on higher education, which is mainly paid for out-of-pocket.

**Table 1.2: Poor users have more difficulties ensuring good education and health**

	<i>Poorest Quintile</i>	<i>Q2</i>	<i>Q4</i>	<i>Richest Quintile</i>	<i>Poorest Quintile</i>	<i>Q2</i>	<i>Q4</i>	<i>Richest Quintile</i>
	<b>Cannot ensure good education</b>				<b>Cannot ensure good health</b>			
<b>Heads having a user</b>								
Main problem	16.0	16.7	19.9	18.5	64.8	61.6	65.1	56.1
Not a main problem	84.0	83.3	80.1	81.6	35.2	38.4	34.9	43.9
<b>Spouses having a user</b>								
Main problem	19.0	18.3	25.1	21.0	55.3	60.1	58.5	53.2
Not a main problem	81.0	81.8	74.9	79.0	44.7	39.9	41.5	46.8
<b>Actual Users*</b>								
Main problem	55.2	61.8	50.0	39.7	68.1	64.3	62.6	59.1
Not a main problem	44.9	38.2	50.0	60.3	31.9	35.7	37.4	40.9
<b>Potential Users*</b>								
Main problem	25.9	31.7	29.0	25.8	72.5	73.2	73.5	69.2
Not a main problem	74.1	68.3	71.0	74.2	27.6	26.8	26.5	30.8

Source: Authors using Armenia ILCS 2004 data. \*Users of education are defined as those households with at least one student attending school. Users or health are defined as those households having received any health treatment. Potential users of education are defined as those in the age group between 16 and 29 years old who are enrolled and actual users are those enrolled within this age group (question about subjective perceptions are asked only to individuals older than 16 years). Potential users of health are those individuals older than 16 years who claimed to be sick and actual users were those who received any type of treatment.

**1.3. Overall levels of dissatisfaction with services are high, especially among the poor.** Forty to 45 percent of all household-heads having a user claim not to be satisfied with service delivery in health. This proportion is somewhat lower (roughly 32 percent) for education services. A larger proportion of users (11 to 13 percent) feel that services have deteriorated recently while only 3 to 6 percent feel improvement in the services. The vast majority of users (70 to 75 percent) feel that the quality of the services has remained unchanged. When asked about having reported administrative failures in service delivery, only 2 to 3 (4 to 6) percent of education (health) users claim to have done so. Although this proportion is rather low, 40 to 50 of the households who filed a complaint claim that the administration took action to solve their problem. As expected, richer households (presumably those with access to better/private services) are more likely to report administrative failures in service delivery. Finally, results suggest that poorer households are less likely to be satisfied with services. This result may reflect the

fact that quality and access to health and education services varies considerably between poor and non-poor users as it will be discussed in detail in sections 2 and 3.

**Table 1.3: Rich users are slightly more satisfied with services than poor ones**

	<i>Education</i>				<i>Health</i>			
	Poorest Quintile	Q2	Q4	Richest Quintile	Poorest Quintile	Q2	Q4	Richest Quintile
<b>Satisfied with Services?</b>								
% not satisfied	32.7	31.3	31.8	31.4	43.4	45.1	40.9	40.8
% satisfied	59.1	62.2	62.6	62.6	40.5	39.3	42.5	45.7
% don't know	8.2	6.5	5.6	6.0	16.0	15.6	16.6	13.5
<b>Any change in services during last year?</b>								
% yes, improvement	5.2	4.9	6.5	9.4	3.2	2.8	3.8	6.0
% yes, a deterioration	11.4	9.6	12.6	13.1	13.5	10.3	11.8	10.9
% no change	75.8	79.0	76.1	71.8	69.1	73.0	70.4	68.9
% do not know	7.6	6.5	4.8	5.7	14.3	13.9	14.0	14.3
<b>Did you report any administrative failures?</b>								
% yes	2.2	3.1	2.9	2.6	4.6	5.0	5.3	6.3
% no	97.8	96.9	97.1	97.5	95.4	95.0	94.7	93.7

Source: Authors using Armenia ILCS 2004 data

**1.4. While expenditure on health and education as percent of GDP is rising, levels are still low especially in the health sector.** In 2004, about 1.6 (2.9) percent of GDP (2004) was allocated to the health (education) sector. These allocations are rather low as compared with average health and education expenditures for CIS countries, given Armenia's level of development (see Figure A3 in the appendix). Expenditures on education constitute about 13 percent of overall public expenditure while expenditures on health account for roughly 5 percent. Expenditures in health are mainly allocated to hospitals (53 percent) while expenditures in education are mainly allocated to basic education (73 percent). Tertiary education and polyclinics constitute the two second main sectors of funding in health and education respectively. As illustrated by Figure 1.1, increases in expenditures on education have been mainly directed to basic education while expenditures in secondary and tertiary education have slightly decreased. Rising primary spending has been driven by capital expenditures to rehabilitate primary school stocks (including updating heating infrastructure) and to increase public sector wages. While private and public expenditure on education as a percentage of GDP is rather similar (2.28 vs. 2.77 percent), private expenditure on health is much larger than public expenditure as a percentage of GDP (4.55 vs. 1.32 percent). A more detailed analysis of private expenditure on education and health and poverty is provided in sections 2 and 3.

**Table 1.4: Private expenditure on health is much larger than public expenditure.**

	1995	1997	1999	2001	2003	2004
<b>Education and science</b>						
Public as % of Total Public Budget	10.73	8.90	8.76	11.35	10.46	13.06
Public as % of GDP	2.82	1.92	2.49	2.68	2.35	2.77
Private as % of GDP*	N.A.	N.A.	N.A.	N.A.	N.A.	2.28

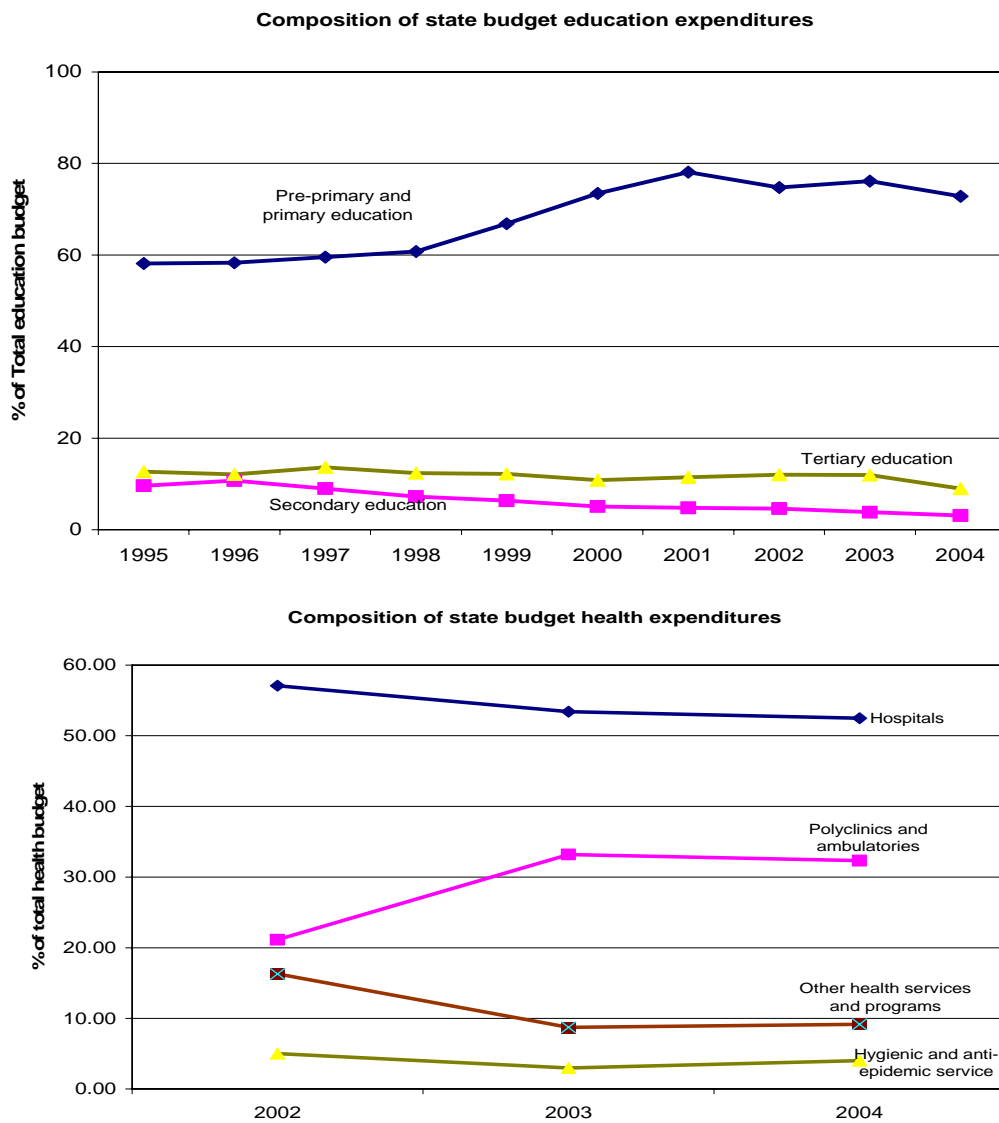
Source: Ministry of Finance, NSS, WB staff calculations, IMF country team. \* Authors using Armenia ILCS 2004 data and WDI dataset.

**Table 1.4 cont.: Private expenditure on health is much larger than public expenditure.**

	1995	1997	1999	2001	2003	2004
<b>Health</b>						
Public as % of Total Public Budget	7.02	5.49	4.86	5.66	5.38	6.23
Public as % of GDP	1.85	1.19	1.38	1.34	1.21	1.32
Private as % of GDP*	N.A.	N.A.	N.A.	N.A.	N.A.	4.55

Source: Ministry of Finance, NSS, WB staff calculations, IMF country team. \* Authors using Armenia ILCS 2004 data and WDI dataset.

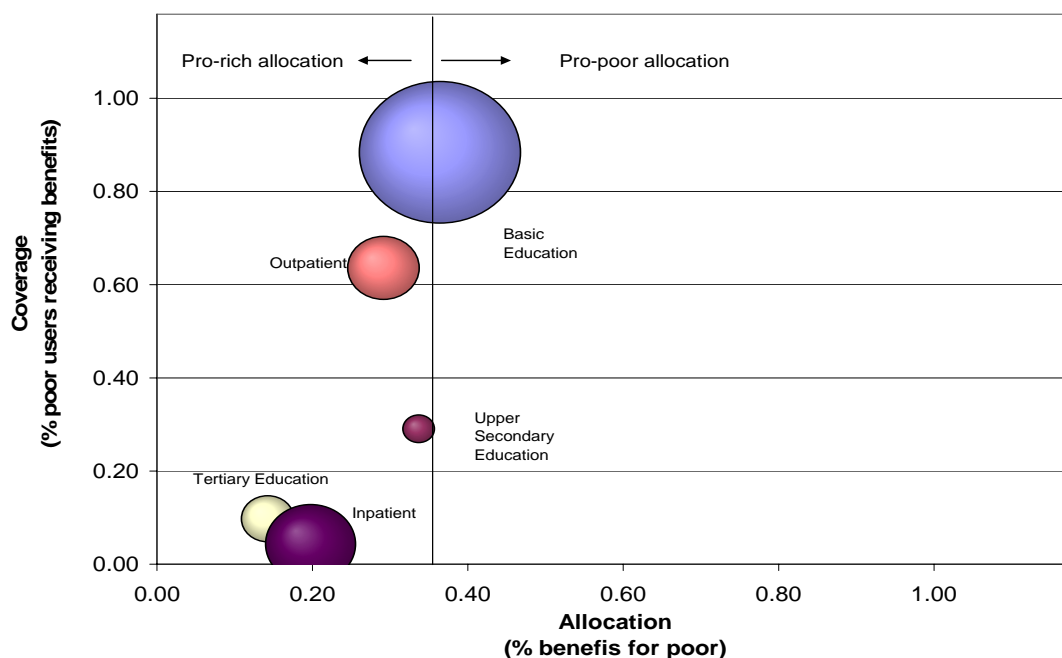
**Figure 1.1: Basic education and hospitals constitute the main expenditure in the education and health sectors.**



Source: Ministry of Finance, NSS, WB staff calculations, IMF country team

**1.5. Expenditure on health and tertiary education is regressive.** We analyze the incidence and allocation of public expenditure on health and education using a three dimensional diagram. The horizontal axis in Figure 1.2 represents allocation (% of total benefits allocated to the poor) and the vertical axis represents coverage among the poor (% of poor users of health and education services receiving the benefits). Education users are defined as those households having at least one member enrolled in public school, while health users are defined as those households with at least one member having received treatment at a public institution (hospital/polyclinic). Although users are defined at the household level, the shares presented in the diagram are population weighted. The size of the bubble is proportional to the total share of per-capita public budget spent in providing the service. Results can be summarized as follow:

**Figure 1.2: Allocation of health and tertiary education expenditures is regressive.**



Source: Authors using Armenia ILCS 2004 data. Transfer sizes from Ministry of Finance, NSS, WB staff calculations, and IMF country team.

Coverage: coverage for basic education is high among poor users (approximately 90 percent). On the contrary, coverage among poor users of upper secondary and tertiary education is rather low. Less than 30 percent of all poor users have students attending upper secondary school and only about 10 percent of all poor users have at least a member enrolled in tertiary education. With respect to health, indicators in Figure 1.2 suggest that only 60 percent of the poor who use health services benefit from public outpatient services and less than 5 percent (a very low share) of all poor users benefit from public inpatient services.

Allocation: Since the poor constitute about 34 percent of the overall population, in order to achieve equitable allocation, an equal share of resources must reach the poor. If the poor receive resources in a larger proportion than their population share, the

allocation is considered pro-poor (progressive). If the opposite occurs, the allocation is considered pro-rich (regressive). According to Figure 1.2, allocation of education resources for basic and upper secondary education is very equitable. On the contrary, allocation of resources for tertiary education is heavily captured by the non-poor (the poor receive less than 18 percent of the overall transfers for tertiary education). Health services are also allocated regressively. Only about 31 (20) percent of the total transfers for health outpatient (inpatient) services reach the poor.

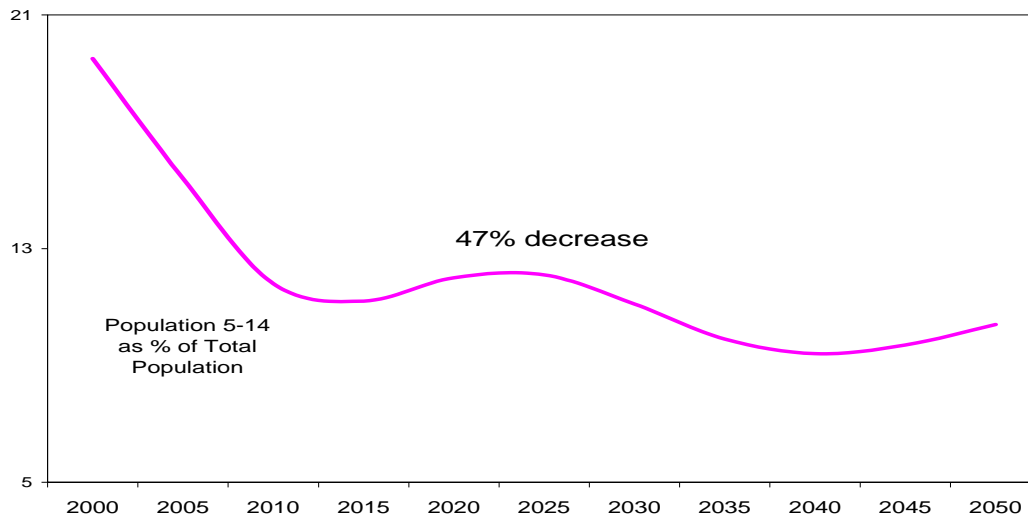
## 2. INEQUITIES AND CONSTRAINTS IN EDUCATION

*Analysis of poverty in Armenia emphasizes the welfare gains from education: non-poor households have higher levels of educational attainment than poor ones (especially in post-primary education), and welfare gains have been associated with higher educational attainment. Despite rather equitable access, we find that there are substantial inequities in the quality of education between richer and poorer households and between urban and rural areas. Richer households have more access to better education, training, and complementary school programs than poor households do. Better education performance, higher motivation to learn, and proper access to learning tools at home (such as computers) are associated with better socio-economic characteristics. Lack of proper infrastructure and resources at the school level constitutes a more relevant constraint within the compulsory education system than lack of human resources. Affordability is a significant constraint, pushing students to drop-out rapidly from the education system after having completed upper secondary education. This section is structured as follows: First, it analyses inequities in access (enrollment) between rich and poor households; second, it provides a description of the main constraints of the education system; and third, it analyzes inequities in quality between rich and poor students in relation to formal and informal (out-of-school) education.*

### ENROLLMENT

**2.1. Demand for basic education services is projected to decrease quickly in the near future.** Due partly to migration and to a decline in fertility rates, total population in Armenia has been decreasing in recent years and the trend is expected to continue in the future. Estimates indicate that between 2005 and 2050 overall population in Armenia will contract by 24 percent. This trend, as expected, has an impact on the future demand for education services. In particular, demand for basic education is expected to shrink rapidly. Estimates suggest that the total population between 5 and 14 years of age is expected to decrease by a yearly rate of 0.83 percent. This implies a 47 percent expected drop in the number of kids pursuing basic education between 2005 and 2050.

**Figure 2.1: Population in basic school-age is shrinking rapidly in Armenia.**

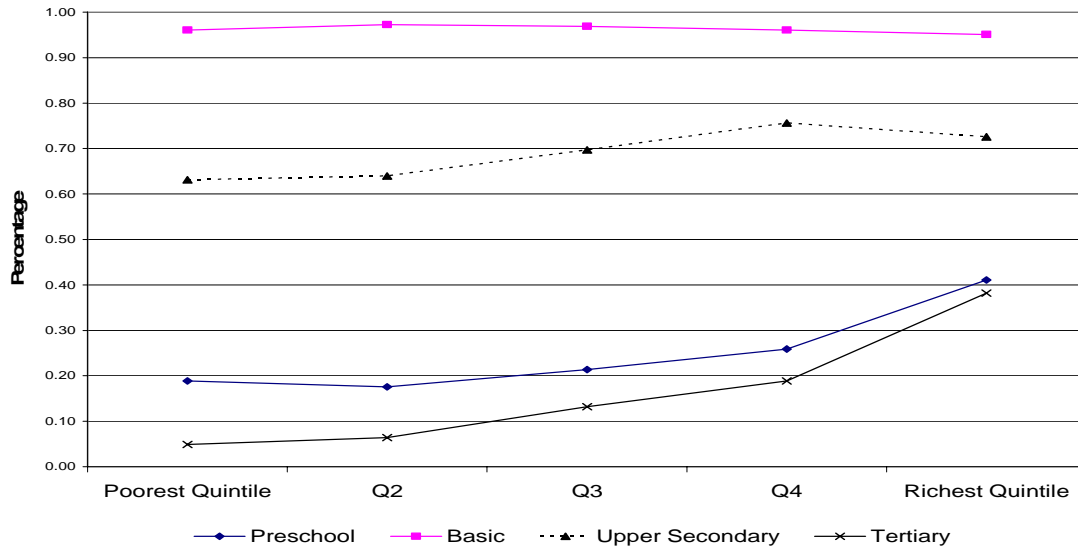


Source: UN population database.

**2.2. Richer households are much more likely to be enrolled in preschool, secondary, and tertiary education as compared to poorer households.** Despite tight budget constraints, Armenia has been able to maintain good levels of participation in basic education. While public resources on education fell from around 8 percent of GDP in the early 1990s to an average of 2.9 percent in the 2000s, gross enrollment ratios have declined only slightly while completion rates have been steadily improving. Estimates of gross and net enrollment rates presented here are produced using the 2004 ILCS data. As such, these indicators serve mainly to illustrate differences in performance between students from poor and non-poor households.<sup>1</sup> As illustrated in Figure 2.2, net enrollment ratios in basic education are high (95 percent) and don't differ much between students across consumption quintiles. Enrollment rates in upper secondary are much lower (about 69 percent nationally) and differences between poorer and richer households become substantial (there is a 10 percentage points difference in net enrollment rates between students in the top and bottom quintiles). Net enrollment rates in preschool and tertiary education are low (16 and 25 percent respectively) and gaps between students from the richest and the poorest quintiles within these education levels are quite substantial. While enrollment rates in preschool (tertiary) education are about 41 (38) percent among students in the richest quintile, they are only 19 (5) percent among students from the poorest quintile.

<sup>1</sup> The level of the indicators presented here may present a slight variation from those provided officially by government. Survey estimates of net and gross enrollment rates by quintile, gender, and strata are provided in Table A1 in the appendix.

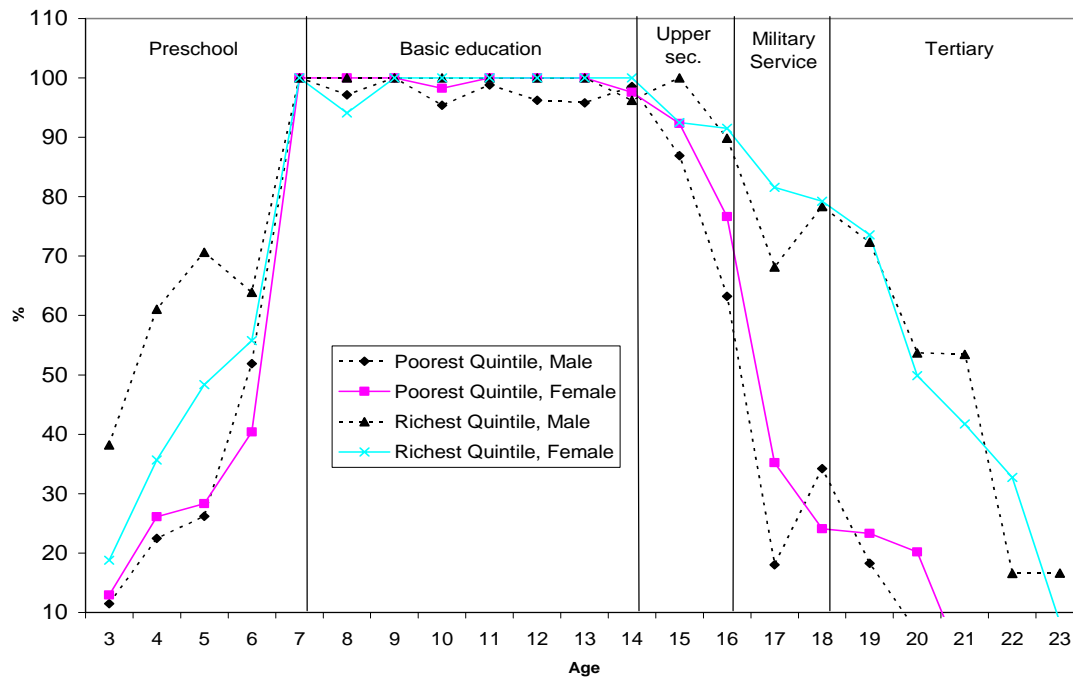
**Figure 2.2: Inequities in net enrollment in preschool and college are significant between richer and poorer households.**



Source: Authors using Armenia ILCS 2004 data

**2.3. Drop-outs after compulsory (basic) education are substantial, especially among poor students.** Figure 2.3 illustrates overall enrollment rates by age and gender in Armenia. As illustrated by the figure, differences in early schooling between richest and poorest households are substantial up to the age of 6 years. Results suggest that boys below 6 in the upper quintile are more likely to be enrolled than girls in the same socio-economic group. There is a drop in enrollment rates for boys in the upper quintile between the ages of 5 and 6, suggesting that they are likely to start basic education earlier than children from other socio-economic groups. Between the ages of seven and 14 enrollment rates by age are similar between boys and girls from different socio-economic conditions. At the age of 14 (presumably at the end of basic education) there is a sharp drop in enrollment ratios, especially among the poor. An even steeper drop in enrollment occurs at the age of 16, presumably once students have finished upper secondary education. As expected, such a drop is steeper for kids in the poorest quintiles and particularly among males since they must join the military at age 17. Note that every year after 14 years of age, differences in enrollment ratios between kids in the poorest and richest quintiles become wider. As expected, after military service some boys return to school and male enrollment rates pick up slightly and decrease thereafter. Figure 2.3 also suggests that after 14 years of age, females from the poorest quintiles are associated with slightly higher enrollment rates than boys from the same economic group (regression analysis by level of consumption confirm that differences in upper secondary and tertiary enrollment rates by gender are significant – these results are available upon request).

**Figure 2.3: Poor students drop-out quickly after completing basic education.**



Source: Authors using Armenia ILCS 2004 data

**2.4. Availability of informal care, the level of education of the spouse, and geographical location are important determinants of preschool enrollment.** Results of a probit regression model (see Table A2 in the appendix) suggest that covariates in relation to access to informal care, education of the spouse, and geographical location constitute more important determinants of preschool enrollment than socio-economic level. Regression results can be summarized as follows:

Informal child care and marital status: Children below the age of 6 having a family member who can take care of them when the child’s mother is not home are 49 percent less likely to be enrolled in preschool than kids who do not have this possibility. Of course, this result reflects an endogenous relationship between choice and availability of informal services as well as preferences of raising children at home. The enrollment probability drops only by six to seven percent if a neighbor or a relative not living in the household are the contingent care takers. This result is not surprising given that mothers who cannot cope informally in case of absence (particularly those who work and who are single) must hire private care for their children. Kids under six living in a household whose head is single are 100 percent more likely to be enrolled than children having a married head.

Level of education of the spouse: While the level of education and employment characteristics of the head seem not to be very influential determinants of preschool enrollment, we find that households having a spouse with at least upper secondary education are 100 percent more likely to have a child attending preschool than mothers with basic or no education.

Socio-economic condition and geographical location: controlling for other characteristics, our estimates suggest that socio-economic conditions have only a limited impact in the likelihood of kids to attend preschool. Estimates suggest that kids in the poorest quintile are barely 5 percent less likely to be enrolled than kids from the richest quintile. We find that kids in rural areas are less likely to be enrolled than the kids in Yerevan. Kids in Aragatsotn, Ararat, Armavir, Gegharkunik, Lori, Kotayk, and Shirak are 3 to 7 percent less likely to be enrolled than kids from the Tavush region (the omitted category).

## **2.5. Socio-economic conditions, remittances, and employment opportunities have a significant influence on the probability of kids being enrolled in tertiary education.**

Other factors related to the characteristics of the student's household play a less important role. Regression results for the determinants of tertiary enrollment in Armenia (see Table A2 in the annex) can be summarized as follows:

Individual characteristics: After the age of 16, the probability that a student stays in college/university falls by 16 percent per year. Individuals between 16 and 28 years, who have a job, are 13 percent less likely to attend tertiary education.

Characteristic of head and spouse: individuals living in a household having a head with tertiary education are only 7.5 percent more likely to be in college/university as compared to individuals living in households having a head having with primary school or no education. Individuals in households with a working (disabled) spouse have a 5.7 (4.7) percent higher (lower) probability of being enrolled.

Remittances, socio-economic conditions, and geographical location: Controlling for socio-economic level, individuals living in households receiving remittances (domestic and international) are 13 to 42 percent more likely to be in college/university. It may be that parents invest these private transfers in higher education for their kids but endogeneity cannot be ruled out (it may also be the effect of better-off households getting more remittances on average). Moreover, kids from the richest quintile are 10 to 12 percent more likely to be in college/university than kids in the bottom quintiles. Finally, we find that individuals living in Yerevan are 5 to 8 percent more likely to be enrolled in tertiary education than individuals living in other urban/rural areas.

## CONSTRAINTS IN EDUCATION

**2.6. Availability of mothers at home constitutes the main reason why children under 6 are not attending preschools.** Difficulty in access to and affordability of preschool services are less recurrent problems affecting mainly poor households in rural areas. As presented in Table 2.1, about 40 percent of the parents of children not attending preschool argue that having a non-working mother at home is the main reason driving their decision to not have their kids attend preschool. Affordability seems to be a less important reason, affecting less than 20 percent of households in the bottom quintile. Somehow, contrary to what is expected, access (proxied by the percentage of parents claiming that their kids do not go to preschool because facilities are not operating) seems to be a more recurrent constraint among richer households and in rural areas. In particular, while about 80 percent of all households in Yerevan and other urban areas have a preschool facility less than 1 kilometer away from their residence (in all quintiles), in rural areas this proportion is less than 50 percent (37 percent for the poorest households). As a matter of fact, more than 30 percent of all households in rural areas claim to live at least 6 km away from the closest preschool facility.

**Table 2.1: Affordability and mother availability at home are the two main reasons for children not to attend preschool.**

	<i>Poorest Quintile</i>	<i>Q2</i>	<i>Q3</i>	<i>Q4</i>	<i>Richest Quintile</i>	<i>All</i>
	Why not attending Preschool?					
% too expensive	18.4	16.4	7.9	5.5	4.0	12.3
% kindergarten is closed	14.1	23.4	20.5	17.9	25.3	19.6
% mother does not work	42.0	42.7	38.4	44.2	37.1	41.4
% already at school	10.8	4.7	10.1	9.9	14.9	9.2
% other	13.6	12.5	21.2	19.0	11.1	15.4
% N.A	1.2	0.3	1.9	3.5	7.6	2.1
	Distance to closest Preschool					
Yerevan						
0-1 km	80.3	80.3	84.4	77.7	82.2	80.9
1-3 kms	16.1	16.4	14.0	19.6	14.2	16.1
4-5 kms	2.4	2.0	1.0	2.7	2.6	2.2
>6 kms	1.2	1.3	0.5	0.0	1.0	0.8
Other Urban						
0-1 km	81.6	75.7	75.5	79.3	79.5	78.4
1-3 kms	17.4	22.3	23.3	19.9	18.4	20.3
4-5 kms	1.0	1.6	1.0	0.6	0.9	1.0
>6 kms	0.0	0.5	0.2	0.2	1.1	0.4
Rural Areas						
0-1 km	37.1	43.8	50.5	48.5	48.1	45.4
1-3 kms	16.9	17.3	12.2	17.8	15.7	16.0
4-5 kms	4.2	2.9	3.2	3.6	7.0	4.1
>6 kms	41.7	36.0	34.1	30.1	29.3	34.5

Source: Authors using Armenia ILCS 2004 data

**2.7. Most individuals between 16 and 20 years consider it sufficient to have finished basic and secondary education.** This result could be linked to low returns to education and high opportunity costs of tertiary education. Surprisingly, affordability is only mentioned as a constraint to tertiary enrollment by less than 5 percent of the individuals. As expected, family reasons (such as marriage and pregnancy) are a more important factor keeping poorer girls out of college (about 5 percent). While lack of interest is rarely cited as a reason for not being in college (about 3 percent), it is mainly prevalent among males in the poorest quintiles. A high proportion of individuals cite the sufficiency of basic and secondary education (even within the highest quintiles) as the main reason for not being in college. In particular, basic regression analysis on the logarithms of wage rates (hourly wages) among individuals between 16 and 65 years working as wage earners (see results in Table A3 in the appendix) suggests that returns to tertiary education, while statistically significant, are very low. Estimates suggest that controlling for other observable characteristics, having completed some college only increases expected wages of individuals by about 50 percent as compared to workers with at most basic education. For instance, this result implies that while a non-educated worker is expected to earn an average of say 10 dollars/hour, an educated worker, who has invested 15 or more years of education, is expected to earn only 15 dollars/hour.

**Table 2.2: Less than 5 percent of all dropouts between 16 and 20 years of age claim that lack of affordability was their main reason for not entering college/university**

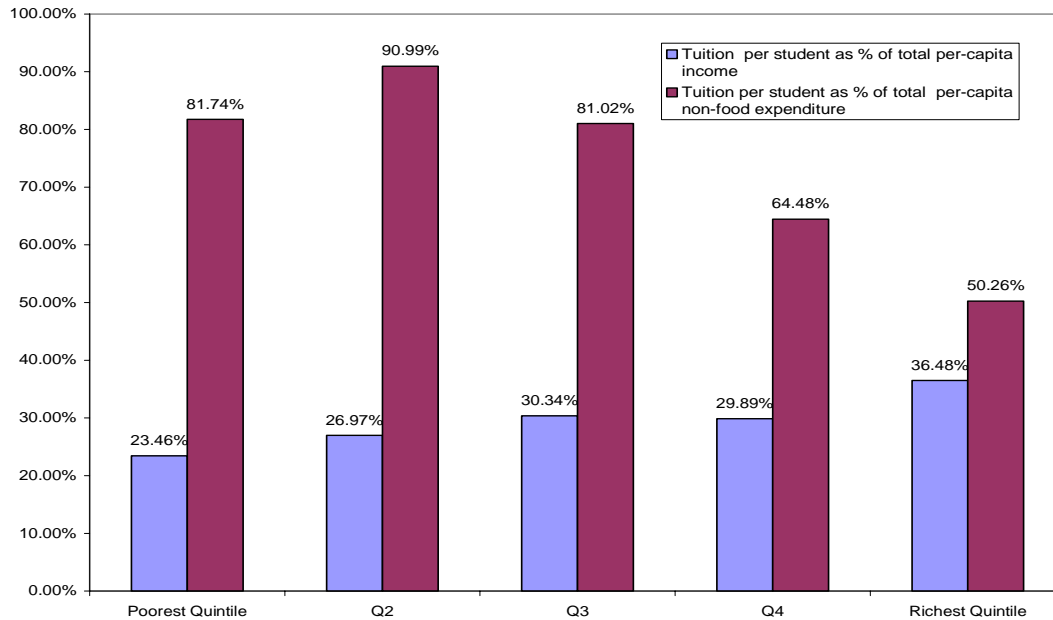
	<i>Poorest Quintile</i>	<i>Q2</i>	<i>Q3</i>	<i>Q4</i>	<i>Richest Quintile</i>	<i>All</i>
	Why not attending School					
<b>Males</b>						
% Illness/temporary abs	3.9	5.9	4.4	0.4	6.7	4.2
% too expensive	2.8	2.4	3.5	0.0	3.2	2.3
% don't want to study	6.4	1.6	1.0	2.5	5.9	3.3
% family reasons	3.0	3.8	1.2	0.8	2.9	2.5
% finished main school	36.9	19.5	15.4	24.8	8.3	23.3
% finished sec. school	42.8	63.1	71.8	67.8	71.7	61.0
% other	4.3	3.7	2.8	3.7	1.3	3.5
<b>Females</b>						
% Illness/temporary abs	0.5	1.9	1.3	1.0	2.7	1.3
% too expensive	6.9	2.6	6.1	2.3	8.8	5.0
% don't want to study	4.9	0.7	1.0	1.4	0.0	1.9
% family reasons	8.5	6.9	2.2	1.0	1.4	5.2
% finished main school	11.2	20.3	8.0	7.1	14.6	13.2
% finished sec. school	65.6	67.2	78.9	84.3	66.9	71.0
% other	2.5	0.4	2.5	3.1	5.7	2.3

Source: Authors using Armenia ILCS 2004 data

**2.8. Tuitions for tertiary education are not affordable for poor households with potential college students.** As suggested by Figure 2.4, college tuitions are very difficult to afford by the average poor household. In particular, we find that having a kid enrolled in college would consume between 81 and 92 percent of the overall yearly non-food expenditure of households in the bottom 3 quintiles. Even among richer households, paying the average college tuition represents a heavy burden (about 50 to 65 percent of

their annual non-food expenditure). As expected, since richer households use a lower share of their income to buy food and because tuition levels are generally more expensive for the non-poor, households in richer quintiles invest a larger share of their income to pay for college tuitions as compared to poorer households.

**Figure 2.4: College tuitions account for about 80 to 90 percent of non-food expenditure among households in the bottom 3 quintiles.**



Source: Authors using Armenia ILCS 2004 data. This figure calculates the average cost per tuition at every quintile and divides it by the average income (and non food expenditure) of those households having a potential user of tertiary education (a member between 16 and 29 years) within the household.

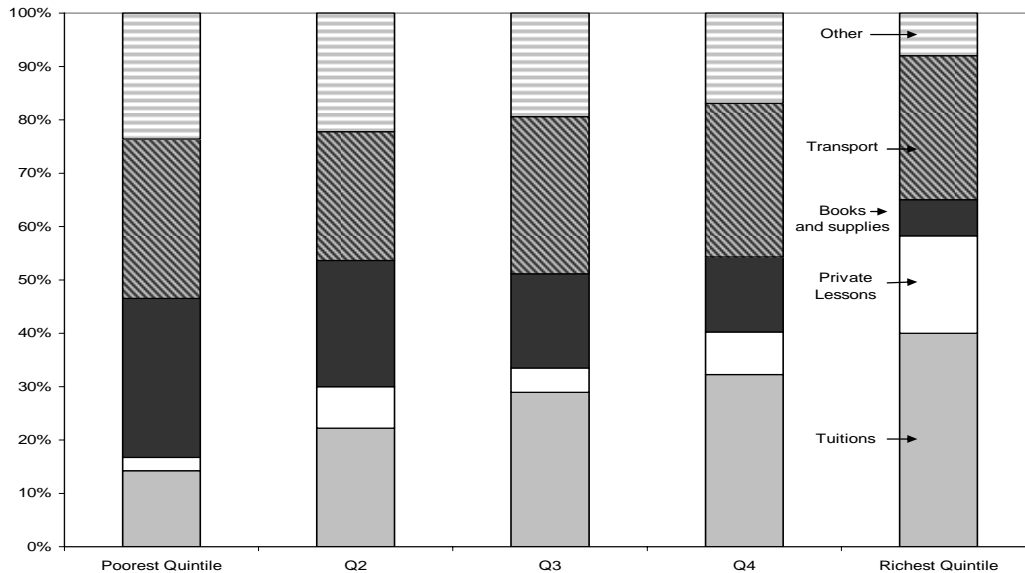
**2.9. Total costs per student in upper secondary (tuition plus non tuition) constitute a significant investment for poor households.** As expected, since Armenia’s compulsory education is heavily subsidized by the state, tuitions for basic and secondary don’t constitute an important expenditure on education. Non-tuition costs, on the other hand, may constitute an economic burden for the poor and especially for households having students in upper secondary. While results suggest that basic and upper secondary education is easily affordable for households in the upper quintiles (representing only 11 percent of their overall yearly non-food consumption and 6 to 8 percent of their overall yearly income) it constitutes a significant investment for households in the poorest quintiles (20 to 47 percent of their overall yearly non-food expenditure and 6 to 13 percent of their overall yearly income). As illustrated by Figure 2.5, transport and supplies constitute more than half of all expenditures in education made by households in the poorest quintiles. As expected, richer households invest more resources paying for tuitions (mainly for college) and private lessons. Surprisingly, transportation costs to school represent about 30 percent of overall education costs at every quintile.

**Table 2.3: Lack of affordability is an issue even among users of basic and upper-secondary education.**

	<i>Poorest Quintile</i>	<i>Q2</i>	<i>Q3</i>	<i>Q4</i>	<i>Richest Quintile</i>
Cost per student as % of total per-capita income					
Basic	6.3%	5.7%	5.7%	6.4%	8.2%
Upper Secondary	13.1%	13.1%	14.7%	15.3%	36.4%
Cost per student as % of total non-food per-capita expenditure					
Basic	21.7%	18.2%	15.2%	13.2%	11.0%
Upper Secondary	46.6%	39.0%	39.8%	32.1%	45.7%
Tuition per student as % of total per-capita income					
Vocational	0.0%	0.0%	0.0%	0.1%	0.1%
Upper Secondary	1.1%	1.4%	2.4%	2.8%	5.8%
Tuition per student as % of total per-capita non-food expenditure					
Vocational	0.1%	0.1%	0.0%	0.1%	0.2%
Upper Secondary	4.0%	4.1%	6.4%	5.9%	7.3%

Source: Authors using Armenia ILCS 2004 data. We calculate the average cost per student at every quintile (at every level) and divide it by the average income (and non food expenditure) of those households having a potential user of tertiary education (a member between 16 and 29 years) within the household.

**Figure 2.5: Non-tuition items (mainly transport and supplies) constitute a large share of total expenditures on education, especially among the poor.**

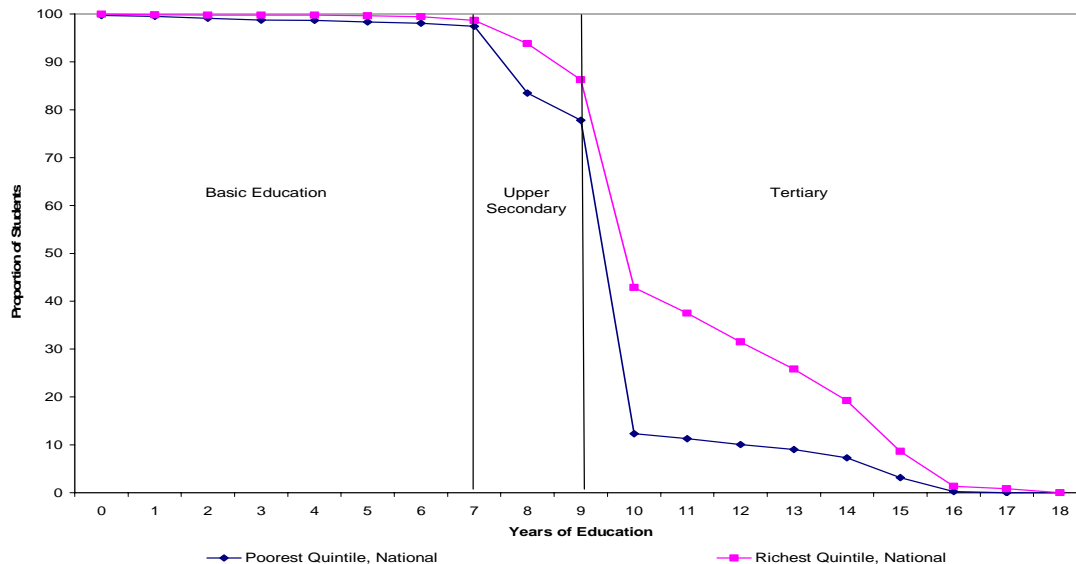


Source: Authors using Armenia ILCS 2004 data. This figure captures total expenditures per item as a share of total education expenditures for all households having a user of education (all levels of education included).

**2.10. Affordability is strongly associated with completion rates by level.** As suggested by Figure 2.6, there is a strong correlation between affordability and completion rates by level. In particular, we see that the completion rates for upper-secondary are significantly lower than for basic education. As expected, drops in completion rates are steeper among the poor. Drops in completion rates for tertiary education are huge and prevalent even among households from the richest quintiles (as

mentioned before, college is a significant investment even for the rich). Not surprisingly, drops in completion rates for tertiary education are twice as large among the individuals from poorest households as compared to the individuals in the richest quintiles.

**Figure 2.6: Completion rates by level in Armenia are associated with affordability [age cohort between 16 and 29 years old]**



Source: Authors using Armenia ILCS 2004 data.

## QUALITY OF EDUCATION

**2.11. We assess indicators on education quality in Armenia using data from the 2003 TIMMS (Trends in International Mathematics and Science Study) dataset.** The dataset provides data on mathematics and science achievement and includes information related to students, professors, and schools in fourth grade (primary school) and eight grade (secondary school). Three areas for analysis have been identified in this chapter:

- Students: analysis of indicators related to self-motivation to learn science, self-confidence, usage of computers, and time spent doing homework.
- Professors: analysis of indicators related to teachers’ qualifications (training and experience) and their satisfaction with the job.
- Schools: analysis of indicators related to a school’s availability of resources for science and mathematics instruction and for ensuring safety.

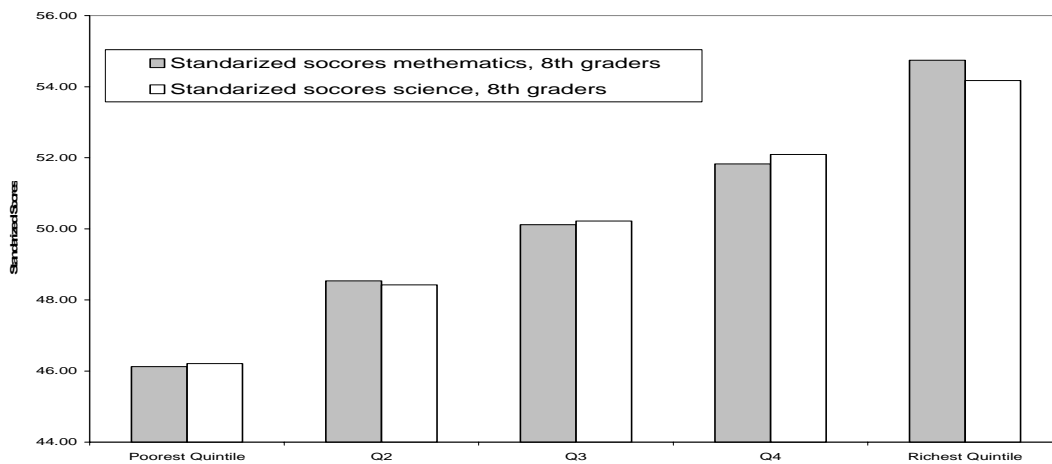
Furthermore, we have made an analysis analysis of test performance of poor vs. non-poor and urban vs. rural students.

**2.12. Students included in the TIMMS in Armenia may not be representative of the overall population.** Basic statistics on the education of the parents corresponding to the 8<sup>th</sup> graders included in the TIMMS suggests that the sample is not representative of the overall population. In particular the education level of the parents of the students included in the TIMMS is higher than the one of Armenian 8<sup>th</sup> graders’ parents. Indeed, while we find that only 15 percent of all students in basic and upper secondary (ILCS 2004) are

associated with heads having completed some college/university education (presumably their fathers), the equivalent proportion is about 50 percent among 8<sup>th</sup> graders included in TIMMS. Since having a head with tertiary education in Armenia is associated with a lower incidence of poverty, our guess is that students in TIMMS must belong to the middle-upper consumption quintiles. Results presented here accounting for inequities in quality between the poorest and richest students are thus likely to be underrepresented.

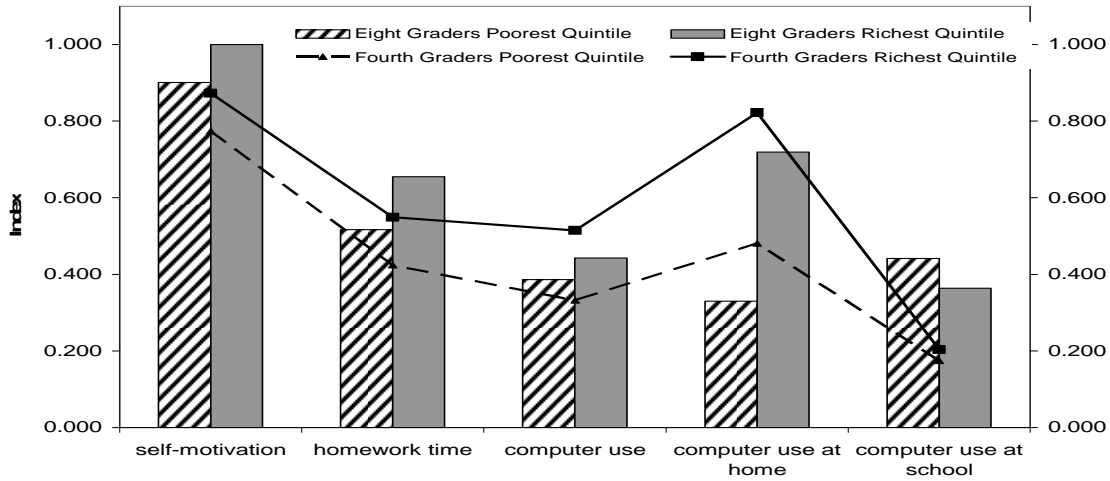
**2.14. Student performance is highly associated with socio-economic conditions and is much higher in urban than in rural areas.** Learning performance, as proxied by standardized test scores in science and mathematics, is higher among richer students. In fact, higher student socio-economic levels are clearly associated with better outcomes as presented by Figure 2.7A. Richer students are more likely to have better attitudes towards learning, spend more time studying at home, and have more access to computers. Overall, there is still low computer usage among students. As presented in Figure 2.7B, students in the richest quintiles (both 4<sup>th</sup> and 8<sup>th</sup> graders) have higher indices of self-motivation and claim to spend more time doing homework than children from the poorest quintile. However, differences are not large. While rich students have twice as much access to computers at home than poor students, students from the poorest quintile (especially 8<sup>th</sup> graders) claim to use computers at school slightly more than richer students. The overall index of computer usage (a weighted average of using computer at home and at school) does not differ much between the richest and poorest students and is generally low (only 4 of every 10 students in Armenia use a computer). Differences in self-motivation and computer usage are mild between urban and rural areas. Urban areas, while associated with lower levels of self-motivation among 8<sup>th</sup> graders, are also associated with slightly higher rates of computer usage.

**Figure 2.7A: Education indicators are much higher among student in the richest quintile.**



Source: Authors using Armenia TIMMS 2003 data

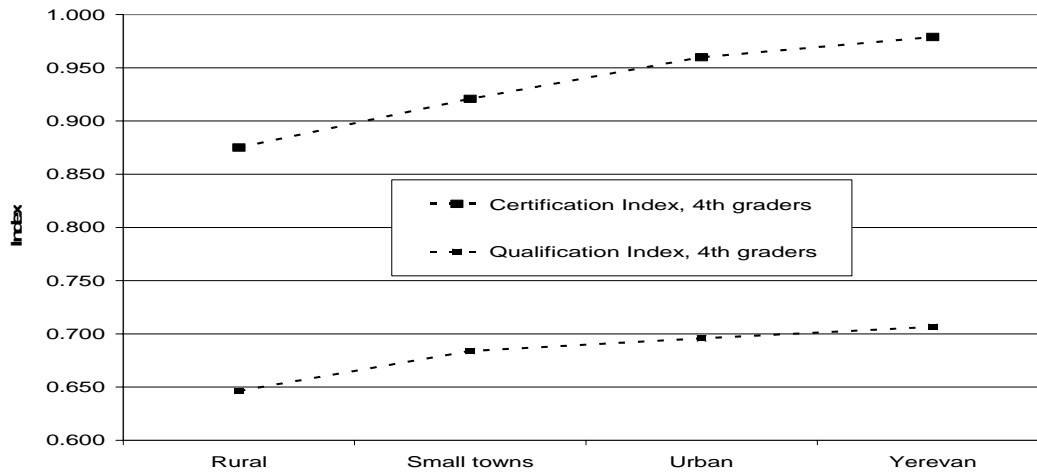
**Figure 2.7B: Richer students are more likely to have higher motivation and better tools for learning.**



Source: Authors using Armenia TIMMS 2003 data. For a detailed explanation on the construction of each particular index, please refer to Tables A4 to A9 in the appendix.

**2.15. Fourth-grade teachers are substantially better qualified in urban than in rural areas; this pattern does not hold among eighth-grade teachers.** Fourth-grade teachers in urban areas display higher indices of qualification and certification than teachers in rural areas and small towns, especially in Yerevan. Eighth-grade teachers in urban areas (Yerevan not included) seem to be better qualified than in rural areas and small towns. However, contrary to what is seen among fourth-grade teachers, indices for teacher qualification and certification in Yerevan are lower than in other urban areas. In general, teachers' certification rates are higher than 85 percent. The qualification index between fourth and eighth-grade teachers is rather similar across areas except in Yerevan where fourth-grade teachers are associated with higher qualifications than eight-grade teachers.

**Figure 2.8: Teachers in urban areas are better qualified than in rural areas**



Source: Authors using Armenia TIMMS 2003 data. For a detailed explanation on the construction of each particular index, please refer to Tables A10 to A12 in the appendix.

**2.16. Teachers in Armenia have extensive teaching experience and claim to be moderately satisfied with their jobs.** The average years of teaching experience among teachers in our sample is 16 to 20 years. This is undoubtedly a very high average, suggesting that teachers tend to remain in the job for a substantial time (which makes teachers quite experienced in their fields). According to Alam et al. (2005), lack of incentives such as low salaries and stagnated employment opportunities have led to rapid aging of the teaching force in the ECA (especially in the middle income CIS countries). The authors claim that while the aging of the teaching force does not necessarily signal a decline in teaching quality, the lack of funding (and re-training) in most countries may lead to a teaching force that provides services with out-of-date pedagogical tools and methods. Finally, results from the TIMSS suggest that teacher job satisfaction is at 70 percent for 4<sup>th</sup> grade teachers and 66 percent for 8<sup>th</sup> grade teachers.

**2.17. School principals are generally more concerned about lack of physical resources than about lack of human resources.** Substantial investment in heating/lighting and computers is required. The index of physical resource availability is generally low (0.5 to 0.6) and doesn't differ substantially between urban and rural areas (although small towns are associated with slightly higher indices than average). The index for human resources presents slightly higher levels (0.7 to 0.8), especially in urban areas and among fourth-grade schools. Half of all schools lack proper heating, light, and computers. This result holds at every stratum and for both fourth-grade and eighth-grade schools. Lack of proper heating and lighting equipment is especially relevant in the winter time and negatively affects attendance and learning. Poor facilities are associated with low teaching motivation and higher rates of student and teacher absenteeism. Evidence suggests that the effect of infrastructure on education outcomes is particularly strong for developing and transitional countries, such as Armenia, where settings are harsh in terms of climate and demanding geographical conditions. According to Alam et al. (2005), the access to and affordability of basic utility services in the ECA region has deteriorated since the transition. Despite great efforts to expand gas networks for supplying heating, a significant fraction of the population still uses so-called dirty-fuels (such as wood and coal) for heating. Armenian schools are difficult to keep warm during the winter because Soviet-era buildings were not designed to conserve energy. Furthermore, the availability of learning equipment, such computers and internet connections, is also quite low.

**2.18. Not surprisingly, levels of school safety are higher in rural than in urban areas.** Although overall safety-at-school indices are high, they are, not surprisingly, generally lower in urban areas and especially in Yerevan. This result is not surprising since urban areas (and big cities in particular) have a higher incidence of crime, gangs, etc. In any case, school principals do not feel that the lack of safety is a recurrent problem within schools. As expected, general levels of safety in fourth-grade schools are higher than in eighth-grade schools.

**Figure 2.9: School-principals claim that safety levels are acceptable.**



Source: Authors using Armenia TIMMS 2004 data. For a detailed explanation on the construction of each particular index, please refer to Tables A13 to A15 in the appendix. Results for 4<sup>th</sup> graders are similar and available upon request.

### OUT OF SCHOOL PROGRAMS

**2.19. Private lessons are an exclusive privilege of the rich.** While one out of every five students, in upper secondary (20 percent) in rich households, receives private lessons to prepare for university entrance, less than 2 percent of all students in the poorest quintiles have the opportunity to do so. As presented in Table 2.5, students in the poorest quintiles are very unlikely to have access to private classes which may increase their academic performance and/or make them more competitive in the pursuit of college-level education. Not surprisingly, since access to private lessons is likely to be expensive, the incidence of students taking private lessons is strongly associated with their socio-economic level. Most students who have access to complementary education programs take classes in the areas of mathematics (37 percent) and languages (Armenian, 28 percent; and foreign languages, 21 percent).

**Table 2.5.: Private lessons help prepare students for college/university**

	<i>Poorest Quintile</i>		<i>Middle Quintile</i>		<i>Richest Quintile</i>	
	Student receives private lessons?					
	% yes	If yes, % to enter University	% yes	If yes, % to enter University	% yes	If yes, % to enter University
Girls	2.1%	100.0%	9.7%	55.3%	25.7%	80.4%
Boys	0.9%	100.0%	4.4%	0.0%	20.6%	70.1%

Source: Authors using Armenia ILCS 2004 data.

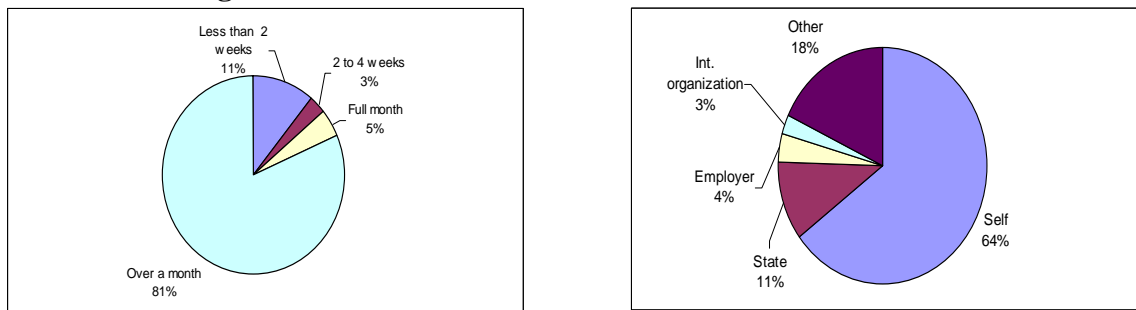
**2.20. Only a minority of the individuals (mainly the rich ones) between 16 and 29 years of age who are not in college have access to out-of-school (training) programs.** Less than 4 percent of all individuals between 16 and 29 years of age receive any type of training. This proportion is very low especially among individuals in the bottom quintiles. Data suggests that most training programs are paid for out-of-pocket by individuals and are likely to last over a month.

**Table 2.6: Training programs in Armenia are very limited and mainly serve the rich.**

	Poorest Quintile	Q2	Q3	Q4	Richest Quintile
Receiving Training if age between 16 and 29 years					
% yes, national	1.00%	0.60%	1.20%	1.10%	4.00%
% yes, Yerevan	1.50%	1.30%	1.80%	2.70%	5.50%
% yes, other urban	1.30%	0.70%	0.30%	0.70%	3.30%
% yes, rural	0.00%	0.70%	0.60%	1.10%	2.40%

Source: Authors using Armenia ILCS 2004 data.

**Figure 2.10: Training programs are mainly self-sponsored and last more than one month on average.**



Source: Authors using Armenia ILCS 2004 data.

### 3. INEQUITIES AND CONSTRAINTS IN HEALTH

*Although health indicators in Armenia are better relative to other Former Soviet Union (FSU) and countries from the Commonwealth of Independent States (CIS), healthcare utilization is generally low, particularly in rural areas and among individuals in the poorest quintiles. Limited public expenditure on health and affordability constraints is causing poor-sick individuals to seek informal care or to not seek care at all. This chapter analyzes constraints to utilization of health services (mainly issues in relation to affordability and under-table-payments) that adversely affect utilization of services by the poor. The section also analyzes whether or not public and private mitigation mechanisms, such as public insurance and remittances, increase utilization. We do not find evidence suggesting that remittances affect utilization. Access to social assistance for health does not seem to increase utilization either because benefits are too small given the high costs of treatment and medicines. While social assistance is generally well targeted, the share of poor households at risk who do not have access to insurance is substantial. This section is structured as follows: first, we provide an overview of the*

health sector in Armenia; second, we analyze inequities in utilization (inpatient and outpatient) between poor and non-poor users and how private and public mechanisms affect utilization among the poor; finally, we analyze affordability constraints to service utilization.

## SECTOR CONTEXT

**3.1. Armenia inherited an oversized and overstaffed healthcare system that is becoming less and less utilized.** Official figures for 1991 show that there were 853 hospital beds and 370 physicians per 100,000 individuals. These numbers were above the average for the European Union but below the average for the CIS. After the 1990s, Armenia began to bring down excess capacity by reducing the number of hospitals (especially in rural areas), hospital beds (mainly in urban areas), and physicians. In relative terms, between 1991 and 2003, the number of hospital beds decreased by 50 percent and the number of physicians by 11 percent.

**Table 3.1: Healthcare resources and utilization have been decreasing in the 1990s**

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
<b>Official estimates</b>												
Hospital beds per 100,000	837	821	777	764	713	675	666	620	547	425	435	442
Physicians per 100,000	360	335	312	304	311	316	316	305	299	286	341	342
Inpatient admissions per 100	9.6	8.2	7.6	7.5	7.5	6.7	6.2	5.8	5.1	4.9	6.2	6.9
Outpatient contacts per person per year	5.3	4.8	4.4	4.2	4.6	3.2	2.4	2.3	2.1	1.8	2.1	2.1

Source: Authors (2004) using the Health for All Database, WHO/Europe, 2005.

**3.2. Health outcomes in Armenia are similar to or even better than those of most Former Soviet Union (FSU) countries with a similar income level.** On the health side, Armenia has achieved significant progress in reducing infant and maternal mortality although the incidence of TB remains on the rise (see Figure A2 in the appendix). Life expectancy in Armenia is high while mortality and standardized death rates are low. Armenia enjoys a life expectancy of 70 years for males and 76 years for females. Infant mortality rates are 12 per 1,000 live births, while the maternal mortality ratio is 22 per 100,000 live births. Vaccination rates are also satisfactory and close to 94 percent (Measles and DPT). These indicators are similar to the average rates for Europe and are clearly better than those of Armenia's neighboring countries (Georgia and Azerbaijan) and of Central Asia. According to WHO (2001) indicators, mortality indicators in Armenia are below the European average. Premature mortality (0-64 years) in Armenia fell steadily between 1994 and 2001 mainly due to a decline in male mortality. Smoking and circulatory system related diseases constitute the major causes of mortality in Armenia. Premature mortality occurred mainly as a consequence of diseases of the circulatory system (accounting for 58 percent of all cases in 2003) followed by malignant neoplasms (15 percent).

**Table 3.2: Armenia's health indicators meet European standards 2003**

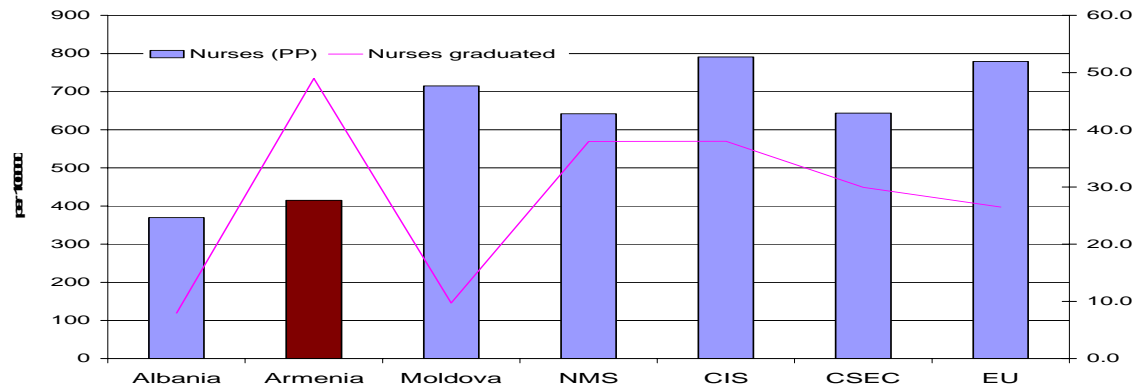
<i>Health Status Comparisons, 2003</i>	Armenia	Europe	NMS	CIS	CSEC
Life expectancy at birth, in years	73.1	74.1	74.3	66.9	68.9
Life expectancy at birth, in years, male	70.0	70.1	70.1	61.6	64.4
Life expectancy at birth, in years, female	75.9	78.1	78.4	72.6	73.6
Estimated life expectancy, (World Health Report)	68.0	73.7	74.4	65.3	67.9
Infant deaths per 1000 live births	11.8	9.0	6.6	14.5	19.8
Maternal deaths per 100000 live births	22.4	15.6	6.0	31.8	51.5
SDR, diseases of circulatory system, all ages per 100,000	626.2	479.4	452.7	821.4	741.5
SDR, ischemic heart disease, all ages per 100,000	387.3	222.7	176.1	433.8	362.3
SDR all causes, all ages, per 100,000	1083.3	962.6	931.3	1431.2	1311.2
SDR, diseases of the respiratory system, all ages per 100,000	63.4	55.5	42.7	70.1	63.1
SDR, selected smoking related causes, all ages per 100,000	653.2	243.7	370.7	716.4	577.0
Tuberculosis incidence per 100,000	47.9	42.4	26.3	87.3	69.0
Clinically diagnosed AIDS incidence per 100,000	0.3	1.1	0.4	0.7	0.6
Diabetes prevalence, in %	1.0	n.a.	4.9	1.4	1.6

Source: WHO - HFA database. *Europe*: the 52 countries in the WHO European Region. *NMS*: EU members since May 2004: the 10 new Member States of the European Union from 1 May 2004. *CIS*: the 12 countries of Commonwealth of Independent States; · *CSEC*: 25 countries in the WHO European Region with higher levels of mortality.

**3.3. Respiratory and infectious diseases are the main causes of sickness in Armenia. Prevalence of HIV/AIDS, while still low, is on the rise.** According to World Bank (2006), the six leading causes of sickness in 2003 were respiratory diseases (47 percent), infectious and parasitic diseases (10 percent), injuries and poisoning (9 percent), pre and post-natal problems (7 percent) and digestive/nervous diseases (6 percent). While the prevalence of HIV/AIDS in Armenia is not very high (1.28 new infected cases per 100,000 individuals; see World Bank 2002), it is on the rise and it is feared that it may reach alarming levels. As many Armenians temporarily migrate for reasons of seasonal labor into highly infected countries, there is a risk that the disease may spread rapidly.

**3.4. Health professionals in Armenia earn wages 13 to 22 percent lower on average than other professionals.** This result holds particularly in urban areas. Low wages fuel the incidence of informal payments and the emigration of health professionals. The number of nurses graduating per 100,000 people in Armenia is much higher than in most CIS and FSU countries and even higher than the EU average. However, the number of nurses actually working per 100,000 is low relative to other countries in the region. Nurses are leaving Armenia probably due to low demand and low returns to a nursing education. Anecdotal evidence suggests that after graduating some nurses and doctors either emigrate or stay in Armenia and switch professions. This story also holds true for other health professionals such as dentists and pharmacists.

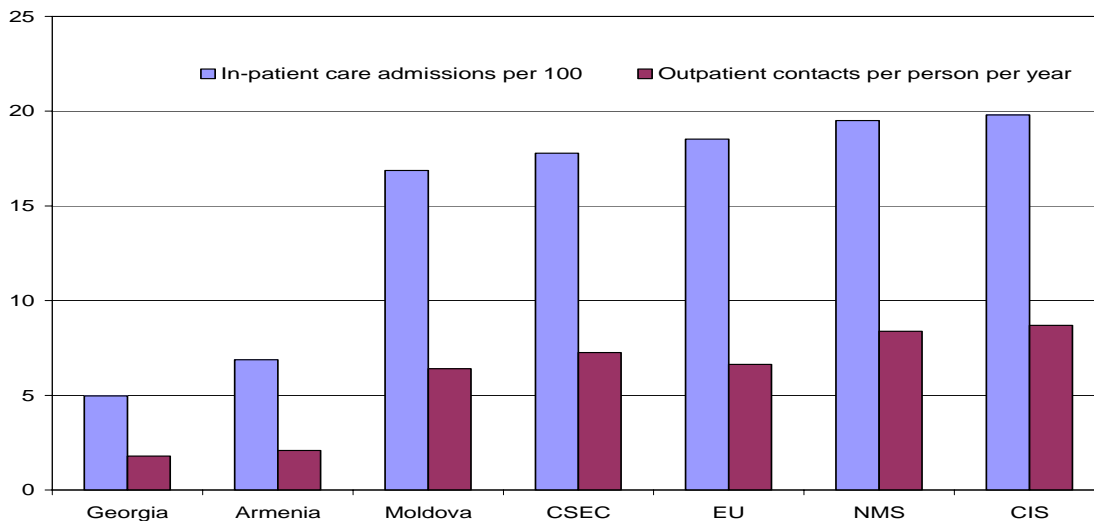
**Figure 3.1: Must nursing graduates in Armenia emigrate or change careers**



Source: WHO - HFA database

**3.5. Inpatient and outpatient utilization rates are much lower in Armenia than in other countries in the region.** In the regional context, Armenia displays very low rates of utilization, especially at the inpatient level. While inpatient care admissions in the region oscillate between 15 and 20 per 100 inhabitants, this figure is less than 8 (about half) for Armenia. While the average number of outpatient visits in the region stands between 6 and 10 per person per year, it is less than 3 per person per year in Armenia.

**Figure 3.2: Healthcare utilization rates in Armenia are low relative to the region**



Source: WHO - HFA database

### HEALTH CARE UTILIZATION

**3.6. Only half of the sick in the poorest quintiles received treatment as compared to 95 percent in the richest quintiles.** As suggested below (see Figure 3.3 and Table 3.3), there are great inequities in utilization rates between the rich and the poor. In particular, while only 45 to 60 percent of the sick are treated in the bottom quintiles, the same rate is between 85 and 95 percent in the upper quintiles. About half of all the treatment received

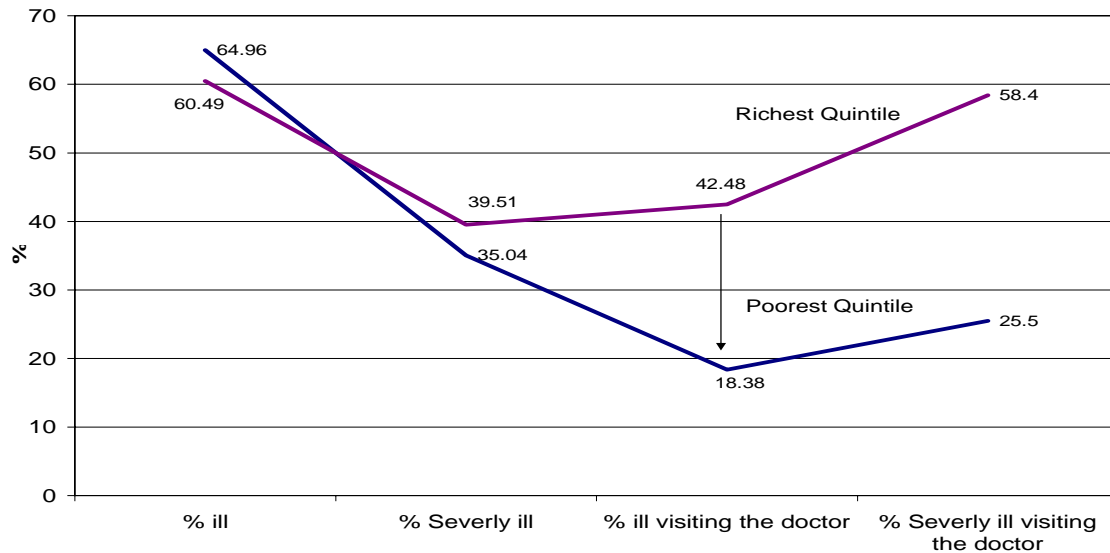
is informal. Treatment ratios in rural areas, although slightly higher than in urban areas, are associated with higher rates of informal treatment (roughly 57 percent). Informal treatment (healers and at home treatment) is quite relevant and constitutes about half of all treatment provided to patients. As expected, those who are severely ill visit the doctor more than those who have minor health problems. However, only 25 percent of the poor visit the doctor even when they are severely ill compared to 60 percent of the non-poor. Finally, as presented in Table 3.3, less than 5 percent of all individuals (mainly from the richest quintiles) use any type of preventive health services.

**Table 3.3: Statistics on sickness and utilization in Armenia**

	<i>All individuals</i>		<i>If sick</i>	<i>If sick &amp; treated</i>	
	% Preventive Care	% sick	% treated	% formal treatment (doctor/poly clinic)	% informal treatment (healer/at home treatment)
<b>Strata</b>					
Yerevan	3.1	20.4	67.3	56.0	44.0
Urban	3.2	17.6	68.6	54.4	45.6
Rural	5.4	19.2	74.0	43.6	56.4
<b>Socio Economic Groups</b>					
Poorest Quintile	2.0	18.7	45.5	51.6	48.4
Quintile 2	3.4	18.8	64.0	45.6	54.4
Quintile 3	4.1	18.1	71.0	46.3	53.7
Quintile 4	5.1	19.2	83.1	49.6	50.4
Richest Quintile	6.5	20.8	94.2	56.6	43.4

Source: Authors using Armenia ILCS 2004 data.

**Figure 3.3: Poor individuals are slightly more likely to be ill but much less likely to receive outpatient (formal) treatment than rich individuals.**



Source: Authors using Armenia ILCS 2004 data.

**3.7. A significant share of all sick individuals receiving informal treatment did so at home.** Usage of other forms of treatment (physicians and healers) is generally low. Around 90 percent of all sick individuals in urban areas who claim to not have visited the doctor (or a polyclinic) but who still received treatment did so at home (i.e. they were auto-treated or treated by a family member/neighbor). At-home treatment is negatively associated with socio-economic group, which is not surprising since individuals from richer households are more likely to afford professional care (although differences are rather mild since at-home treatment is generally used by those who are not severely ill independently of their socio-economic condition – in case of a flu, for example). While 93 percent of all sick individuals in the poorest quintiles received at-home treatment, only 85 percent in the richest quintile did so. As expected, fewer individuals in the poorest quintiles use private physicians when sick (probably due to affordability). Utilization of healers by sick patients is generally low, which is good given that healers are individuals who practice medicine but who are not certified practitioners.

**Table 3.4: Type of treatment among sick individuals who did not visit the doctor but received treatment**

	<i>% treated by Healer</i>	<i>% treated by Physician</i>	<i>% treated At home</i>
Yerevan	1.00	5.33	93.67
Urban	1.90	10.56	87.55
Rural	3.67	12.96	83.37
Poorest Quintile	1.42	5.60	92.98
Quintile 2	2.04	9.72	88.24
Quintile 3	4.44	10.00	85.57
Quintile 4	2.22	9.68	88.10
Richest Quintile	1.88	13.30	84.82
<b>Total</b>	2.16	10.15	87.69

Source: Authors using Armenia ILCS 2004 data.

**3.8. Differences in utilization rates between poor and non-poor users who are severely ill are substantial.** As illustrated by Figure 3.4, poor and non-poor individuals have roughly the same incidence of being affected by a severe illness. While the gap between the poor and the non-poor in terms of receiving treatment among this group of individuals is large, the gap in terms of hospitalization is much lower. Less than 7 percent of those individuals who were severely ill claim to have been hospitalized. As indicated by Table 3.5, hospital utilization rates are low even among the rich. Hospitalization rates are higher in rural areas and among individuals in the upper quintiles. This result is somewhat expected given that in cases of life-threatening emergencies (which are most probably randomly distributed across the population), users have no choice but to seek hospital care independently of their socio-economic characteristics.

**Table 3.5: Very ill users from the top quintiles are much more likely to receive treatment than very ill users from the bottom quintiles.**

	<i>If Sick</i>		<i>If very ill</i>	
	% very ill	% visiting the doctor	% hospitalized	% getting any treatment
Yerevan	40.00	41.77	7.31	63.16
Urban	42.58	38.34	5.86	56.81
Rural	24.07	31.71	4.06	64.07
Poorest Quintile	34.94	25.5	5.15	41.68
Quintile 2	31.63	26.26	1.32	56.85
Quintile 3	29.93	35.86	4.93	61.72
Quintile 4	35.16	42.8	6.93	67.93
Richest Quintile	39.30	58.42	10.80	80.10

Source: Authors using Armenia ILCS 2004 data.

**Figure 3.4: Non-poor users are more likely to receive treatment when ill or severely ill than poor ones**



Source: Authors using Armenia ILCS 2004 data.

**3.9. Private transfers (remittances) seem to not impact utilization significantly.**

However, socio-economic conditions, level of education, gender, and strata have a significant influence on the probability of individuals receiving treatment when sick. Regression analysis of the determinants of health utilization in Armenia (see Table A16 in the annex) can be summarized as follows:

Individual characteristics: Male patients are 7 percent less likely to get formal treatment if sick than female patients. As expected, patients who are severely ill are 13 to 20 more likely to visit the doctor and about 30 percent more likely to receive any treatment. More educated individuals (those with at least upper secondary) are about 20 percent more likely to visit a doctor (or to get any treatment) when sick than individuals with only basic education.

Socio-economic conditions: Individuals from poor households are 15 to 16 percent less likely to receive treatment when sick than individuals from non-poor households and 10 percent less likely to be hospitalized when severely ill.

Remittances and geographical location: individuals in Yerevan are about 17 percent less likely to receive any treatment than individuals living in other urban areas (although the likelihood of visiting the doctor is not statistically different across strata). Controlling for other observables, our estimates suggest that living in households receiving income from international remittances does not affect utilization among sick individuals.

**3.10. Households receiving social assistance, and therefore eligible for free medical insurance, are not more likely to utilize services than households not receiving benefits.** Previous analysis in Armenia (see Murrugarra, 2002) suggests that households receiving social assistance are more likely to use health services when needed than households who do not receive social assistance. Murrugarra (2002) finds that for every 1,000 ADM given to users, utilization increases by 1 percentage point. Angel-Urdinola and Jain (2006) find that social insurance does not increase utilization because it provides benefits that are too small given the high costs of healthcare (especially that of medicines, which are not covered by the program). Results in Table 3.5 indicate that while poor users from households receiving assistance are equally likely to visit the doctor when sick as poor users from households not receiving assistance, they have higher hospitalization rates and higher treatment rates. In particular, while 4.44 (38.1) percent of all users who did not receive assistance in the poorest quintile were hospitalized (received any treatment), the equivalent rates were 6.7 (49.5) percent among users who did receive assistance. Nevertheless, once controlling for other individual and household characteristics, regression analysis suggests that differences in utilization rates among individuals receiving and not receiving assistance are not statistically significant (see estimates on Table A16 in the annex).

**Table 3.5: Utilization rates among the sick if insured by the State**

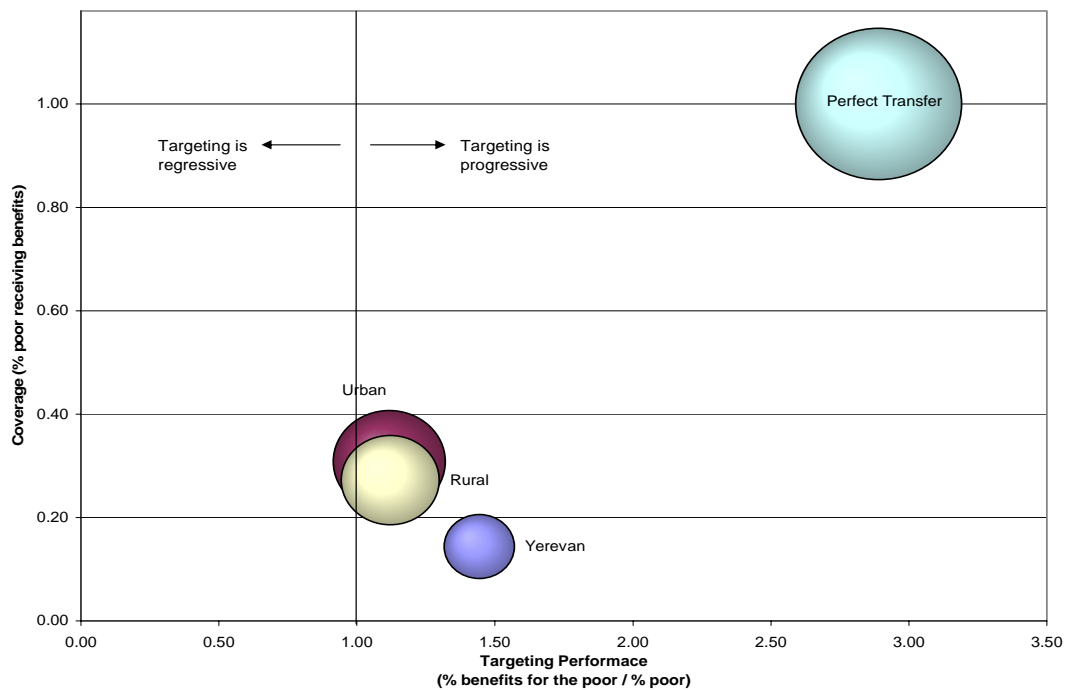
	<i>Visit doctor</i>		<i>Hospitalized</i>		<i>Any treatment</i>	
	Not PFB	PFB	Not PFB	PFB	Not PFB	PFB
<b>Strata</b>						
Yerevan	42.19	39.34	7.68	5.2	63.6	60.65
Urban	39.08	36.39	6.39	4.48	55.6	59.98
Rural	34.42	25.48	5.49	0.75	65.55	60.68
<b>Socio Economic Condition</b>						
Poor users	26.14	26.73	3.37	4.27	46.37	53.04
Non Poor users	45.74	39.21	8.38	2.26	69.29	67.67
Users in Poorest Quintile	25.5	25.52	4.44	6.69	38.1	49.52

Source: Authors using Armenia ILCS 2004 data. PFB: Poverty Family Benefits

**3.11. Social assistance reaches less than 30 percent of the poor population. While targeting indicators for social assistance are favorable, coverage among the poor is low.** We analyze the incidence and allocation of social assistance using a three dimensional diagram. The horizontal axis in Figure 3.5 represents the program's targeting

performance ( $\%$  of total benefits allocated to the poor divided by the  $\%$  of the population that is poor) and the vertical axis represents coverage among the poor ( $\%$  of poor receiving the benefits). A value higher (lower) than one for the targeting performance indicator means that on average the poor are receiving more (less) benefits than their population share. An indicator higher (lower) than one indicates that targeting is progressive (regressive). The size of the bubble is proportional to the total per capita transfer. Results in Figure 3.5 can be summarized as follows: while targeting indicators of social assistance are favorable, (i.e. values for targeting performance are greater than one), coverage among the poor is low (less than 30 percent in rural/urban areas) and particularly in Yerevan (14 percent only). The bubble in the top right corner of the figure illustrates the size of a perfect transfer (targeted perfectly to the poor with full coverage) that would be necessary to fully eradicate poverty. If we pulled together all social insurance benefits (all the bubbles) and gave them fully to “all” the poor, poverty could be roughly eradicated. This result suggests that the size of social assistance transfers is substantial.

**Figure 3.5: Social Assistance transfers are large, well targeted, but cover only a minority of the poor.**



Source: Authors using Armenia ILCS 2004 data. Data on the average size of social assistance transfers by household was obtained from Murrugarra (2002).

**3.12. Social assistance helps to alleviate poverty and to increase equality. However, a substantial share of all the beneficiaries is not poor.** Indicators in Table 3.6 indicate that social assistance transfers contribute to decrease poverty rates by 1.15 to 2.88 percentage points and have positive distributional effects (a negative value of the Gini Income elasticity suggests that inequality would decrease given a marginal increase in the program). However, the program presents a high leakage among the non-poor. In particular, we find that roughly half of all the beneficiaries receiving social assistance are

not poor. In rural areas the leakage rate is up to 60 percent. Since targeting performance is favorable, this finding suggests that non-poor households receive on average less nominal transfers than poor households do. High errors of exclusion ratify the observation that coverage of social assistance among the poor is low.

**Table 3.6: Other performance indicators of social assistance transfers**

	<i>Increase in Headcount in % points if program were cancelled</i>	<i>Gini Income Elasticity</i>	<i>Error of Exclusion (% poor not receiving benefits)</i>	<i>% of non-poor beneficiaries</i>
Yerevan	1.15	-0.79	86%	52%
Urban	2.88	-0.32	69%	44%
Rural	2.68	-0.29	73%	61%

Source: Authors using Armenia ILCS 2004 data. Calculations are made using pre-transfer consumption (i.e. recalculating deciles and poverty without the source of income).

#### AFFORDABILITY OF HEALTH SERVICES

**3.13. Average expenditures on health constitute a heavy burden, especially for poorer users.** High costs of health are likely to be the main cause of low utilization rates among the poor. Health expenditures account on average for slightly less than half of the total non-food consumption among households using services (this proportion is roughly 70 percent for households in the poorest quintile). This suggests that to have a sick family member receiving treatment is likely to be quite expensive, especially for the poorest households. Expenditures on hospitals represent on average 52 percent of total non-food expenditures among users in the poorest quintiles. This proportion is lower (about 20 to 24 percent) for middle-class households and only 13 percent for users in the richest quintile.

**Table 3.7: Indicators of affordability of health among households having at least one user**

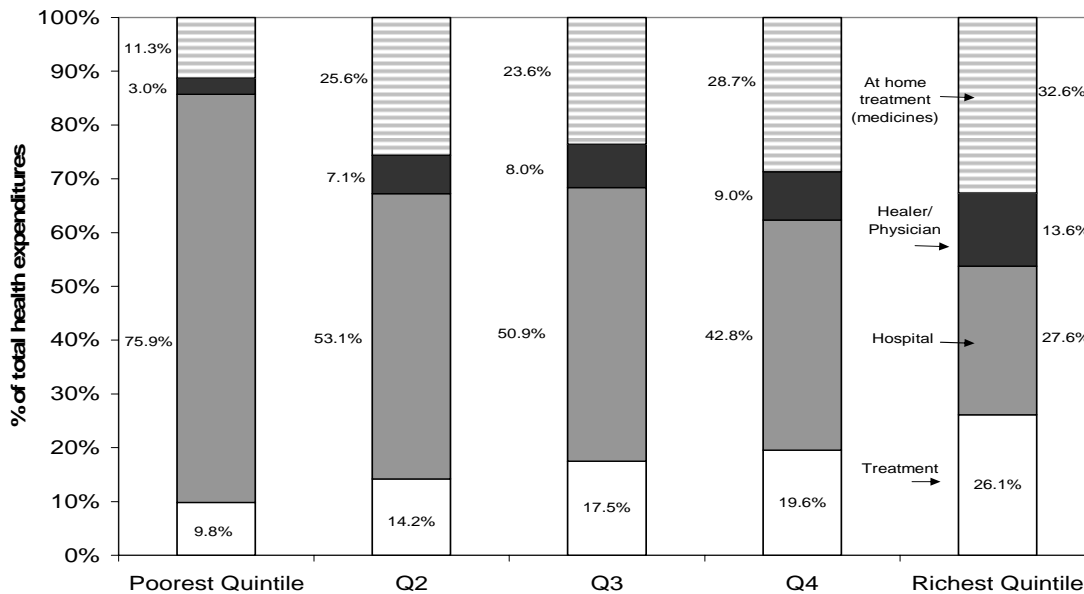
	<i>Poorest Quintile</i>	<i>Q2</i>	<i>Q3</i>	<i>Q4</i>	<i>Richest Quintile</i>
	Total Health Expenditures				
As % of total Income	19.95%	13.33%	17.84%	22.06%	32.39%
As % of total non-food consumption	69.09%	44.20%	47.72%	47.85%	47.18%
	Hospitals				
As % of total Income	15.14%	7.08%	9.08%	9.44%	8.95%
As % of total non-food consumption	52.43%	23.46%	24.29%	20.46%	13.04%

Source: Authors using Armenia ILCS 2004 data

**3.14. Hospitalization and at-home treatment (presumably medicines) constitute the two main household expenditures on health among users.** Given the ILCS survey design, results in regard to hospitalization may be overestimated. As illustrated by Figure 3.6, hospitalization accounts for about 76 percent of all health expenditures among users (households with at least one member who received treatment) in the poorest quintile. This same proportion is between 42 and 53 percent for households in the second, third,

and fourth quintiles, making hospitalization the main health expenditure in Armenia. This result, however, has to be interpreted with care as the health section of the ILCS asks users about expenditures within a time frame of 4 weeks (including hospitalization) although expenditures on hospitals are preferably asked on a yearly basis (given the low probability of the event). Of course, the expenditures of those who were hospitalized in the month prior to the interview are likely to significantly increase the average. Expenditures on health treatment at home (presumably medicines) constitute the second main expenditure item and account for 24 to 33 percent of total health expenditure among households in the second, third, fourth, and upper quintiles. As expected, expenditures on treatment and private care are proportionally larger for households in higher socio-economic groups.

**Figure 3.6: Hospitalization and at-home treatment (presumably medicines) are the main components of household expenditure on health among users.**



Source: Authors using Armenia ILCS 2004 data.

**3.15. Potential users in the bottom quintile cannot afford to pay for hospitals and can barely afford any treatment.** For an average household having a potential user (an individual receiving any treatment), hospitalization is not affordable. As presented in Table 3.6, the average expenditure on hospitalization made by households in the poorest two quintiles accounts for about 146 to 250 percent (45 to 73 percent) of the average total non-food expenditure (income) amongst potential users. Paying for the average cost of a formal health treatment (visiting a doctor or a polyclinic) consumes between 60 to 70 percent of total non-food expenditure among potential users at all quintiles. Even the average cost of informal healthcare (such as at-home treatment and healers) constitutes a significant burden for potential users.

**Table 3.8: Indicators of affordability of health for potential users**

	<i>Poorest Quintile</i>	<i>Q2</i>	<i>Q3</i>	<i>Q4</i>	<i>Richest Quintile</i>
Average cost per patient as % of total per-capita expenditure of potential users					
Treatment	62.4%	57.0%	63.0%	70.1%	59.3%
Hospital	250.6%	146.0%	67.7%	53.8%	32.6%
Healer	35.9%	30.2%	26.8%	25.8%	24.8%
Physician	68.7%	60.7%	59.8%	55.0%	71.0%
At home treatment	46.4%	53.7%	50.3%	57.1%	53.1%
Post natal care	33.2%	20.2%	26.0%	12.6%	8.3%
Average cost per patient as % of total non-food income of potential users					
Treatment	18.1%	17.7%	23.6%	33.8%	43.8%
Hospital	72.6%	45.3%	25.4%	26.0%	24.1%
Healer	10.4%	9.4%	10.0%	12.4%	18.3%
Physician	19.9%	18.8%	22.4%	26.5%	52.5%
At home treatment	13.4%	16.7%	18.8%	27.5%	39.2%
Post natal care	9.6%	6.3%	9.7%	6.1%	6.1%

Source: Authors using Armenia ILCS 2004 data. We calculate the average cost per patient (for every type of treatment) and divide it by the average income (and non food expenditure) of those households having a potential user of health (a member receiving treatment) within the household.

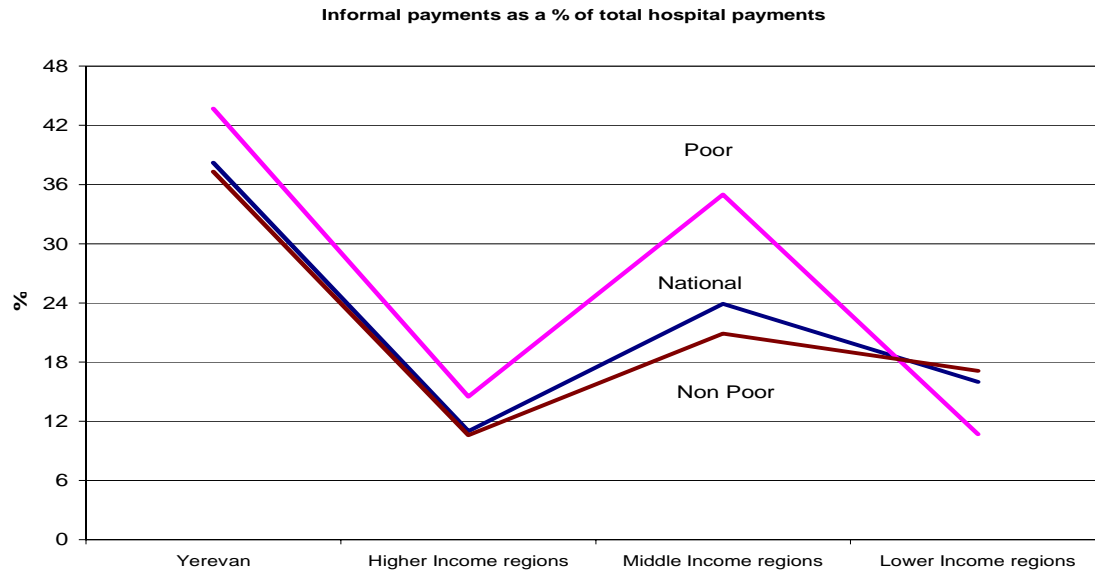
**3.16. Informal (under-the-table) payments for health services are large, especially for hospitalization.** Health professionals in Armenia are generally underpaid, which creates an incentive for them to charge users informal fees for their services. As such, informal payments constitute about a 10 percent premium for all medical treatment and a 22.5 percent premium for hospitalizations (a very high cost for users). As displayed in Table 3.9, informal payments for medical treatment are particularly large in Yerevan and among users from the top quintiles (presumably because they have the means to afford such payments). In regards to hospitalization, on the contrary, poor users are paying the highest cost: while users in the richest quintiles pay hospital informal premiums of roughly 26 percent, users in the poorest quintiles pay premiums of up to 40 percent. Informal payments for hospitalization are larger in Yerevan and in middle-income regions (Aragatsotn, Armavir, and Sjunik) as compared to those made in other regions.

**Table 3.9: Informal payments as a % of medical treatment**

<i>Socio Economic Group</i>	<i>Informal payment as a % of total medical treatment</i>	<i>Informal payment as a % of total hospital bill</i>
Poorest Quintile	6.3	39.7
Quintile 2	7.3	23.4
Quintile 4	12.2	25.5
Richest Quintile	10.7	26.2
<b>Strata</b>		
Yerevan	15.5	38.2
Urban	6.5	18.6
Rural	7.7	13.9
<b>Total</b>	9.3	22.5

Source: Authors using Armenia ILCS 2004 data

**Figure 3.7: The poor are associated with making higher informal payments than the non-poor for hospitalization services, especially in Yerevan.**



Source: Authors using Armenia ILCS 2004 data. Higher income regions: Vayots, Dzor, Tavush, Lori, and Ararat; middle income regions: Aragatsotn, Armavir, and Sjunik; lower income regions: Kotayk, Gegharkunik, and Shirak.

**3.17. Poor users benefiting from social assistance spend less on informal payments than poor users who do not receive assistance.** As indicated by Table 3.10 below, informal payments for medical treatment (hospitalization) are lower by about half (one third) among users from households benefiting from social assistance. Poor users benefit highly from this tendency: while users in the poorest quintile receiving social assistance do not pay informal fees at all (both for treatment and hospitalization), users from the same socio-economic group not getting assistance pay very significant fees (8 percent premiums for treatments and up to 43 percent for hospitalization). It may be that the government is paying higher prices per patient than private users can afford thus reducing the incentives of medical personnel to request informal fees.

**Table 3.10: Informal payments as a % of medical treatment (insured vs. non-insured)**

	<i>Treatment</i>		<i>Hospitalizations</i>	
	<i>Informal payments of as % of total</i>		<i>Informal payments of as % of total</i>	
	Don't get PFB	Get PFB	Don't get PFB	Get PFB
<b>Total</b>	10.80	4.60	26.60	8.40
<b>Quintile</b>				
Poorest Quintile	8.20	0.00	43.30	0.00
Quintile 2	8.30	4.00	27.70	2.40
Quintile 4	12.90	9.70	30.00	4.70
Richest Quintile	11.30	0.40	26.90	0.00
<b>Socio Economic group</b>				
Non Poor	11.10	6.30	25.80	9.90
Poor	9.20	0.00	30.90	1.80

Source: Authors using Armenia ILCS 2004 data. PFB: Poverty Family Benefits

## CONCLUSION

Despite rather good basic health and education indicators, the education and health sectors in Armenia face several challenges and constraints in terms of equity and efficiency. Despite rather equitable access to basic education, there are substantial inequities in the quality of education between the rich and the poor. Children from better-off families have access to better education, perform better, and have higher motivation to learn. Lack of proper infrastructure and resources at most schools constitutes a main challenge for compulsory education. Affordability constitutes a significant constraint for access to higher education. Students drop-out rapidly from the education system after having completed upper secondary education. Although health indicators in Armenia meet regional standards, healthcare utilization is generally low, particularly in rural areas and among individuals in the poorest quintiles. Low public expenditures on health and hard affordability constraints (health treatment in Armenia is mainly paid out-of-pocket) force poor-sick individuals to seek informal care or to not seek care at all. Access to social assistance for health and/or private transfer in the form of remittances does not seem to increase utilization because benefits/transfers are too small given the high costs of healthcare, especially in relation to medicines and hospitalization.

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ANNEX

**Table A0: Determinants of Subjective Poverty** [omitted variables: education: primary/no education; socio economic condition: poorest quintile; strata: Yerevan; region: Tavush]

<i>Dependent Variable: head of the household feels household is poor</i>	<i>All</i>	<i>Yerevan</i>	<i>Urban</i>	<i>Rural</i>
	dF/dx	dF/dx	dF/dx	dF/dx
<b>Health Characteristics</b>				
Household having a sick member	0.11	0.09	0.11	0.13
Head feels sick	0.11	0.08	0.10	0.14
Spouse feels sick	0.10	0.08	0.09	0.11
<b>Education of the Head and Spouse</b>				
Head has basic/secondary education	N.S.	N.S.	-0.09	N.S.
Head has upper-secondary education	-0.07	N.S.	-0.20	<u>-0.08</u>
Head has some tertiary education	-0.11	N.S.	-0.22	<u>-0.10</u>
Spouse has basic/secondary education	N.S.	-0.14	N.S.	N.S.
Spouse has upper-secondary	<u>-0.08</u>	<u>-0.16</u>	N.S.	N.S.
Spouse has some tertiary education	-0.13	-0.19	N.S.	N.S.
<b>Demographic Characteristics</b>				
Number of under-6s in household	N.S.	N.S.	N.S.	N.S.
Square of number of under-6s in household	N.S.	N.S.	N.S.	N.S.
Number of 7-14s in household	N.S.	-0.07	<u>-0.05</u>	N.S.
Square of number of 7-14s in household	N.S.	0.03	N.S.	N.S.
Number of adults in household	-0.11	-0.09	-0.15	-0.10
Square of number of adults in household	0.01	0.01	0.02	0.01
Number of 65+ in household	N.S.	N.S.	N.S.	N.S.
Square of number of 65+ in household	N.S.	N.S.	N.S.	N.S.
Female-headed household	N.S.	N.S.	N.S.	N.S.
<b>Other Characteristics of the Head</b>				
Head of household is single	N.S.	N.S.	N.S.	N.S.
head is disable	N.S.	N.S.	N.S.	N.S.
Age of head	0.01	0.01	0.01	<u>-0.01</u>
Square of age of household Head	0.00	0.00	0.00	N.S.
Head has a job	-0.06	N.S.	-0.06	N.S.
Head is employed as a wage earner	N.S.	N.S.	N.S.	N.S.
<b>Other Characteristics of the Spouse</b>				
Age of spouse	N.S.	0.01	N.S.	N.S.
Square of age of Spouse	N.S.	0.00	N.S.	N.S.
Spouse is retired	N.S.	0.11	N.S.	N.S.
Spouse is disable	N.S.	N.S.	N.S.	N.S.
Spouse has a job	N.S.	N.S.	N.S.	N.S.

Source: Authors using Armenia ILCS 2004 data. Underlined coefficients are significant at a 10 percent confidence interval. N.S: coefficient is not significant

**Table A0 cont.**

	<i>All</i>	<i>Yerevan</i>	<i>Urban</i>	<i>Rural</i>
	dF/dx	dF/dx	dF/dx	dF/dx
<b>Socio Economic Condition</b>				
Second quintile	-0.05	N.S.	-0.05	-0.12
Third quintile	-0.13	-0.11	-0.13	-0.17
Fourth quintile	-0.15	-0.13	-0.17	-0.19
Richest quintile	-0.22	-0.19	-0.23	-0.24
<b>Geographical Location</b>				
Aragatsotn	0.10		N.S.	<u>0.09</u>
Ararat	N.S.		N.S.	N.S.
Armavir	N.S.		0.13	N.S.
Gegharkunik	N.S.		N.S.	N.S.
Lori	N.S.		N.S.	N.S.
Kotayk	-0.07		N.S.	<u>-0.08</u>
Shirak	N.S.		0.17	N.S.
Sjunik	N.S.		0.18	N.S.
Vayots dzor	N.S.		N.S.	N.S.
<b>Strata</b>				
Urban dummy	N.S.			
Rural dummy	N.S.			
Observations	6423.00	1943.00	2846.00	1634.00

Source: Authors using Armenia ILCS 2004 data. Underlined coefficients are significant at a 10 percent confidence interval. N.S: coefficient is not significant

**Table A1: Estimates of enrollment ratios by quintile, sex, and strata.**

	<i>Gross Enrollment</i>					<i>Net Enrollment</i>				
	Poorest Quintile	Q2	Q3	Q4	Richest Quintile	Poorest Quintile	Q2	Q3	Q4	Richest Quintile
	National					National				
Preschool	19	18	21	26	41	19	18	21	26	41
Basic	102	101	101	98	98	96	97	97	96	95
Upper Secondary	85	85	98	107	114	63	64	70	76	73
Tertiary	12	17	26	42	67	5	6	13	19	38
	Female					Female				
Preschool	19	15	25	26	50	19	15	25	26	50
Basic	101	103	103	98	97	96	98	96	97	94
Upper Secondary	100	88	105	116	136	71	68	67	80	82
Tertiary	12	17	28	40	60	5	7	16	18	41
	Male					Male				
Preschool	19	20	18	26	34	19	20	18	26	34
Basic	103	99	100	99	99	96	97	98	96	96
Upper Secondary	66	81	92	99	95	53	60	72	71	65
Tertiary	11	18	22	44	77	5	6	10	21	33
	Yerevan					Yerevan				
Preschool	45	32	37	35	64	45	32	37	35	64
Basic	102	98	101	98	103	97	95	98	95	95
Upper Secondary	79	98	97	105	111	54	69	69	77	66
Tertiary	16	34	35	54	80	7	16	14	30	48
	Urban					Urban				
Preschool	17	30	32	34	37	17	30	32	34	37
Basic	100	102	98	98	95	94	97	97	96	93
Upper Secondary	93	92	109	112	119	70	71	79	80	80
Tertiary	13	25	37	42	65	5	8	21	15	37
	Rural					Rural				
Preschool	2	8	9	17	16	2	8	9	17	16
Basic	105	102	103	98	96	98	98	97	97	97
Upper Secondary	77	74	93	107	115	61	58	65	73	75
Tertiary	6	4	13	29	44	2	1	8	11	22

Source: Authors using Armenia ILCS 2004 data

**Table A2: Determinants of enrollment by level** [omitted variables: sector of employment of the head/spouse: agriculture; type of firm of the head/spouse: public; education of the head/spouse: primary/no education; distance to school facility: less than 1 km; strata: Yerevan; region: Tavush]

	<i>Preschool</i>	<i>Tertiary</i>
	dF / dx	dF / dx
<b>Individual Characteristics</b>		
Male dummy	N.S.	N.S.
Age	-	-0.160
Square of age	N.S.	N.S.
vulnerable child (orphan, disable)	N.S.	N.S.
Individual is employed	-	-0.132
Individual works full-time	-	N.S.
If employed, individual is hired employee	-	0.077
<b>Type of care when mother is not home (preschoolers only)</b>		
Got care free of charge	N.S.	-
Household member takes care of child	-0.486	-
Relative outside household takes care of child	-0.068	-
Neighbor takes care of child	-0.060	-
<b>Household Characteristics</b>		
Logarithm of household size	N.S.	N.S.
Square of logarithm of household size	N.S.	N.S.
Female-headed household	N.S.	N.S.
Age of head	N.S.	-0.004
Square of age of household Head	N.S.	0.000
Head of household is single	1.000	N.S.
<b>Employment status of the head</b>		
Head is disable	N.S.	N.S.
Head has a job	N.S.	N.S.
If employed, head works full time	0.097	N.S.
If employed, head has a job contract	N.S.	N.S.
If employed, head is a permanent worker	N.S.	N.S.
Head is employed as a wage earner	-0.101	-0.029
<b>Sector of employment of the head</b>		
Head works in delivery of water, elect, gas	-0.055	N.S.
Head works in construction	-0.057	N.S.
Head works in commerce	N.S.	N.S.
Head works giving professional svcs.	N.S.	N.S.
Head works in public admin./army/police	N.S.	N.S.
Head works on health/education sector	N.S.	N.S.
Head works on other pub./priv. social services	N.S.	N.S.
<b>Type of firm of the head</b>		
Head works in a private firm	N.S.	N.S.
Head works in a semi-private/collective firm	0.497	N.S.
<b>Education of the head</b>		
Head has basic secondary education	N.S.	N.S.
Head has upper/special secondary education	N.S.	N.S.
Head has at least some tertiary school	N.S.	0.075

Source: Authors using Armenia ILCS 2004 data. Presented coefficients are significant at a 10 percent confidence interval. N.S: coefficient is not significant.

**Table A2 cont. Determinants of enrollment by level**

	<i>Preschool</i>	<i>Tertiary</i>
	dF / dx	dF / dx
<b>Characteristics of the spouse</b>		
Age of spouse	N.S.	N.S.
Square of age of Spouse	N.S.	N.S.
Spouse is retired	-0.096	N.S.
Spouse is disable	N.S.	-0.047
Spouse has a job	N.S.	0.057
If employed, Spouse works full time	N.S.	N.S.
If employed, spouse is a permanent worker	-0.071	N.S.
Spouse works in a private firm	N.S.	-0.074
Spouse works in a semi-private/collective firm	N.S.	N.S.
Spouse is employed as a wage earner	N.S.	N.S.
spouse has basic secondary	0.994	-
spouse has upper/specializes secondary	0.987	-
Spouse has at least some tertiary school	0.990	-
<b>Remittances</b>		
Income from Intl. remittances last year (per equiv. adult)	N.S.	0.127
Income from dom. remittances last year (per equiv. adult)	N.S.	0.422
Total non-remittances Income last year (per equiv. adult)	N.S.	N.S.
<b>Distance to nearest preschool/university</b>		
1 to 3 kms	N.S.	N.S.
4 to 5 kms	N.S.	N.S.
More than 5 kms	N.S.	N.S.
<b>Socio Economic Group</b>		
First quintile	-0.054	-0.120
Second quintile	-0.051	-0.109
Third quintile	-0.021	-0.072
Fourth quintile	-0.035	-0.055
<b>Strata</b>		
Urban	N.S.	-0.050
Rural	-0.102	-0.082
<b>Region</b>		
Aragatsotn	-0.056	N.S.
Ararat	-0.058	N.S.
Armavir	-0.065	N.S.
Gegharkunik	-0.072	0.059
Lori	-0.065	N.S.
Kotayk	-0.066	0.077
Shirak	-0.035	0.082
Sjunik	N.S.	N.S.
Vayots dzor	N.S.	dropped
Observations	645	6094

Source: Authors using Armenia ILCS 2004 data. Presented coefficients are significant at a 10 percent confidence interval. N.S: coefficient is not significant.

**Table A3: Determinants of wages among wage earners between 16 and 65 years of age** [omitted variables: sector of employment: professional services; type of firm: cooperative; education: basic/no education; strata: Yerevan and Aragatsotn in urban areas and Lori in Urban areas]

	<i>Yerevan</i>	<i>Urban</i>	<i>Rural</i>
(Depent var: log of hourly wage)			
<b>Individual Characteristics</b>			
Male dummy	0.305	0.327	0.218
Age	0.029	0.028	N.S.
Square of age	0.000	0.000	N.S.
Single	N.S.	-0.058	0.138
Feels overqualified	-0.188	-0.248	-0.194
Feels unqualified	N.S.	N.S.	N.S.
Worker has a contract	N.S.	N.S.	N.S.
Workers works full time	N.S.	-0.173	-0.210
Workers has second job	N.S.	N.S.	-0.167
Permanent Worker	N.S.	N.S.	0.352
Disable worker	-0.269	-0.228	N.S.
<b>Education</b>			
Upper secondary	N.S.	N.S.	N.S.
Special secondary	N.S.	N.S.	<u>0.160</u>
Tertiary	0.482	0.472	0.585
<b>Industry of employment</b>			
Industry = agriculture	N.S.	N.S.	N.S.
Industry = electricity and water	N.S.	0.144	N.S.
Industry = construction	N.S.	0.161	0.351
Industry = commerce	N.S.	-0.133	N.S.
Industry = public admin. / police	N.S.	N.S.	N.S.
Industry = Health (and education) professionals	-0.223	-0.135	N.S.
Industry = Other Services	N.S.	-0.148	N.S.
<b>Type of Firm</b>			
Public firm	<u>-0.094</u>	N.S.	N.S.
Private firm	0.161	0.160	0.243
<b>Region</b>			
Aragatsotn	-	(dropped)	0.702
Ararat	-	N.S.	0.260
Armavir	-	N.S.	0.580
Gegharkunik	-	N.S.	0.569
Lori	-	N.S.	(dropped)
Kotayk	-	0.067	0.453
Shirak	-	-0.156	N.S.
Sjunik	-	N.S.	0.227
Vayots dzor	-	-0.196	0.476
Tavush	-	N.S.	0.447
Constant	4.354	4.451	3.739

Source: Authors using Armenia ILCS 2004 data. Presented coefficients are significant at a 5 percent confidence interval. Underlined coefficients are significant at a 10 percent confidence interval. N.S: coefficient is not significant.

**Table A4: Description of variables in TIMMS used to analyze education quality among 4<sup>th</sup> graders in Armenia.**

	<i>Variable name</i>	<i>Definition</i>
Calculator	number_of_1	Equals 1 if the student owns a calculator, 0 otherwise.
Computer	number_of_2	Equals 1 if the student owns a computer, 0 otherwise.
Study desk	number_of_3	Equals 1 if the student owns a study desk, 0 otherwise.
Dictionary	number_of_4	Equals 1 if the student owns a dictionary, 0 otherwise.
Bible	number_of_5	Equals 1 if the student owns a bible, 0 otherwise.
Number of books at home	number_of_6	Equals 1 if none or very few (0-10 books). Equals 2 If one shelf (11-25 books). equals 3 if one bookcase (26-100 books) Equals 4 if two bookcases (101-200 books). Equals 5 if three or more bookcases (>200 books).
Student assets proxy	assets_proxy	created using factor analysis variables considered: number_of_1-number_of_6
Enjoy to learn math	enjoy_m	Ranges from 1 through 5. 1 if the student does not like, 5 if he really does. Missing values represent that students are indifferent.
Enjoy to learn science	enjoy_s	Ranges from 1 through 5. 1 if the student does not like, 5 if he really does. Missing values represent that students are indifferent.
I like being in school	likes	it ranges from 1 through 5. 1 if the student does not like, 5 if he really does. Missing values represent that students are indifferent.
Use of a computer at home	comphom	Equals 1 if the student uses a computer at home , 0 otherwise.
Use of a computer at school	compsch	Equals 1 if the student uses a computer at school , 0 otherwise.
Time spent doing homework	hwtime	it ranges from 1 through 5. 1 if the student does not spend time doing hws, 5 if he really does.
Region indicator (urban rural)	ruregion	ruregion=1 if fewer than 3000 people --> RURAL ruregion=2 3001 to 50000 people --> SMALL TOWNS ruregion=3 if more than 50000 people --> URBAN ruregion=4 if fewer than 3000 people --> YEREVAN (capital)

Source: Authors using TIMMS 2003 data

**Table A4 cont. Description of variables from the TIMMS used to analyze education quality among 4<sup>th</sup> graders in Armenia.**

	<i>Variable name</i>	<i>Definition</i>
Poverty region indicator	region	1=most poor regions (9,2,6,10) 2=middle regions (1,3,8) 3=least poor regions (5,4,7) 4=capital (Yerevan) where: 1 Aragatsotn, 2 Ararat 3 Armavir 4 Gegharkunik 5 Kotayk 6 Lori 7 Shirak 8 Syunik 9 Tavush 10 Vayots Dzor 11 Yerevan
Owning a computer indicator	hcomp	equals 1 if the student owns a computer, 0 otherwise.

Source: Authors using TIMMS 2003 data

**Table A5: Descriptive Statistics of variables from the TIMMS used to analyze education quality among 4<sup>th</sup> graders in Armenia.**

<i>Variable name</i>	<i>obs.</i>	<i>mean</i>	<i>std deviation</i>	<i>min</i>	<i>max</i>
number_of_1	5144	0.68	0.47	0.00	1.00
number_of_2	4979	0.29	0.45	0.00	1.00
number_of_3	4989	0.60	0.49	0.00	1.00
number_of_4	5024	0.75	0.43	0.00	1.00
number_of_5	4965	0.49	0.50	0.00	1.00
number_of_6	5674	2.54	1.62	0.00	5.00
assets_proxi	4699	3.75	1.28	1.00	5.52
enjoym	5674	3.93	1.25	1.00	5.00
enjoys	5674	4.07	1.19	1.00	5.00
likes	5674	4.42	1.05	1.00	5.00
comphom	3502	0.52	0.50	0.00	1.00
compsch	3451	0.21	0.41	0.00	1.00
hwtime	5674	2.56	1.40	1.00	5.00
selfmot_ind	5674	0.83	0.16	0.20	1.00
compuse_ind	3423	0.37	0.30	0.00	1.00
comphom	3502	0.52	0.50	0.00	1.00
compsch	3451	0.21	0.41	0.00	1.00
hwtime_ind	5674	0.51	0.28	0.20	1.00

Source: Authors using TIMMS 2003 data

**Table A6: Description of indexes from TIMMS used to analyze education quality among 4<sup>th</sup> graders in Armenia.**

	<i>Variables considered to build the index</i>	<i>Comments and interpretation</i>
Self-motivation	- enjoy to learn math - enjoy to learn science - like being in school	Index built as an average of the 3 variables used. The index ranges from 0 to 1. If high motivation the index is =1
Computer use	- use of a computer at home - use of a computer at school	Index built as an average of the 2 variables used. The index ranges from 0 to 1. If high use the index is =1
Computer use at home	- use of a computer at home	equals 1 if the student uses a computer at home, 0 otherwise.
Computer use at school	- use of a computer at school	equals 1 if the student uses a computer at school, 0 otherwise.
Homework time	- Homework time	Index built normalizing the variable hwtime. The index ranges from 0 to 1. If the student spends a lot of time doing his hws the index is =1

Source: Authors using TIMMS 2003 data

**Table A7: Description of variables in TIMMS used to analyze education quality among 8<sup>th</sup> graders in Armenia.**

	<i>Variable name</i>	<i>Definition</i>
Calculator	number_of_1	Equals 1 if the student owns a calculator, 0 otherwise.
Computer	number_of_2	Equals 1 if the student owns a computer, 0 otherwise.
Study desk	number_of_3	Equals 1 if the student owns a study desk, 0 otherwise.
Dictionary	number_of_4	Equals 1 if the student owns a dictionary, 0 otherwise.
Bible	number_of_5	Equals 1 if the student owns a bible, 0 otherwise.
Number of books at home	number_of_6	Equals 1 if none or very few (0-10 books). Equals 2 If one shelf (11-25 books). equals 3 if one bookcase (26-100 books) Equals 4 if two bookcases (101-200 books). Equals 5 if three or more bookcases (>200 books).
Student assets proxi	assets_proxi	created using factor analysis variables considered: number_of_1-number_of_6
Mother education level	number_of_7	1=primary or below 2=basic general education (8years) 3=sec general education (10years) 4=professional college (preliminary professional education) 5=university (higher education) We assume that all those parents whose education level is missing (about 10 %) have an education level equal to primary level or below (i.e. the students where ashamed to report it). This assumption is consistent with data on Armenian since 10% of the adult population has an education level equal or lower than primary education.

Source: Authors using TIMMS 2003 data

**Table A7 cont. Description of variables in TIMMS used to analyze education quality among 8<sup>th</sup> graders in Armenia.**

<i>Variable content</i>	<i>Variable name</i>	<i>Definition</i>
Father education level	number_of_8	1=primary or below 2=basic general education (8years) 3=sec general education (10years) 4=professional college (preliminary professional education) 5=university (higher education) We assume that all those parents whose education level is missing (about 10 %) have an education level equal to primary level or below (i.e. the students were ashamed to report it). This assumption is consistent with data on Armenian since 10% of the adult population has an education level equal or lower than primary education.
Student assets proxy including parents' education	assets_proxib	created using factor analysis variables considered: number_of_1-number_of_8
I like being in school	number_of_9	Ranges from 1 through 5. 1 if the student does not like, 5 if he really does. Missing values represent that students are indifferent.
I enjoy learning biology	number_of_10	Ranges from 1 through 5. 1 if the student does not like, 5 if he really does. Missing values represent that students are indifferent.
I enjoy learning earth science	number_of_11	Ranges from 1 through 5. 1 if the student does not like, 5 if he really does. Missing values represent that students are indifferent.
I enjoy learning chemistry	number_of_12	Ranges from 1 through 5. 1 if the student does not like, 5 if he really does. Missing values represent that students are indifferent.
I enjoy learning physics	number_of_13	Ranges from 1 through 5. 1 if the student does not like, 5 if he really does. Missing values represent that students are indifferent.
Use of a computer at home	comphom	Equals 1 if the student uses a computer at home, 0 otherwise.
Use of a computer at school	compsch	Equals 1 if the student uses a computer at school, 0 otherwise.
Time spent doing homework	hwtime	it ranges from 1 through 5. 1 if the student does not spend time doing homework, 5 if he really does.
Region indicator (urban rural)	ruregion	ruregion=1 if fewer than 3000 people --> RURAL ruregion=2 3001 to 50000 people --> SMALL TOWNS ruregion=3 if more than 50000 people --> URBAN ruregion=4 if fewer than 3000 people --> YEREVAN (capital)
Owning a computer indicator	hcomp	Equals 1 if the student owns a computer, 0 otherwise.

Source: Authors using TIMMS 2003 data

**Table A8: Descriptive Statistics of variables from the TIMMS used to analyze education quality among 8<sup>th</sup> graders in Armenia.**

<i>Variable name</i>	<i>obs.</i>	<i>mean</i>	<i>std deviation</i>	<i>min</i>	<i>max</i>
number_of_1	5448	0.76	0.43	0.00	1.00
number_of_2	5396	0.20	0.40	0.00	1.00
number_of_3	5393	0.64	0.48	0.00	1.00
number_of_4	5417	0.76	0.43	0.00	1.00
number_of_5	5390	0.56	0.50	0.00	1.00
number_of_6	5726	2.94	1.40	0.00	5.00
number_of_7	5527	3.69	1.36	1.00	5.00
number_of_8	5520	3.56	1.38	1.00	5.00
number_of_9	5726	4.43	1.01	1.00	5.00
number_of_10	5726	4.06	1.24	1.00	5.00
number_of_11	5726	3.94	1.28	1.00	5.00
number_of_12	5726	3.42	1.43	1.00	5.00
number_of_13	5726	3.75	1.33	1.00	5.00
assets_proxi	5300	4.72	1.41	1.00	6.82
assets_proxib	5249	4.73	1.58	0.06	7.37
comphom	2941	0.40	0.49	0.00	1.00
compsch	2937	0.41	0.49	0.00	1.00
hwtime	5726	2.89	1.46	1.00	5.00
selfmot_ind	5726	0.95	0.28	0.11	1.34
pareduc_ind	5511	0.79	0.25	0.20	1.00
compuse_ind	2925	0.41	0.33	0.00	1.00
comphom	2941	0.40	0.49	0.00	1.00
compsch	2937	0.41	0.49	0.00	1.00
hwtime_ind	5726	0.58	0.29	0.20	1.00

Source: Authors using TIMMS 2003 data

**Table A9: Description of indexes from TIMMS used to analyze education quality among 8<sup>th</sup> graders in Armenia.**

	<i>Variables considered to build the index</i>	<i>Comments and interpretation</i>
Self-motivation	I enjoy learning biology I enjoy learning earth science I enjoy learning chemistry I enjoy learning physics I like being in school	Index built as an average of the 3 variables used. The index ranges from 0 to 1. If high motivation the index is =1
Parents' education	Father education level Mother education level	Index built considering the highest education of the parents. If the education of one of the parents is missing, the education of the other one is taken. The index ranges from 0 to 1. The index is =1 if the education of the parent is the highest.
Computer use	use of a computer at home use of a computer at school	Index built as an average of the 2 variables used. The index ranges from 0 to 1. If high use the index is =1
Homework time	hwtime	Index built normalizing the variable hwtime. The index ranges from 0 to 1. If the student spends a lot of time doing his hws the index is =1

Source: Authors using TIMMS 2003 data

**Table A10: Description of variables in TIMMS used to analyze education quality among teachers in Armenia.**

<i>Variable content</i>	<i>Variable name</i>	<i>Definition</i>
years of teaching	yrs_teaching	Number of years a teacher has been teaching
teaching certification	certif	It equals 1 if the teacher has a teaching certificate, 0 otherwise.
job satisfaction	satisf	It ranges from 1 through 5. 1 if the teacher has a very low satisfaction it equals 1, 5 if it has a very high satisfaction. The index is normalized to unity in the analysis.

Source: Authors using TIMMS 2003 data

**Table A11: Descriptive Statistics of variables from the TIMMS used to analyze education quality among teachers in Armenia.**

<i>Variable contents</i>	<i>obs.</i>	<i>mean</i>	<i>std deviation</i>	<i>min</i>	<i>max</i>
<b>Fourth-grade teachers</b>					
Years of teaching	322	18.08	11.12	1.00	50.00
Teaching certification	309	0.94	0.24	0.00	1.00
Job satisfaction	319	3.54	0.77	1.00	5.00
Teacher's qualifications index	296	0.69	0.16	0.15	1.00
Job satisfaction index	319	0.71	0.15	0.20	1.00
<b>Eighth-grade teachers</b>					
Years of teaching	206	18.995	9.665	3.000	50.000
Teaching certification	219	0.945	0.228	0.000	1.000
Job satisfaction	216	3.319	0.933	1.000	5.000
Teacher's qualifications index	202	0.669	0.144	0.135	1.000
Job satisfaction index	216	0.664	0.187	0.200	1.000

Source: Authors using TIMMS 2003 data

**Table A12: Description of indexes from TIMMS used to analyze education quality among teachers in Armenia.**

	<i>Variables considered to build the index</i>	<i>Comments and interpretation</i>
Teacher's qualifications	yrs_teaching	Index computed using the assets score method
	certif	
Job satisfaction	satisf	The index is a combination of years of teaching and having a teaching certificate The index has been normalized to 1. Index computed normalizing satisf, so that the index ranges from 0 to 1.

Source: Authors using TIMMS 2003 data

**Table A13: Description of variables in TIMMS used to analyze education quality among schools in Armenia.**

<i>Variable content</i>	<i>Variable name</i>	<i>Definition</i>
No shortage of instruction material	material	Ranges from 1 through 4. If no lack of resources the variable is equal to 4.
No shortage of budget for supplies	budget	Ranges from 1 through 4. If no lack of resources the variable is equal to 4.
No shortage of school buildings	buildings	Ranges from 1 through 4. If no lack of resources the variable is equal to 4.
No shortage of heating and lighting	heat	Ranges from 1 through 4. If no lack of resources the variable is equal to 4.
No shortage of instructional space	space	Ranges from 1 through 4. If no lack of resources the variable is equal to 4.
No shortage of handicapped facilities	handi	Ranges from 1 through 4. If no lack of resources the variable is equal to 4.
No shortage of computer	computer	Ranges from 1 through 4. If no lack of resources the variable is equal to 4.
No lack of internet	internet	Ranges from 1 through 4. If no lack of resources the variable is equal to 4.
No shortage of teachers	teachers	Ranges from 1 through 4. If no lack of resources the variable is equal to 4.
No shortage of staff	staff	Ranges from 1 through 4. If no lack of resources the variable is equal to 4.
No acts of vandalism	vandalism	Ranges from 1 through 3. If no vandalism the variable is equal to 3.
No theft	theft	Ranges from 1 through 3. If no theft the variable is equal to 3.
No students were intimidated	intims	Ranges from 1 through 3. If no student was intimidated the variable is equal to 3.
No teachers were intimidated	intimt	Ranges from 1 through 3. If no teacher was intimidated the variable is equal to 3.
No students were injured	injures	Ranges from 1 through 3. If no student was injured the variable is equal to 3.
No teachers were injured	injuret	Ranges from 1 through 3. If no teacher was injured the variable is equal to 3.
Region indicator (urban rural)	ruregion	ruregion=1 if fewer than 3000 people --> RURAL ruregion=2 3001 to 50000 people --> SMALL TOWNS ruregion=3 if more than 50000 people --> URBAN ruregion=4 if fewer than 3000 people --> YEREVAN (capital)
Owning a computer indicator	hcomp	equals 1 if the student owns a computer, 0 otherwise.

Source: Authors using TIMMS 2003 data

**Table A14: Descriptive Statistics of variables from the TIMMS used to analyze education quality among schools in Armenia.**

<i>Variable contents</i>	<i>obs.</i>	<i>mean</i>	<i>std</i>	<i>min</i>	<i>max</i>
<b>Eighth-grade schools</b>					
No shortage of instruction material	118	2.47	1.11	1.00	4.00
No shortage of budget for supplies	119	2.49	1.04	1.00	4.00
No shortage of school buildings	119	2.51	1.14	1.00	4.00
No shortage of heating and lighting	117	1.87	1.00	1.00	4.00
No shortage of instructional space	116	2.99	1.10	1.00	4.00
No shortage of handicapped facilities	102	3.21	1.16	1.00	4.00
No shortage of computer	26	2.42	1.14	1.00	4.00
No lack of internet	74	1.86	1.23	1.00	4.00
No shortage of teachers	116	3.21	1.12	1.00	4.00
No shortage of staff	115	2.70	1.23	1.00	4.00
No acts of vandalism	114	2.57	0.78	1.00	3.00
No theft	112	2.55	0.80	1.00	3.00
No students were intimidated	114	2.48	0.79	1.00	3.00
No students were injured	114	2.54	0.79	1.00	3.00
Overall resources	19	0.66	0.13	0.38	0.85
Physical resources	19	0.64	0.12	0.39	0.82
Human resources	115	0.74	0.25	0.25	1.00
Heating and light	117	0.47	0.25	0.25	1.00
Computer	26	0.61	0.28	0.25	1.00
Internet access	74	0.47	0.31	0.25	1.00
School safety	111	0.85	0.25	0.33	1.00
<b>Fourth-grade schools</b>					
No shortage of instruction material	123	2.52	1.17	1.00	4.00
No shortage of budget for supplies	122	2.53	1.05	1.00	4.00
No shortage of school buildings	123	2.53	1.13	1.00	4.00
No shortage of heating and lighting	123	1.82	1.02	1.00	4.00
No shortage of instructional space	122	2.93	1.12	1.00	4.00
No shortage of handicapped facilities	106	3.28	1.20	1.00	4.00
No shortage of computer	25	2.40	1.22	1.00	4.00
No lack of internet	71	1.80	1.20	1.00	4.00
No shortage of teachers	120	3.32	1.13	1.00	4.00
No shortage of staff	120	2.63	1.29	1.00	4.00
No acts of vandalism	112	2.59	0.78	1.00	3.00
No theft	111	2.59	0.79	1.00	3.00
No students were intimidated	111	2.49	0.78	1.00	3.00
No students were injured	112	2.57	0.79	1.00	3.00
Overall resources	18	0.66	0.14	0.40	0.85
Physical resources	19	0.63	0.13	0.39	0.82
Human resources	119	0.74	0.26	0.25	1.00
Heating and light	123	0.46	0.26	0.25	1.00
Computer	25	0.60	0.31	0.25	1.00
Internet access	71	0.45	0.30	0.25	1.00
School safety	109	0.86	0.25	0.33	1.00

Source: Authors using TIMMS 2003 data

**Table A15: Description of indexes from TIMMS used to analyze education quality among schools in Armenia.**

	<i>Variables considered to build the index</i>	<i>Comments and interpretation</i>
Overall resources	$(\text{material} + \text{budget} + \text{buildings} + \text{heat} + \text{space} + \text{handi} + \text{computer} + \text{internet} + \text{teachers} + \text{staff}) / (10 * 4)$	The index ranges from 0 to 1. The index is =1 if no lack of any kind regarding the overall school resources
Physical resources	$(\text{material} + \text{budget} + \text{buildings} + \text{space} + \text{handi} + \text{computer} + \text{internet}) / (7 * 4)$	The index ranges from 0 to 1. The index is =1 if no lack of any kind regarding the school physical resources
Human resources	$(\text{teachers} + \text{staff}) / 8$	The index ranges from 0 to 1.
heating and light	$\text{heat} / 4$	The index ranges from 0 to 1. The index is =1 if no problem with heating and lighting
Computers	$\text{computer} / 4$	The index ranges from 0 to 1. The index is =1 if no lack of computers
Internet access	$\text{internet} / 4$	The index ranges from 0 to 1. The index is =1 if no lack of internet access
School safety	$(\text{vandalism} + \text{theft} + \text{intims} + \text{injures} + \text{intimt} + \text{injuret}) / (3 * 6)$	The index ranges from 0 to 1. The index is =1 if the school is safe

Source: Authors using TIMMS 2003 data

**Table A.16: Determinants of health care utilization** [omitted variables: education of the head/spouse: basic/no education; distance to closest health facility: less than 1 km; strata: Yerevan; region: Tavush]

	<i>Visited a Doctor</i>		<i>Received Treatment</i>		<i>Hospitalized</i>
	All Sick dF / dx	Poor Sick dF / dx	All Sick dF / dx	Poor Sick dF / dx	If severely ill dF / dx
<b>Patient Characteristics</b>					
Male dummy	-0.072	N.S.	N.S.	N.S.	<u>-0.053</u>
Age	N.S.	N.S.	N.S.	N.S.	0.031
Square of age	N.S.	N.S.	-0.001	N.S.	-0.001
dummy if severely ill	0.131	0.206	0.117	0.281	-
Subjective health good	N.S.	N.S.	-0.450	-0.506	N.S.
Subjective health not very good	N.S.	N.S.	-0.283	-0.443	N.S.
Subjective health bad	N.S.	N.S.	-0.283	-0.359	N.S.
Subjective health very bad	N.S.	N.S.	N.S.	<u>-0.315</u>	N.S.
<b>Level of Education of patient</b>					
Upper secondary	0.188	0.181	0.131	<u>0.160</u>	<u>-0.058</u>
Secondary specialized	0.177	N.S.	N.S.	N.S.	<u>-0.054</u>
Tertiary	0.203	0.453	0.202	0.405	N.S.
<b>Characteristics of the household</b>					
logarithm of household size	-0.504	-0.842	N.S.	N.S.	N.S.
Square of logarithm of household size	0.158	0.267	N.S.	N.S.	N.S.
Income intl. remittances (12m) per equiv adult.	N.S.	N.S.	N.S.	N.S.	<u>-0.009</u>
Total income (12m) per equiv adult.	N.S.	N.S.	N.S.	0.007	N.S.
household receives BBP	-0.106	-0.107	N.S.	N.S.	N.S.
Dummy if household is poor	-0.150	-	-0.160	-	-0.102
<b>Characteristic of the head/spouse</b>					
Age of head	N.S.	-0.033	N.S.	-0.068	<u>0.015</u>
Sq. of age of household Head	N.S.	0.000	N.S.	0.001	<u>0.000</u>
Female-headed household	N.S.	N.S.	N.S.	N.S.	N.S.
Head of household is single	N.S.	N.S.	N.S.	N.S.	N.S.
Head has a job	N.S.	N.S.	N.S.	N.S.	N.S.
Age of spouse	N.S.	N.S.	N.S.	N.S.	N.S.
Square of age of Spouse	N.S.	N.S.	<u>0.000</u>	N.S.	N.S.
Spouse has a job	N.S.	N.S.	N.S.	N.S.	N.S.
<b>Level of Education of head</b>					
Primary education	-0.235	N.S.	-0.367	N.S.	N.S.
Basic secondary education	-0.259	N.S.	-0.402	N.S.	N.S.
Upper/special secondary	-0.359	N.S.	-0.524	N.S.	N.S.
Tertiary	-0.317	N.S.	-0.502	N.S.	N.S.
<b>Distance to closest health facility</b>					
1-3 km	0.081	N.S.	0.141	0.176	N.S.
4-5 km	-0.080	N.S.	N.S.	N.S.	N.S.
6-10 km	N.S.	N.S.	N.S.	N.S.	-
more than 10 km	N.S.	0.671	<u>0.203</u>	N.S.	-

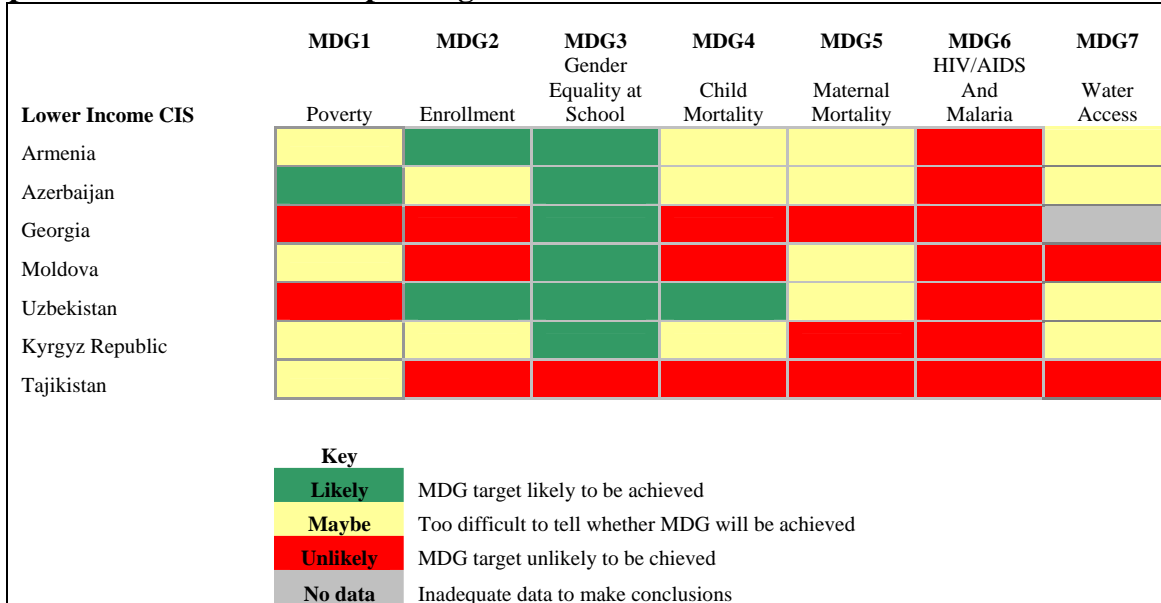
Source: Authors using Armenia ILCS 2004 data. Presented coefficients are significant at a 5 percent confidence interval. Underlined coefficients are significant at a 10 percent confidence interval. N.S: coefficient is not significant

**Table A.16 cont: Determinants of health care utilization**

	<i>Visited a Doctor</i>		<i>Received Treatment</i>		<i>Hospitalized</i>
	All Sick dF / dx	Poor Sick dF / dx	All Sick dF / dx	Poor Sick dF / dx	If severely ill dF / dx
<b>Geographical location</b>					
Urban dummy	N.S.	N.S.	<u>0.172</u>	<u>0.274</u>	N.S.
Rural dummy	N.S.	N.S.	N.S.	N.S.	N.S.
region==Aragatsotn	N.S.	N.S.	N.S.	N.S.	-
region==Ararat	N.S.	-0.018	-0.209	N.S.	-
region==Armavir	N.S.	N.S.	N.S.	N.S.	-
region==Gegharkunik	0.268	N.S.	0.283	<u>0.358</u>	-
region==Lori	N.S.	N.S.	N.S.	<u>-0.245</u>	-
region==Kotayk	0.222	N.S.	N.S.	N.S.	-
region==Shirak	N.S.	N.S.	N.S.	N.S.	-
region==Sjunik	N.S.	N.S.	N.S.	N.S.	-
Observations	987	396	1003	401	240

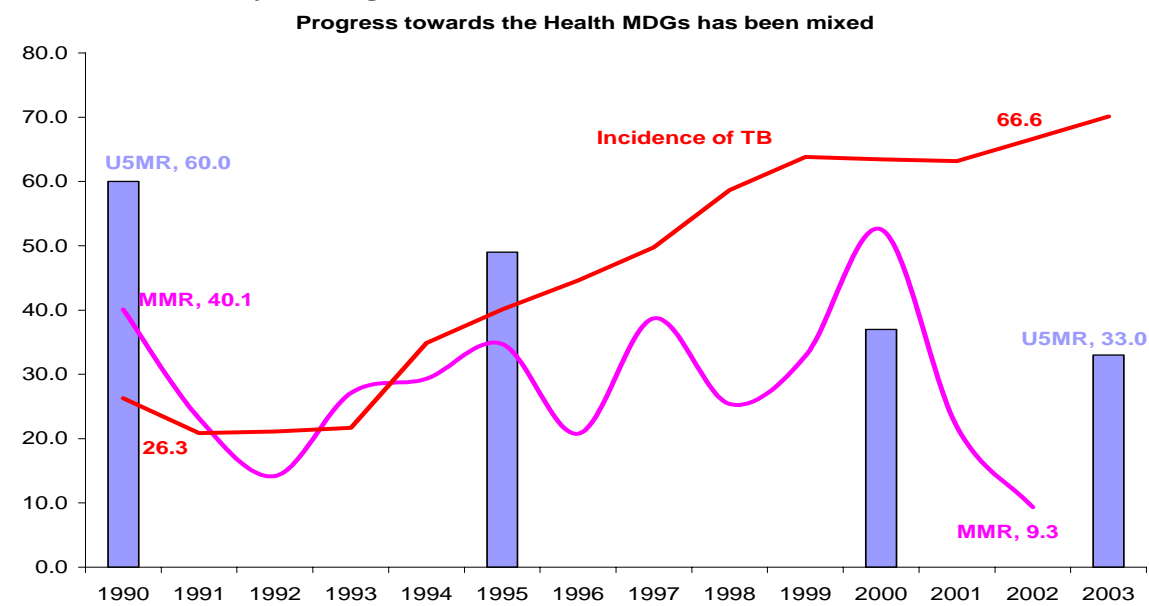
Source: Authors using Armenia ILCS 2004 data. Presented coefficients are significant at a 5 percent confidence interval. Underlined coefficients are significant at a 10 percent confidence interval. N.S: coefficient is not significant

**Figure A1: Armenia is one of the best performers among CIS countries in terms of potential success in accomplishing MDGs**



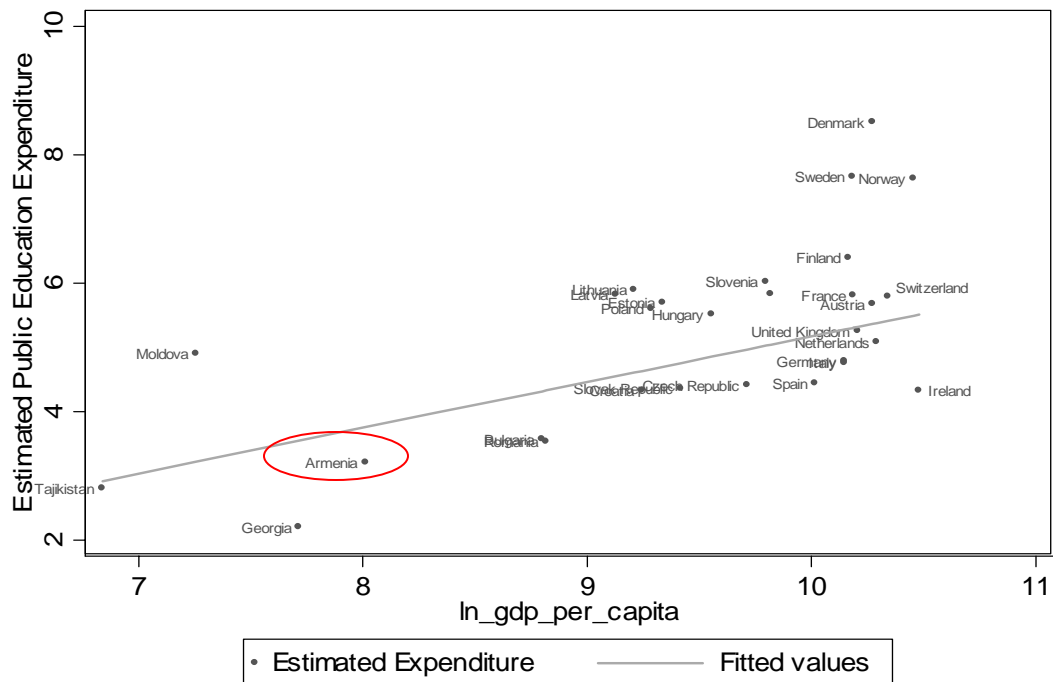
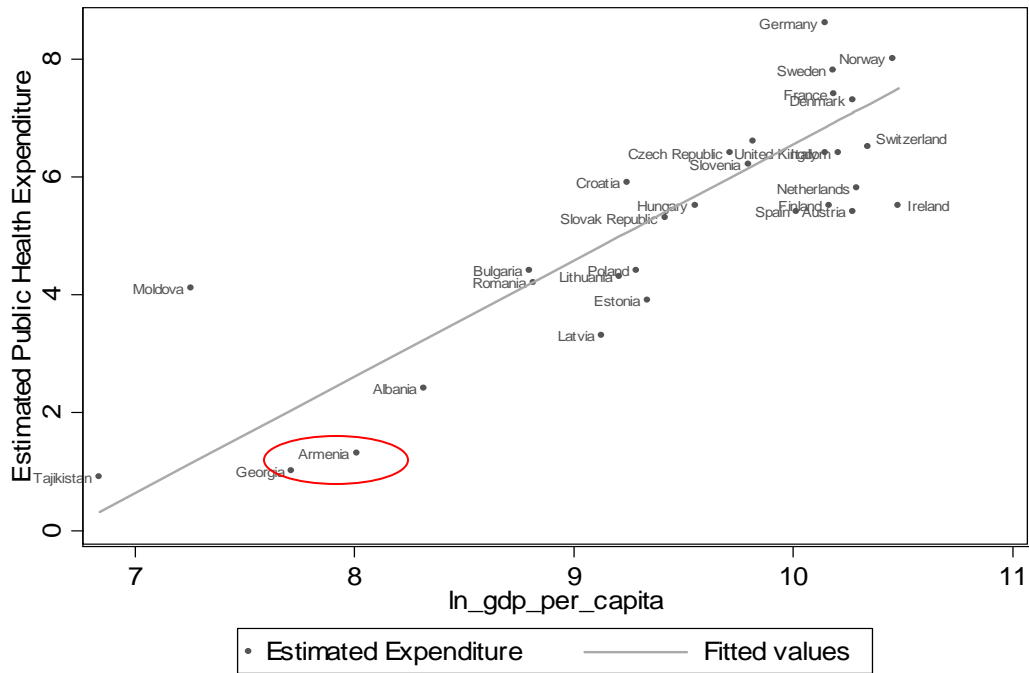
Source: World Bank (2004)

**Figure A2: Armenia has achieved significant progress in reducing infant and maternal mortality although incidence of TB remains on the rise**



Source: World Bank (2004)

**Figure A3: Levels of expenditure on health and education in Armenia are somewhat lower given its level of development.**



Source: World Bank using WHO 2004 data