

Report No. 63

## South Asia Human Development Sector

# Educational, Economic Welfare and Subjective Well-Being in Afghanistan

July 2013



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**South Asia Region  
Human Development Unit**

**EDUCATION, ECONOMIC WELFARE AND  
SUBJECTIVE WELL-BEING IN AFGHANISTAN**

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## INTRODUCTION

Education is universally recognized as one of the key determinants of socio-economic security and welfare. The link between education and increased individual earnings has been widely documented: there is a large body of cross-country evidence that education enhances the employability, productivity and income earning capacity of individuals (Hanushek and Welch, 2006). This in turn enables individuals to increase their household income and welfare (Hanushek and Woessmann, 2008; Patrinos and Psacharopoulos, 2011). Education has also been shown to have an impact on other socio-economic indicators such as child health. Here again, the evidence from numerous countries shows a strong correlation between mother's education and child health outcomes (Currie and Moretti, 2003; Glewwe, 1999; Desai and Alva, 1998; Behrman and Deolalikar, 1988). Better educated mothers are less likely to have low birth weight babies and these babies are less likely to die within their first year of life (Cutler and Muney, 2006). Moreover, more educated mothers are more likely to have better health and nutrition levels, which lead to higher health and nutrition outcomes for their children (Bicego and Boerma, 1993; Miller and Korenman, 1994; Duflo and Breierova, 2004; and Boyle et al., 2006).

Likewise, there is an increasing body of evidence to support the hypothesis that education is a determinant of happiness, or subjective well-being. Reaching important personal goals can often increase a person's sense of self-worth and happiness, and resources such as education and income are often necessary for the successful pursuit of goals. Hence it can be assumed that people with fewer resources and opportunities are, on average, less successful in reaching personal goals and are thus unhappier and less satisfied than people with more resources and opportunities (Diener and Biswas-Diener, 2002; Diener and Fujita, 1995). In a study of the association between education and happiness in 35 mainly advanced but also developing countries, Cheung and Chan (2009) found education to be a strong predictor of life satisfaction, and that the longer the time spent on education, the higher were people's reported levels of satisfaction. Meanwhile, Tesch-Romer et al.'s (2008) study of the relationship between gender inequality and subjective well-being across 57 countries found that societal gender inequality was related to the size of gender differences in subjective well-being, and that the inclusion of individual resources such as education and income in the analysis reduced the size of gender and country differences.

The impact of educational attainment on these various socio-economic indicators has been shown to vary by region, sub-region, gender, age, by income levels, and other variables. For instance, the educational rate of return tends to be higher in developing countries vs. developed countries. Investing in girl's education tends to yield greater benefits than boys education. The rate of return tends to decline with an increase in both the level of schooling and a country's per capita income. Moreover, most of the literature measures economic returns to education in terms of the quantity of schooling rather than quality and more recently; there has been an emphasis on the importance of adding educational quality to the model. This increases the variation in returns to education from 25% to 73% (Hanushek and Woessmann, 2010). Recent literature also emphasizes that education may have less impact in less developing countries that lack other facilitating factors (Hanushek and Woessmann

2010). Given this kind of variation, it is important to examine the impact of education on socio-economic variables in various regional and cultural contexts.

In this paper, we focus on the socio-economic impact of educational attainment in Afghanistan. Afghanistan presents a fairly unique context for examining the association between education and the socio-economic variable discussed above. It is a conflict-affected country, with strong and rich cultural and religious traditions. It also has some of the worst developmental indicators and in the world. To date there is little empirical evidence of the socio-economic economic impact of education in Afghanistan, although factors associated with school enrollment have received some attention (Guimbert et al., 2008; Hunte, 2006; Rashid, 2005; and Aturupane, Gunatilaka, Shojo and Ebenezer 2013). There are hardly any studies that have looked specifically at the association between education and subjective well-being in the context of a poor, conflict-affected country such as Afghanistan where cultural norms and practices also impose considerable restrictions against women's education. It is this gap in knowledge that the present study aims to fill.

Using data from the National Risk and Vulnerability Assessment (NRVA) survey of 2007/08, we investigate the extent to which the educational attainment of men and women is associated with greater economic welfare and less likelihood of being poor. The analysis is divided into four parts: part one looks education and other factors associated with household economic welfare and the probability of being poor; part two focuses on the education and other factors associated with women's participation in the labor force; part three looks at the association of mother's education with health-related outcomes of children; and part four looks at the association between educational attainment of girls and women, and their perceptions of well-being.

## **COUNTRY CONTEXT**

Afghanistan's education indicators are among the worst in the world and girls and rural communities are particularly disadvantaged (Government of Afghanistan and International Agencies, 2004; World Bank, 2012; and World Bank, 2013). Even in South Asia, Afghanistan lags behind in education by a substantial margin as Table 1 indicates. And even though a significant leap in enrollment took place immediately after the collapse of Taliban rule in 2002 (Miwa, 2005), these positive developments have not been sustained (Aturupane, Gunatilaka, Shojo and Ebenezer, 2013).

Historically politicization of education policy and ideological battles between successive governments and political groups were partly responsible for marked inequalities in educational attainment in Afghanistan up to about 2002 (World Bank, 2005). Years of conflict also destroyed educational infrastructure and constrained access while the issue of girls' education has been a flashpoint for ideological controversy and even violence. However, the Government of Afghanistan recognizes that girls need to be educated if Afghanistan is to transform and develop.



**Table 1: Key Education indicators for South Asia**

<b>Indicators</b>	<b>Afghanistan</b>		<b>Bangladesh</b>	<b>Bhutan</b>		<b>India</b>		<b>Maldives</b>		<b>Nepal</b>	<b>Pakistan</b>		<b>Sri Lanka</b>	
Primary school net enrolment ratio, 2003-2010 (%M,F)	<b>74</b>	<b>46</b>	<b>93</b>	<b>87</b>	<b>90</b>	<b>97</b>	<b>94</b>	<b>97</b>	<b>95</b>	<b>94.5 (Total)</b>	<b>72</b>	<b>60</b>	<b>95</b>	<b>96</b>
Females as % of males, primary school 2007-2010 (GER)	<b>63</b>		<b>104</b>	<b>101</b>		<b>81</b>		<b>95</b>		<b>1.02 (GPI)</b>	<b>84</b>		<b>100</b>	
Primary completion rate as a % of relevant age , 2009	<b>n.a.</b>		<b>65</b>	<b>87</b>		<b>95</b>		<b>120</b>		<b>n.a.</b>	<b>63</b>		<b>95</b>	
Secondary school net enrolment ratio, 2007-2010 (%M,F)	<b>38</b>	<b>15</b>	<b>40(Total)</b>	<b>46</b>	<b>49</b>	<b>n.a.</b>		<b>n.a</b>		<b>46.5 (Total)</b>	<b>36</b>	<b>29</b>	<b>n.a.</b>	
Females as % of males, secondary school, 2007-2010 (GER)	<b>49</b>		<b>112</b>	<b>99</b>		<b>88</b>		<b>n.a.</b>		<b>.99 (GPI)</b>	<b>79</b>		<b>n.a.</b>	
Youth literacy rate (15-24 years), 2005-2008 (%)	<b>n.a.</b>		<b>79</b>	<b>74</b>		<b>81</b>		<b>99</b>		<b>81</b>	<b>69</b>		<b>98</b>	

Source: (UNICEF, 2012).

## **ANALYSIS OF FACTORS ASSOCIATED WITH HOUSEHOLD ECONOMIC WELFARE AND POVERTY**

The majority of Afghans are reported to view poverty as the main reason behind the ongoing conflict (Oxfam, 2009). The most recent estimates of poverty in Afghanistan support this view. While 36 per cent of Afghans are poor and only able to meet 78 per cent of the estimated cost of basic consumption needs, at least half the population is consuming at a level less than 120 per cent of the poverty line (World Bank, 2010). Thus, vulnerability is very high and one small negative shock can plunge many individuals into poverty. In this section we look at the extent to which the educational attainment of the household head and other factors are associated with household economic welfare and the probability of the household being poor.

This analysis of household economic welfare defines economic welfare fairly narrowly as denoted by the level of household per capita consumption. We look at economic welfare rather than labor earnings, which is the usual approach to estimating returns associated with educational attainment. This is because the wage data available in the NRVA 2007/08 is not uniform across industries and occupations whereas the data on household consumption is comprehensive.

The welfare function we estimate is based on the relationships between consumption and households' resource endowments that have emerged from the theoretical and empirical literature as follows:

$$W = \alpha + \beta X + \varepsilon \tag{1}$$

In this equation,  $W$  denotes economic welfare as represented by the log of real per capita household consumption and  $X$  is a vector of exogenous endowments that determine household expenditure, and  $\varepsilon$  is a stochastic error term. The exogenous endowments are grouped into five categories: The demographic characteristics of the household head; his or her level of educational attainment; characteristics of the household; community and infrastructure variables, and regional variables.

The analysis of the probability of being poor fits the following model,

$$\Pr(P = 1 | X) = F(\alpha + \beta X) \tag{2}$$

where the binary dependent outcome  $P$  takes the value one if the household is poor, and zero if it is not.  $F(z) = e^z / (1 + e^z)$  is the cumulative logistic distribution and the parameters  $\beta$  are estimated by maximum likelihood.  $X$  is the same vector of five categories of exogenous endowments used in the estimation of household economic welfare.

Neither model addresses the issue of causality to distinguish whether household per capita consumption or a household being in poverty is a cause or a consequence of various resource endowments available to the household. Instead, it only seeks to identify the variables associated with household economic welfare and the probability of being poor.

The dependent variable in the analysis of household economic welfare is per capita household consumption expenditure which has been adjusted for spatial and temporal differences. This is exactly the same data used for the World Bank's (2010) *Poverty Status in Afghanistan*, and details about how the data was adjusted can be found in that report. Data identifying a household as being poor is also derived from the same study (World Bank, 2010), which used the Cost of Basic Needs (CBN) method (Ravallion, 1998) to estimate the poverty threshold. Thus the poverty line used in this analysis represents the level of per capita consumption at which the members of a household can be expected to meet their basic needs (food and non-food).

We turn next to the explanatory variables included in the five categories of endogenous endowments. Among the characteristics of the household head included such as age, gender and marital status are two variables denoting two levels of disability, mild and severe. Six levels of educational attainment are included, ranging from primary education to university, with no schooling being the reference category. Among the household variables are dependency ratio of the household and four sources of the largest share of household income: market farming, farm wage, trade and transport and transfers, with non-farm wage being the reference category. These factors were included as the World Bank (2010) found income generating activities to be closely linked to per capita consumption expenditure and poverty in Afghanistan.

Terrain characteristics were also included as explanatory variables as they were found to be highly correlated with poverty in Afghanistan (World Bank, 2010), particularly in the estimations based on the rural sub-sample. We also controlled for accessibility and connectivity by including variables on the distance to the nearest road, and a dummy variable to indicate whether the road was passable all year. Since the World Bank's (2010) study suggested that the level of economic development of the community as denoted by the proportion of bad jobs (casual laborer, self-employment and family work) and the share of underemployed (working less than 35 hours a week) among the employed were important correlates of poverty, we included these variables in the models to see their impact on per capita household consumption and the probability of being poor. Finally, we included province dummies to capture the effect of regional fixed effects not captured by the other spatial variables.

### **Women's Labor Force Participation**

The female labor force participation rate in Afghanistan in 2007/08 was considerably higher than in many of the country's South Asian neighbors. In Afghanistan, 47 per cent of women between the ages of 16 and 60 participated in the labor market in 2007/08 (based on NRVA 2007/08 data) whereas the equivalent rate for Sri Lanka was 37 per cent, India 32 per cent, and Pakistan 21 per cent. Participation rates in Bangladesh and Nepal tended to be higher at around 57 and 80 per cent (ILO data from KLIMnet). In rural Afghanistan, 54 per cent of working age women participates in the labor force whereas in urban areas this figure drops below the regional average to 31 per cent.

In this section we look at the factors associated with the probability of female labor force participation in Afghanistan, in particular, the impact of educational attainment on women's labor force participation decisions. In addition to the explanatory variables included in the previous analyses on the factors associated with economic welfare, we controlled for cultural

factors by introducing two dummy variables denoting whether the individual was usually accompanied when she left the family compound, and whether she usually wears a burka outside the home.

### **Education and Child Health Outcomes**

Afghanistan has some of the lowest health indicators in the world and in the region. It has the highest maternal mortality rate (1400 in 2008), second lowest life expectancy (48 years in 2010), and the 11<sup>th</sup> highest under-five mortality rate (149 deaths) in the world (UNICEF, 2012). In the region, the country had the highest incidence of stunting at 59 per cent, which is higher than the South Asian average of 47 with Nepal and India in close pursuit at 49 and 48 per cent. And it also fared the worst in child immunization indicators. Only 68 per cent of children had been immunized against tuberculosis, and 66 per cent against polio, whereas in South Asia, the averages for 2010 were 88 and 75 per cent, with India faring the next worse at 87 per cent and 70 per cent, respectively (UNICEF, 2012).

The root causes of Afghanistan's alarming health indicators appear to be poverty, conflict, and slow economic and social progress (World Bank, 2005). Low access of girls to education must also play a role, as participation in education is known to delay marriage until the age at which the female body is sufficiently developed for child-bearing. In this part of the analysis we looked at the extent to which the probability of a child being given colostrum and being immunized (both indicators of child health) is associated with her mother's education level. Accordingly, our analysis was based on modeling four equations related to four child health outcomes: the probability of a child being given colostrum; being immunized for tuberculosis by being given the BCG vaccine; for diphtheria whooping cough and tetanus with the DPT vaccine, and for polio with the polio vaccine. We included several other variables in addition to many of the variables included in the analyses in preceding sections, these included variables denoting birth order and mother's age, to investigate whether a male child is more likely to be given colostrum and whether having an older and more experienced mother is likely to be important. We have also looked at the impact of decision-making within the household on child health outcomes by examining whether, the principal female member of the household having decision-making control over what needs to be spent on children's health, is associated with better child health outcomes.

To understand supply-side factors, we included those variables which represent the availability of health facilities in the community, including the availability of health personnel of both sexes. The response options to the questions of the time taken to walk to the nearest health facility were taken to represent the distance in terms of travel time by foot to four types of health facilities: health post, public clinic, government hospital, and pharmacy, and since the lowest response rate for the health facilities variables was 70 per cent, we were able to include these critical variables without compromising too much on sample size.

### **Education and the Subjective Well-Being of Girls and Women**

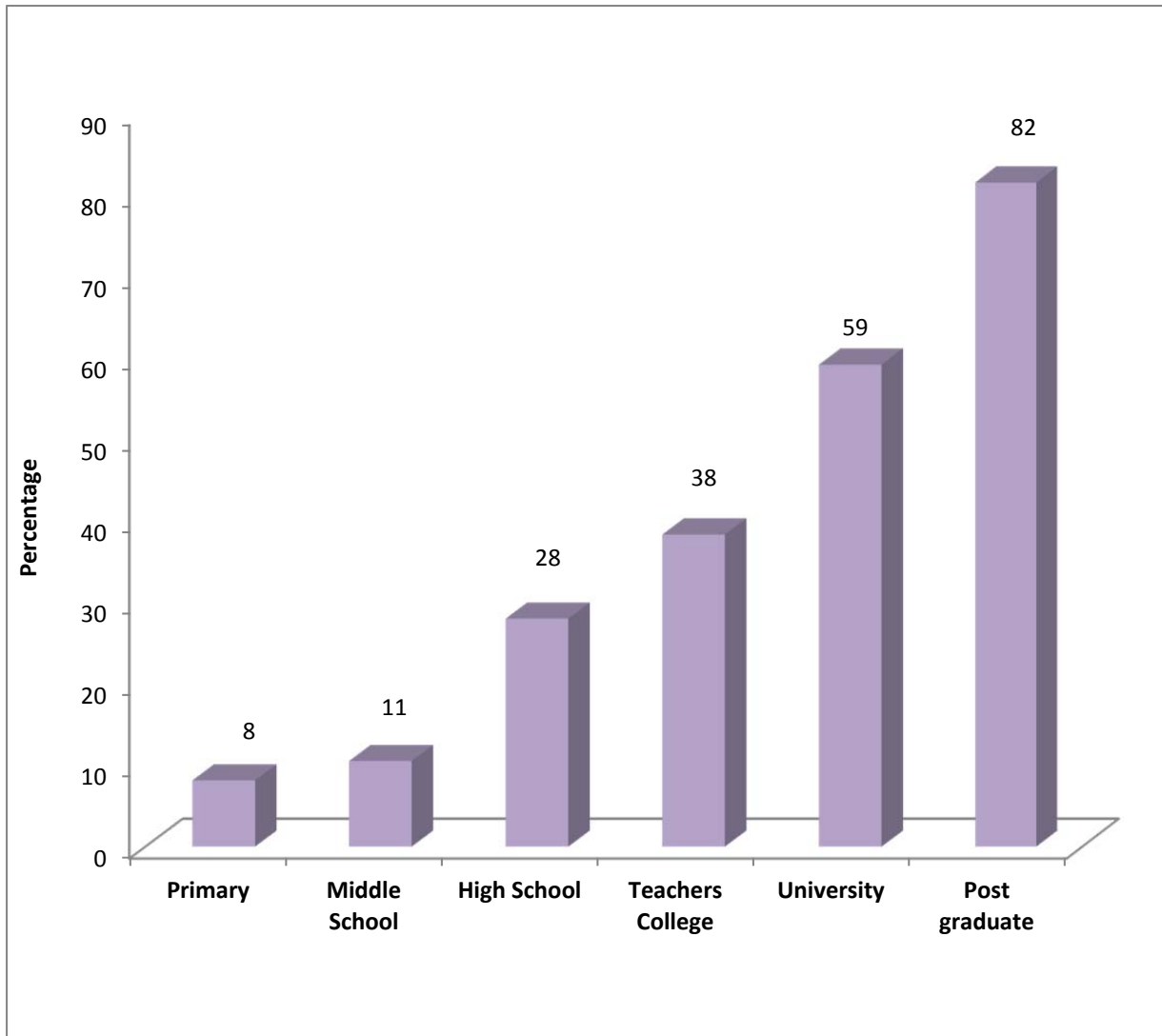
While the notion of utility or units of happiness is central to welfare economics, it is only recently that economists have accepted people's own perceptions of their happiness as a good

measure on which to base quantitative research. Following this shift in economists' own perceptions, the empirical literature on subjective well-being has expanded rapidly. Fortunately, the NRVA data of 2007/08 allows us to explore the subjective well-being of girls because the survey schedule administered to all girls and women 10 years and older included a question on perceived happiness which was amenable to analysis. The question was phrased as follows: 'If you were asked to rate how content you are with your life, how would you rate it?' There were five ranked answers: 'very unhappy'; 'unhappy'; 'neither unhappy nor happy'; 'happy'; and, 'very happy'. Converting these answers into happiness scores (1,2,3,4 and 5), we estimated happiness functions using ordinary least squares with the happiness score as the dependent variable, and individual, household, community and regional variables which can plausibly be hypothesized to influence happiness as the explanatory variables. Unfortunately, the survey did not administer the same question to males, so we are only able to look at the association between education and the subjective well-being of females. We turn next to the results of the estimation of happiness functions for Afghan women older than 18 years of age. In these models, the association of education with happiness levels were explored in greater detail, with dummy variables included for the level of educational attainment, the reference category being no schooling.

## **EMPIRICAL RESULTS**

The results of Part 1 of our analysis are laid out in Tables 2 and 3 below. Table 2 lays out the results of the OLS estimation of factors associated with log of per capita household consumption. Separate equations were estimated for the urban and rural sub-samples. Figures 1 and 2 present our findings on the impact of various levels of education on household consumption for urban and rural populations. The model estimating factors associated with log of per capita household consumption in urban households fits well, explaining 45 per cent of the variation of the dependent variable. The equation relating to the much larger rural sub-sample fits less well, explaining only 15 per cent of the variation in household consumption.

**Figure 1: Impact of Education on Household Consumption (Urban)**



Source: Econometric analysis by Bank Staff Team based on Table 2.

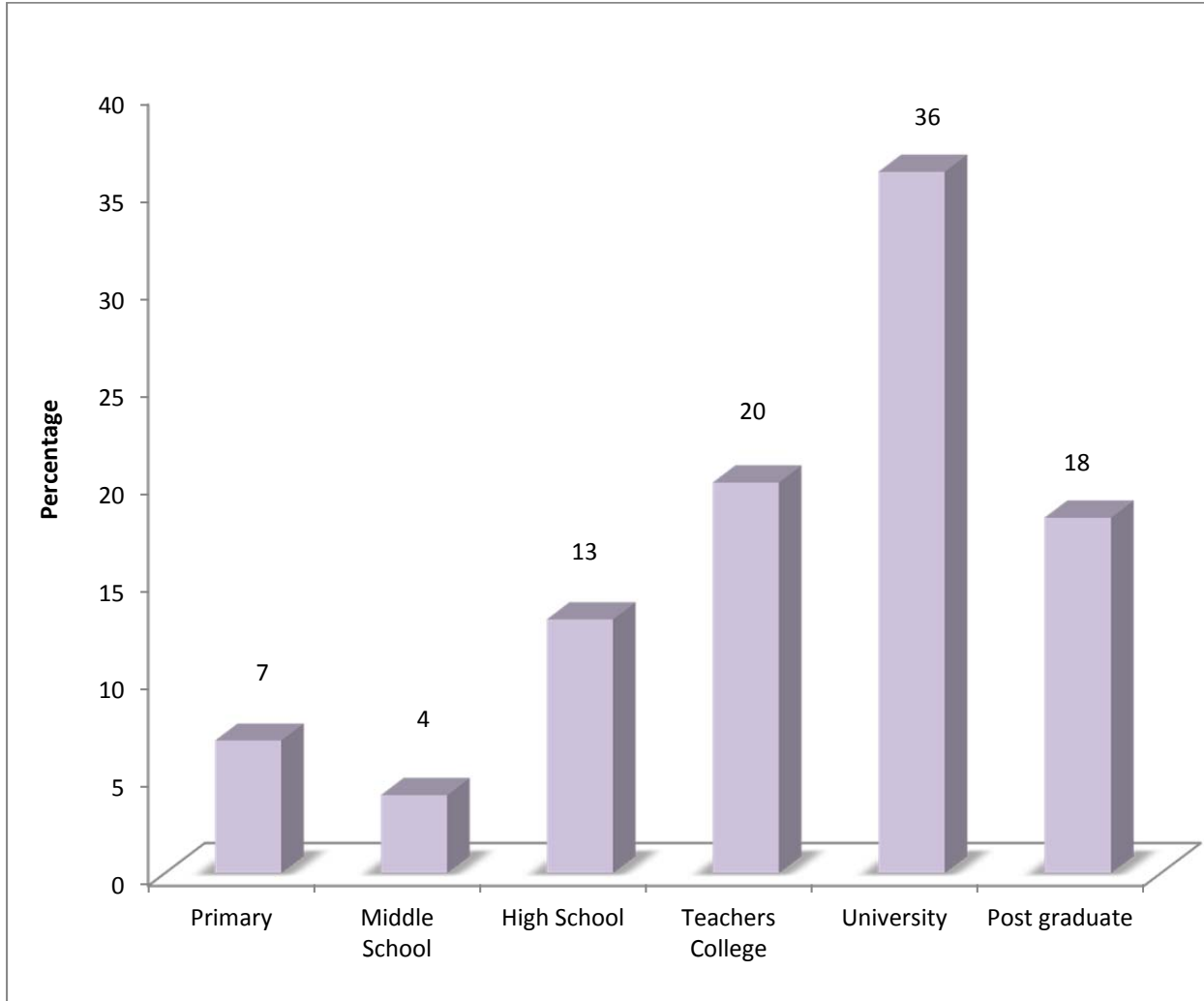
In contrast, the proportion of bad jobs in the community, and the proportion of under-employed persons in the community have as significant, almost as large, negative association with household consumption as the higher levels of education. Again the impacts appear to be larger in urban areas. The limits that the environment imposes on per capita consumption are also evident from the large, significant coefficients on the regional dummies. Other than for the south west, household per capita consumption in all other provinces is significantly lower than consumption in the central region. The differentials, though, appear more marked for urban areas than for rural areas. For example, while per capita consumption is 40 per cent less in the urban south than in urban areas in central province, in rural areas, the differential between the two provinces is only 8 per cent.

**Table 2: Education and other factors associated with per capita household consumption in urban and rural Afghanistan 2007/08: OLS Estimation**

	Means or proportions		(1)	(2)
	Urban	Rural	Urban	Rural
<i>Demographic characteristics of household head</i>				
Age	44.91	43.12	-0.0188***	-0.0120***
Age squared	2226.07	2058.35	0.0002***	0.0001***
Male (sex)	0.97	0.98	0.0990	-0.0383
Divorced	0.00	0.00	-0.0624	0.4449***
Widowed	0.04	0.03	0.1548**	0.0470
<i>Educational attainment of household head</i>				
Primary	0.12	0.10	0.0784***	0.0656***
Middle school	0.07	0.05	0.1006***	0.0396**
High school	0.15	0.05	0.2475***	0.1250***
Teacher's college	0.02	0.01	0.3247***	0.1851***
University	0.06	0.01	0.4653***	0.3066***
Postgraduate	0.01	0.00	0.5961***	0.1672
<i>Household variables</i>				
Dependency ratio	0.73	0.66	-0.4385***	-0.4003***
Farming for own consumption most important source of household income	0.04	0.26	0.0017	0.0690***
Market farming is most important source of income	0.14	0.18	-0.2044***	0.1126***
Farm wage most important source of income	0.02	0.07	-0.0831	0.0710***
Trade and transport most important source of income	0.29	0.12	0.1629***	0.1048***
Transfers most important source of income	0.05	0.07	0.0833**	-0.0165
<i>Community and infrastructure variables</i>				
Valley		0.12		-0.0609***
Hills		0.01		-0.0658*
Distance in km to nearest road	1.10	4.16	0.0025*	0.0001
Road is passable all year	0.87	0.64	0.0132	0.0389***
Proportion of 'bad' jobs in community	0.76	0.93	-0.4669***	-0.3107***
Proportion of under-employed in community	0.16	0.34	-0.5165***	-0.2307***
<i>Regional variables</i>				
South	0.04	0.12	-0.4036***	-0.0785***
East	0.06	0.09	-0.4699***	-0.1495***
Northeast	0.10	0.17	-0.1331***	-0.1280***
North	0.12	0.16	-0.3844***	-0.1164***
West	0.13	0.12	-0.1279***	-0.0770***
Southwest	0.09	0.11	0.0165	0.2698***
West central	0.01	0.09	-0.5957***	-0.2684***
<b>Constant</b>			8.6561***	8.0930***
<b>R-squared</b>			0.448	0.154
<b>Number of observations</b>			5036	13368

1. Dependent variable is log of per capita household consumption, adjusted for temporal and regional differences. Urban: mean 7.592, standard deviation .010. Rural: mean 7.208, standard deviation 0.004
2. The omitted categories in the dummy variable analyses are: female sex; single; no schooling; non-farm wage most important source of household income; plain; Central.
3. \*\*\*, \*\*, and \* denote statistical significance at the one per cent, five per cent and ten per cent levels respectively.
4. Estimated using NRVA 2007/08 data, household weights used.

**Figure 2: Impact of Education on Household Consumption (Rural)**



Source: Econometric analysis by Bank Staff Team based on Table 2.

### **Empirical Findings: Part One**

The education variables emerge as the most important in explaining the variation in household consumption. Only the variables related to the level of economic development in the community come close. There are several important points to note about the education variables. First, they are all highly significant. Second, the impact of educational attainment on per capita consumption increases monotonically with the level of education with secondary education in rural areas being the only exception. Third, returns to education in urban areas are consistently higher than in rural areas. So, for example, if an urban household head is educated to the primary level, then household per capita consumption will be 7 per cent more than if he or she did not have any schooling, all other things being equal. In rural areas, the return would be marginally less. From that level of education onwards, the differential in returns generally increases. Thus, a household head with a university degree in urban areas is associated with a level of household



consumption that is almost 50 per cent more than one with no schooling, whereas in rural areas, the returns are 30 per cent more.

Relatedly, the household's main source of income being non-farm wages makes for lower per capita consumption in rural areas than income from other sources, whereas the converse is true of urban areas. Main income from trade and transport, in particular, appear to be associated with higher per capita household consumption than in rural areas. The dependency ratio has a predictably large negative impact on household per capita consumption, with little difference in impact between urban and rural areas. But the size of the coefficient is as large as that of the proportion of bad-jobs in the community in urban areas, but in rural areas, a higher dependency ratio is more strongly associated with lower levels of consumption than is the proportion of bad jobs in the community.

By and large, other than for age, the demographic characteristics of the household head appear not to be very important: household per capita expenditure decreases with the age of the household head, and this is probably because Afghanistan's labor market is skewed heavily towards younger people, and the level of economic activity is such that physical strength rather than experience is better rewarded.

### **Empirical Findings: Part Two**

We turn next to the results of the analysis of the factors associated with the probability of being poor set out in Table 3. The urban model passes the goodness of fit test, but the rural model does not, suggesting that the explanatory variables in the equation for the rural sample fail to adequately explain the factors associated with poverty in rural areas. Nevertheless, the education variables in both equations perform well, although their impact is not as large as in the model explaining variations household consumption. As the education level of the head of the household increases, the likelihood that the household will be poor decreases monotonically for both the urban and rural samples, but here again, the impact appears greater in urban areas than in rural areas.

The other variables impact on reducing or increasing the chances of being poor in much the same way they increase or decrease household per capita consumption. To be noted, in particular, is the impact of economic environment as represented by the proportion of bad jobs and under-employed in the community, and the regional dummies. A higher dependency ratio is significantly associated with poverty, and the older the household head, the more likely the household is poor.

**Table 3: Education and Other Factors Associated With the Probability of Being Poor in Urban and Rural Afghanistan 2007/08: Marginal Effects of Logistic Estimation**

	Means or proportions		(1)	(2)
	Urban	Rural	Urban	Rural
<i>Demographic characteristics of household head</i>				
Age	44.91	43.12	0.0213***	0.0117***
Age squared	2226.07	2058.35	-0.0002***	-0.0001***
Male (sex)	0.97	0.98	-0.1138	0.0085
Married	0.92	0.93	-0.0201	-0.0310
Divorced	0.00	0.00	0.1186	-0.1799**
Widowed	0.04	0.03	-0.1092**	-0.0430
<i>Educational attainment of household head</i>				
Primary	0.12	0.10	-0.0401*	-0.0565***
Middle school	0.07	0.05	-0.0363	-0.0664***
High school	0.15	0.05	-0.1698***	-0.0958***
Teacher's college	0.02	0.01	-0.1661***	-0.1063**
University	0.06	0.01	-0.2556***	-0.1767***
Postgraduate	0.01	0.00	-0.2433***	-0.0624
<i>Household variables</i>				
Dependency ratio	0.73	0.66	0.2650***	0.3303***
Farming for own consumption most important source of household income	0.04	0.26	-0.0816***	-0.0666***
Market farming is most important source of income	0.14	0.18	0.0198	-0.1184***
Farm wage most important source of income	0.02	0.07	-0.0229	-0.0411**
Trade and transport most important source of income	0.29	0.12	-0.1617***	-0.0734***
<i>Community and infrastructure variables</i>				
Valley		0.12		0.0493***
Distance in km to nearest road	1.10	4.16	-0.0033**	-0.0001
Road is passable all year	0.87	0.64	0.0256	-0.0320***
Proportion of 'bad' jobs in community	0.76	0.93	0.2636***	0.2510***
Proportion of under-employed in community	0.16	0.34	0.2744***	0.1853***
<i>Regional variables</i>				
East	0.06	0.09	0.1771***	0.0360**
Northeast	0.10	0.17	-0.0806***	-0.011
North	0.12	0.16	0.2150***	0.0037
West	0.13	0.12	-0.0784***	-0.0475***
Southwest	0.09	0.11	-0.0647***	-0.2041***
West central	0.01	0.09	0.2102***	0.1111***
F-adjusted mean residual test (p-value)			0.293	0.000
No of observations			5036	13368

1. Dependent variable is the probability of being poor. Urban: mean 0.32, standard deviation 0.007. Rural: mean 0.34, standard deviation 0.004.
2. The omitted categories in the dummy variable analyses are: female sex; single; no schooling; non-farm wage most important source of household income; plain; Central.
3. Proportion of 'bad' jobs in the community is the proportion of casual labourers, self-employed and family workers among the employed in the community. Proportion of underemployed in the community is the share of employed who work less than 35 hours a week.
4. The F-adjusted mean residual test measures goodness of fit after fitting a logistic regression model to survey data. Archer and Lemeshow's user-written Stata program `svylogitgof.ado` was used to generate the test results. See Archer and Lemeshow (2006), 'Goodness-of-fit test for a logistic regression model fitted using sample survey data', in *Stata Journal*, 6 (1), pp. 97-105.
5. \*\*\*, \*\*, and \* denote statistical significance at the one per cent, five per cent and ten per cent levels respectively.
6. Estimated using NRVA 2007/08 data, household weights used.

Part 2 of our analysis focused the impact of educational attainment on women's labor force participation decision. To do this we introduced two dummy variables in addition to those in our base model, denoting whether a woman is usually accompanied when she left the family compound, and whether she wears a burka outside her home. The results of the logistic regression for the rural and urban sub-samples are set out in Table 4. Admittedly, the models do not explain variations in the dependent variable very well as neither passes the goodness-of-fit test. Nevertheless, while the equations may not explain the factors associated with the probability of women's labor force participation satisfactorily, we can still see the extent to which education and some other variables of interest are associated with the probability of participation.

The estimates in the table show that educational attainment is strongly, significantly and monotonically associated with the probability of labor force participation only in urban areas and that, too, for education levels including and beyond high school. In fact, in urban areas, they appear to have the strongest association with the dependent variable from all the factors included in the model other than for the dependency ratio which dominates. In contrast, the results associated with the education variables are by and large not significant in rural areas.

The higher the dependency ratio and the higher per capita household consumption, the less likely the woman participates, but having children less than 10 years of age appears to increase the likelihood that she goes to work. Thus while greater care responsibilities keep women at home, higher per capita household consumption levels may mean that women can afford to make a choice. But having small children may require more income, while the presence of other adults in the household may enable women to leave small children in their care and go out to work. Older women are more likely to participate in the labor market, but marriage reduces the likelihood of participation. Likewise, coming from a traditional cultural background appears to reduce the likelihood of women going out to work. Thus, having to be accompanied when leaving the compound, and having to wear a burka when doing so appear to constrain women from engaging in market work.

**Table 4: Education and Other Factors associated with the Probability of Women's Labor Force Participation in Urban and Rural Afghanistan 2007/08: Marginal Effect of Logistic Estimation**

	Mean or proportion		(1)	(2)
	Urban	Rural	Urban	Rural
<i>Demographic characteristics</i>				
Age	34.65	34.44	0.0413***	0.0842***
Age squared	1337.53	1313.16	-0.0005***	-0.0011***
Married	0.79	0.86	-0.1477***	-0.1623***
Divorced	0.00	0.00	-0.0240	-0.0779
Widowed	0.07	0.07	-0.0246	-0.2753***
Severely disabled	0.01	0.02	-0.1551***	-0.2896***
<i>Educational attainment</i>				
Primary	0.08	0.02	0.0243	-0.0122
Middle school	0.05	0.01	-0.0189	0.0501
High school	0.08	0.01	0.2021***	0.0673
Teacher's college	0.02	0.00	0.7477***	0.2448*
University	0.01	0.00	0.5492***	
Postgraduate	0.00	0.00	0.5815***	
<i>Cultural variables</i>				
Usually accompanied outside the compound	0.78	0.81	-0.0386**	-0.0675***
Usually wears burka when outside the compound	0.62	0.63	-0.0683***	-0.0377***
<i>Household characteristics</i>				
Log of per capita household consumption	7.60	7.19	-0.1400***	-0.1055***
Dependency ratio	0.73	0.66	-1.4115***	-2.5736***
At least one child less than 10 years of age	0.63	0.71	0.1443***	0.3560***
Farming for own consumption most important source of household income	0.04	0.27	0.0805**	0.0667***
Market farming is most important source of income	0.14	0.16	0.0462*	0.0899***
Farm wage most important source of income	0.02	0.07	0.0655	-0.0102
Trade and transport most important source of income	0.30	0.12	-0.0287*	0.0425***
Transfers most important source of income	0.05	0.08	0.1458***	0.1088***
<i>Community and infrastructure variables</i>				
Valley and hills		0.36		-0.0653***
Hills		0.01		-0.1510***
Distance in km to nearest road	0.89	4.34	0.0002	-0.0004**
Road is passable all year	0.88	0.64	0.0298*	-0.0121
Proportion of 'bad' jobs in community	0.75	0.93	0.1233***	0.0792
Proportion of under-employed in community	0.16	0.35	0.3506***	0.2828***
<i>Regional variables</i>				
South	0.04	0.13	-0.0107	0.0645***
East	0.07	0.11	0.0663**	0.0705***
Northeast	0.10	0.18	0.1803***	0.1111***
North	0.12	0.15	0.0929***	-0.024
West	0.12	0.12	-0.0337*	-0.0947***
Southwest	0.07	0.08	-0.025	-0.0508**
West central	0.01	0.09	0.5826***	0.3262***

	Mean or proportion		(1)	(2)
	Urban	Rural	Urban	Rural
F-adjusted mean residual test (p-value)			0.000	0.000
Number of observations			7097	17858

1. Dependent variable is the probability of labor force participation. Urban: mean 0.29, standard deviation 0.006. Rural: mean 0.55, standard deviation 0.004
2. The omitted categories in the dummy variable analyses are: single; no schooling; non-farm wage most important source of household income; plain; Central.
3. Proportion of 'bad' jobs in the community is the proportion of casual laborers, self-employed and family workers among the employed in the community. Proportion of underemployed in the community is the share of employed who work less than 35 hours a week.
4. The F-adjusted mean residual test measures goodness of fit after fitting a logistic regression model to survey data. Archer and Lemeshow's user-written Stata program `svylogitgof.ado` was used to generate the test results. See Archer and Lemeshow (2006), 'Goodness-of-fit test for a logistic regression model fitted using sample survey data', in *Stata Journal*, 6 (1), pp. 97-105.
- 5 \*\*\*, \*\*, and \* denote statistical significance at the one per cent, five per cent and ten per cent levels respectively.
6. Estimated using NRVA 2007/08 data, individual weights used.

Women in households that are dependent on agricultural income and transfers, particularly in the rural sector, are more likely to work. But living in remote hilly areas and further away from roads appear to work against women engaging in the labor market. Low levels of economic development in the community as denoted by the proportion of bad jobs and share of underemployed also appear to compel women to go out to work, and regional variables are also significant. But only in the west and southwest are women more likely to go to work than women in the central regions.

### Empirical Findings: Part Three

The results of the part 3 of our analysis regarding the impact of education non child health related outcomes are laid out in Table A.1 in the appendix. Although only the model on the probability of being given colostrum passes the goodness of fit test, the results suggest strong associations between several of the explanatory variables included in the models and child health outcomes of interest.

First looking at demand-side factors, it is apparent that the probability of positive outcomes increases with the mother's years of schooling, although the marginal effects are significant only in the immunization for tuberculosis and diphtheria, whooping cough and tetanus. Older mothers are less likely to immunize their children and if mothers have to be accompanied outside the family compound, then their children are also less likely to be immunized. On the other hand, wearing a burka is associated with a greater probability of immunization. However, the largest positive association between demand-side factors and child health outcomes is for the decision-making variable and the per capita household consumption variable. Per capita household expenditure is positively correlated with child health outcomes, significantly in the case of BCG and DPT vaccination, and the size of the marginal effects are as large as the effects on the variable denoting household decision-making.

We turn next to the health facilities variables. By and large, the greater the distance the health facility is from the community, the less likely that the infant is given colostrum and the child is immunized, but the marginal effects are significant only in the case of health post and public clinic. The availability of female healthcare personnel at the facilities is associated with a greater likelihood of immunization. The presence of a female health worker at the health post and the

midwife at the public clinic seem particularly important. While several of the terrain and infrastructure access variables and almost all the regional variables appear to be significantly associated with child immunization outcomes, there is no distinct pattern as the importance of these variables seems to vary with the different outcomes. This is hard to explain.

#### **Empirical Findings: Part Four**

The results of the final part of our analysis are laid out in Table 5, which shows the results of the estimation of happiness functions for the sub-samples of girls between 10 and 18 years of age in urban and rural areas. Table 6 sets out the equivalent results for the estimation of factors associated with the subjective well-being of women 19 years and older. The first point to note in the tables is that the models do not have much explanatory power. For example, the explanatory variables in the urban model explaining girls' happiness account for only 19 per cent of the variation in reported happiness levels and this is the best fit of all four equations. Nevertheless, many of the associations between happiness and the explanatory variables included in the models are informative, significant and worthy of comment.

Consider the results relating to girls between 10-18 years of age, enrollment in school is strongly and significantly associated with greater happiness. In urban areas, going to school increases girls' happiness score by 18 per cent, and in rural areas, it increases the score by 13 per cent, all else being equal. In contrast, being severely disabled, having been employed the previous week, and having to do household chores, reduces happiness. Nevertheless, being accompanied when leaving the compound makes girls happy, but having to wear a burka does not.

All the coefficients on the educational attainment variables bar one are positive, large and significant, and in urban areas, they increase monotonically with the level of education. So having primary education increases the happiness score by 16 per cent in urban areas compared with having no schooling at all. But continuing in education up to university increases the happiness score by 21 per cent. In rural areas, the returns to education in terms of happiness increase far more steeply. Those with primary education are 9 per cent happier than those with no education, but university education increases the happiness score by nearly 50 per cent.

**Table 5: Education and Other Factors Associated With Girls' Happiness, Rural and Urban Afghanistan 2007/08: OLS Estimation**

	Means/proportions		(1)	(2)
	Urban	Rural	Urban	Rural
<i>Child's characteristics</i>				
Age	12.52	12.37	0.0228	-0.1027
Age squared	159.68	155.92	-0.0014	0.0045
Child is severely disabled	0.01	0.01	-0.0674	-0.4358***
Child engaged in income-earning activity last week	0.10	0.19	0.0082	-0.0593**
Hours spent on household chores during previous week	17.11	16.15	-0.0040***	-0.0081***
Child usually accompanied outside the compound	0.66	0.69	0.1003***	0.0690***
Child usually wears burka when outside the compound	0.15	0.24	-0.1234***	-0.0895***
Child is enrolled in school	0.65	0.39	0.1826***	0.1293***
<i>Household, parents, culture</i>				
Household's per capita expenditure	7.50	7.13	0.1818***	0.1087***
Experienced violence or insecurity last year	0.04	0.11	0.0387	-0.1228***
Mother's years of education	1.29	0.17	-0.0028	0.0154*
Father's years of education	3.31	1.84	0.0072***	0.0041
Mother has sole decision-making power over girls' education	0.05	0.04	-0.5394***	-0.1667***
Father has sole decision-making power over girls' education	0.48	0.51	-0.0765**	-0.0097
Household head/father decides about girls' education in consultation with person concerned	0.01	0.01	-0.1353	-0.1305*
Household head/father and spouse decide about girls' education in consultation with person concerned	0.02	0.02	0.3304***	0.3653***
<i>Community and infrastructure variables</i>				
Hills		0.01		-0.1825**
Distance in km to nearest road	0.66	3.44	-0.0068	-0.0004
Road is passable all year	0.89	0.66	-0.1624***	0.0129
<i>Regional variables</i>				
South	0.03	0.13	0.1645*	-0.2959***
East	0.07	0.11	0.4927***	0.1417***
Northeast	0.11	0.18	0.1640***	-0.1126***
North	0.13	0.14	0.0907*	-0.4429***
West	0.13	0.14	0.4585***	0.0448
Southwest	0.05	0.04	-0.0291	-0.0927
West central	0.02	0.08	-0.5403***	-0.3334***
Constant			2.4888***	3.9388***
R-squared			0.188	0.113
Number of observations			2404	5940

1. Dependent variable: Score of happiness based on cardinal values assigned to qualitative assessments as follows: very happy=5, happy=4, neither happy nor unhappy=3, unhappy=2 and very unhappy=1. Urban mean 3.94, standard deviation 0.014. Rural mean 3.93, standard deviation 0.011.

2. Sample relates to individuals between 10 and 18 years of age.

3. The omitted categories in the dummy variable analyses are: consultative decision-making that ranges from including just the spouse of the principal male or female member in making the decision, through consultation with the child concerned, to consultation with male members of the family or the decision being made by non-family members; plain; Central.

4. \*\*\*, \*\*, and \* denote statistical significance at the one per cent, five per cent and ten per cent levels respectively.

5. Estimated using NRVA 2007/08 data, individual weights used.

Happiness increases with household consumption, but employment appears to have no effect on happiness levels. Violence or insecurity-related shocks significantly reduce happiness in rural areas, but experiencing other shocks is negatively and significantly associated with happiness in both sectors. In fact, in rural areas, other shocks appear to cause greater unhappiness than experience of violence or insecurity related shocks. Rural girls appear to be happy to wear the burka as they become older but they continue to prefer participation and consultation in the process of making decisions about girls' education. Women living in valleys and hills seem to be happier than those living in plains and greater connectivity is also important for rural women's happiness. However, living near a road which is passable all year reduces urban women's happiness and this may be due to this variable picking up the discomfort associated with living near a busy highway. All else being equal, living in urban areas in the southwest and west central regions is associated with lower happiness than living in all other provinces, but only rural women living in the western and eastern Provinces are significantly happier than women living in the rural areas of central province.

### **Empirical Findings: Part Five**

To sum up, our findings indicate that educational attainment of the household head is one of the most important predictors of economic welfare as measured by per capita household consumption and of the probability of being poor. The economic opportunities afforded by the environment in which households find themselves, and internal characteristics such as the number of dependents relative to the number of working members, and the age of the head of household, are also important.

Our findings on the impact of educational attainment on women's decisions to participate in the labor force in Afghanistan maybe summed by as follows: greater educational attainment is significantly associated with a greater likelihood of women participating in the labor force only in urban areas. But by and large, it is economic factors such as low household income and living in economically backward areas that compel women to go out to work. Only the better off can afford to stay at home while those with too many domestic care responsibilities and those bound by cultural traditions are compelled to do so.

The findings in regards to the impact of education on child health outcomes ARE reassuring. They suggest that the more educated the mother is, the more likely that her child is immunized. The household's level of economic welfare and the decision-making power of its principal female member appear to be critical, with the availability of female health personnel and distance to health facilities also playing a part.



**Table 6: Education and Other Factors Associated with Women's Happiness, Rural and Urban Afghanistan 2007/08: OLS Estimation**

	Means/proportions		(1)	(2)
	Urban	Rural	Urban	Rural
<i>Individual's characteristics</i>				
Age	36.65	36.21	-0.0259***	-0.0167***
Age squared	1540.86	1492.07	0.0003***	0.0002***
Employed	0.26	0.53	-0.0092	0.0025
Married	0.77	0.84	0.0534	0.0054
Divorced	0.00	0.00	-0.9526***	0.0267
Widowed	0.10	0.09	-0.2199***	-0.3063***
Severely disabled	0.02	0.02	-0.5046***	-0.1383**
<i>Educational attainment</i>				
Primary	0.08	0.02	0.1570***	0.0974**
Middle school	0.04	0.01	0.1630***	0.3749***
High school	0.08	0.01	0.1541***	0.2811***
Teacher's college	0.02	0.00	0.3189***	0.2337
University	0.01	0.00	0.2098**	0.4960***
Postgraduate	0.00	0.00	0.9048**	0.5014***
<i>Household, empowerment, culture</i>				
Household's per capita expenditure	7.60	7.19	0.3131***	0.1142***
Experienced violence or insecurity last year	0.03	0.11	0.0291	-0.0439*
Experienced other shock last year	0.53	0.68	-0.0456*	-0.0982***
Usually accompanied outside the compound	0.77	0.81	0.0532*	0.0535***
Usually wears burka when outside the compound	0.61	0.62	-0.0004	0.1114***
Mother has sole decision-making power over girls' education	0.05	0.03	-0.3862***	-0.1797***
Father has sole decision-making power over girls' education	0.42	0.44	-0.0279	-0.0586***
Household head/father decides about girls' education in consultation with person concerned	0.01	0.01	-0.0871	0.0923
Household head/father and spouse decide about girls' education in consultation with person concerned	0.02	0.01	0.6817***	0.4590***
<i>Community and infrastructure variables</i>				
Valley		0.12		0.1159***
Valley and hills		0.36		0.0936***
Road is passable all year	0.88	0.64	-0.1131***	0.0363**
<i>Regional variables</i>				
South	0.04	0.13	0.1678***	-0.2789***
East	0.07	0.11	0.4960***	0.1175***
Northeast	0.10	0.18	0.2209***	-0.2525***
North	0.12	0.15	0.0788**	-0.4039***
West	0.12	0.12	0.4860***	0.0652***
Southwest	0.07	0.08	-0.0853*	-0.2519***
West central	0.01	0.09	-0.5252***	-0.4686***
Constant			1.6683***	3.2322***
R-squared			0.136	0.094
Number of observations			7279	18269

Notes:

1. Dependent variable: Score of happiness based on cardinal values assigned to qualitative assessments as follows: very happy=5, happy=4, neither happy nor unhappy=3, unhappy=2 and very unhappy=1. Urban mean 3.62, standard deviation 0.012. Rural mean 3.60, standard deviation 0.007.
2. Sample relates to individuals more than 18 years of age.
3. The omitted categories in the dummy variable analyses are: consultative decision-making that ranges from including just the spouse of the principal male or female member in making the decision, through consultation with the child concerned, to consultation with male members of the family or the decision being made by non-family members;; plain; Central.
4. \*\*\*, \*\*, and \* denote statistical significance at the one per cent, five per cent and ten per cent levels respectively.
5. Estimated using NRVA 2007/08 data, individual weights used.

Finally, in regards to the impact of educational attainment on the happiness of girls and women our findings confirm what has been shown in other countries: that happiness increases with per capita expenditure, confirming that poverty makes for greater unhappiness. We found that being enrolled in school increased happiness, and the more educated women were, the happier they reported themselves as being. Consultative decision-making in the household about education was associated with greater happiness and having better-educated parents also increased happiness. Other things being equal, greater household income was associated with greater happiness levels, violence and other shocks tended to reduce happiness particularly in rural areas, and there appear to be large and significant regional effects on happiness levels not accounted for by the other spatial variables.

## **CONCLUSION**

This study investigated socio-economic outcomes associated with education in Afghanistan. Among the outcomes considered were, household economic welfare and the probability of being poor; women's labor force participation; the likelihood of infants being given colostrum and being immunized; and, girls' and women's own perceptions of well-being.

The econometric analysis revealed strong and significant relationships between educational attainment and all these socio-economic outcomes. For example, the educational attainment of the household head appears to be one of the most important predictors of economic welfare as measured by per capita household consumption and of the probability of being poor. The economic opportunities afforded by the environment in which households find themselves, and internal characteristics such as the number of dependents relative to the number of working members, and the age of the head of household, are also important.

Greater educational attainment was also found to be significantly associated with a greater likelihood of women participating in the labor force in urban areas. Nevertheless, it appears that economic factors such as low household income and living in economically backward areas are more compelling forces that propel women to go out to work. Only the better off can afford to stay at home while those with too many domestic care responsibilities and those bound by cultural traditions appear to have little other choice.

Educational attainment of the mother was also found to be a key predictor of whether her child is immunized. Here, too, the household's level of economic welfare and the decision-making power of its principal female member appear to be critical, with the availability of female health personnel and distance to health facilities also playing a part.

Being enrolled in school increased girls' happiness, and the more educated women were, the happier they reported themselves as being. Consultative decision-making in the household about education was also associated with greater happiness and having better-educated parents also increased happiness. Other things being equal, greater household income was associated with greater happiness levels, violence and other shocks tended to reduce happiness particularly in rural areas. There also appear to be strong regional effects on the socio-economic outcomes examined in this paper.

The findings of this study provide very strong empirical support for the Government of Afghanistan's declared policy goals to invest in education, particularly of women, to transform and develop the country. And since education influences many other variables found to be associated with these outcomes, such as the availability of female health workers on child health outcomes, enhancing educational attainment will be absolutely essential for the socio-economic progress of Afghanistan's people.

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**Table A.1: Mother's Education and Other Factors associated With the Probability of Infants Being Given Colostrum and of Children Being Immunized, Afghanistan 2007/08: Marginal Effects of Logistic Estimation**

	Means or proportions		(1)	(2)	(3)	(4)
	Colostrum	BCG, Polio, DPT	Colostrum	BCG	Polio	DPT
<i>Child's demographic characteristics</i>						
Male	0.51	0.51	0.0089	0.0042	-0.0045*	-0.0194
Birth order	1.11	1.45	0.0016	-0.0100	0.0001	-0.0129
<i>Household's and mother's characteristics</i>						
Household's per capita expenditure	7.13	7.15	0.0172	0.1240***	0.0037	0.0877***
Mother's age	28.64	29.52	0.0000	-0.0027***	0.0000	-0.0031***
Mother's years of education	0.27	0.23	0.0024	0.0164**	0.0014	0.0222***
Female head/spouse has sole decision-making power over expenditure on medicines for children	0.03	0.03	0.0220	0.0462*	0.0109***	0.0389
Mother usually accompanied outside the compound	0.88	0.88	-0.0423***	-0.0561***	0.0042	-0.0844***
Mother usually wears burka when outside the compound	0.75	0.75	0.0153	0.0808***	-0.0040	0.1209***
<i>Health facilities in community</i>						
Time taken by foot to health post	1.92	1.93	-0.0134**	-0.0063	0.0030*	-0.0249***
Time taken by foot to public clinic	2.69	2.66	0.0116	-0.0325***	-0.0060***	-0.0564***
Time taken by foot to government hospital	4.10	4.11	-0.0017	0.0028	0.0007	0.0022
Time taken by foot to pharmacy	3.50	3.43	0.0025	-0.0090**	0.0016	-0.0024
Female community worker at health post	0.55	0.52	0.0471***	0.0808***	0.0066**	0.1417***
Male doctor at public clinic	0.91	0.92	0.0121	0.0161	-0.0033	-0.0615*
Female doctor at public clinic	0.55	0.56	-0.0417***	-0.0041	0.0031	-0.0023
Female nurse at public clinic	0.65	0.66	0.0157	-0.0335**	-0.0048	-0.0031
Midwife at public clinic	0.73	0.75	-0.0094	0.0376**	0.0126*	0.1049***
Male doctor at government hospital	0.99	0.98	0.0621	-0.1328***	-0.0033	-0.1725***
Female doctor at government hospital	0.91	0.92	0.2100***	0.0504	-0.0045	0.1242***
Female nurse at government hospital	0.93	0.94	0.0568	0.0203	0.0076	0.0785
Midwife at government hospital	0.94	0.95	-0.1153***	0.1273***	-0.0068	-0.0632

<i>Other community and infrastructure variables</i>						
Rural	0.92	0.93	-0.0381**	0.0523*	0.0071	0.0412
Valley	0.07	0.08	-0.0056	0.0245	-0.0298**	0.0192
Valley and hills	0.37	0.34	-0.0156	0.0637***	-0.0153***	0.0655***
Hills	0.01	0.01	0.0515*	0.1714***	-0.0005	0.1723***
Distance in km to nearest road	4.96	3.74	0.0007	-0.0006**	-0.0001*	-0.0002
Road is passable all year	0.72	0.74	-0.0007	0.0639***	-0.0034	0.0475**
<i>Regional variables</i>						
South	0.06	0.06	-0.0885	-0.2291***	0.0084*	0.1519***
East	0.06	0.07	0.0403	0.0108	0.0128***	0.2875***
Northeast	0.32	0.32	-0.0242	0.0007	0.0153***	0.2885***
North	0.13	0.12	-0.0304	-0.1948***	0.0102***	0.1034***
West	0.22	0.21	0.0741***	-0.1876***	0.0177***	0.1598***
Southwest	0.08	0.09	-0.0840	0.0126	-0.0972***	-0.3798***
West central	0.07	0.06	-0.2174***	-0.1523**	0.0104**	0.1978***
F-adjusted mean residual test (p-value)			0.617	0.000	0.051	0.000
Number of observations			2726	4707	4704	4695

Notes:

1. Dependent variables are: the probability of being given colostrum, mean 0.86, standard deviation 0.007; the probability of receiving BCG vaccination, mean 0.62, standard deviation 0.006; the probability of receiving Polio vaccination; mean 0.76, standard deviation 0.006; the probability of receiving DPT vaccination; mean 0.49, standard deviation 0.007.
2. Sample includes children 3 years or less for the model of factors associated with the probability of being given colostrum while the immunization equations relate to the sample of children 5 years or less.
3. The variables denoting the time taken by foot to various health facilities have been cardinalized from the response options as follows: 1 – no time at all, in community itself; 2 – one hour or less; 3 – more than one hour, less than three; 4 – more than 3 hours, less than 6 hours; 5 – more than 6 hours, less than 12 hours; more than 12 hours.
4. The omitted categories in the dummy variable analyses are: urban; plain; Central.
5. The F-adjusted mean residual test measures goodness of fit after fitting a logistic regression model to survey data. Archer and Lemeshow's user-written Stata program `svylogitgof.do` was used to generate the test results. See Archer and Lemeshow (2006), 'Goodness-of-fit test for a logistic regression model fitted using sample survey data', in *Stata Journal*, 6 (1), pp. 97-105.
6. \*\*\*, \*\*, and \* denote statistical significance at the one per cent, five per cent and ten per cent levels respectively.
7. Estimated using NRVA 2007/08 data, individual weights used.