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IZA DP No. 17279

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Economic Losses**

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ISSN: 2365-9793

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ABSTRACT

The Mis-Education of Women in Afghanistan: From Wage Premiums to Economic Losses*

This paper uses microdata from the Labor Force and Household Surveys conducted in Afghanistan to show the wage premium differences for education between men and women, documenting a significantly larger premium for women. This sharp distinction is causal as demonstrated by analysis of the compulsory schooling law. Recent bans on women's education and employment are projected to have significant negative impacts on women's future schooling, wage growth, and national income growth.

JEL Classification: C13, J31

Keywords: returns to schooling, returns to experience, investments in education, Afghanistan

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* We thank Caio Piza, Chris Sakellariou for comments. Disclaimer: The findings, interpretations, and conclusions expressed in this work are entirely those of the author and should not be attributed in any manner to the World Bank, its Board of Executive Directors, or the governments they represent.

1 Introduction

In recent years, there has been growing attention to the contributions of women's education to national economic development. This is evident in the high returns to women's schooling (Psacharopoulos & Patrinos, 2018), which are further amplified by increases in the educational attainment of women (Evans et al., 2021). An important return on investments in women's education is the intergenerational benefits to society, reflected in the increased schooling and health outcomes of future generations (Behrman & Rosenzweig, 2002; Haveman & Wolfe, 1995; Heckman & Hotz, 1986; Hill & King, 1995). Despite evidence of wage premiums for education, especially for women, significant barriers to their education and entry into the labor market persist in developing countries. The existing literature demonstrates how the expansion of women's education contributes to economic growth and development, often focusing on a few countries. We expand on this literature by examining the return to schooling and investigating how the banning of women's education and work can lead to significant economic loss in a fragile and conflict-affected setting. This work complements existing studies examining the economics of education in conflict and post-conflict contexts, and the importance of women's labor force participation rate to economic growth in these contexts.

Afghanistan has made significant strides in expanding access to educational opportunities at all levels, particularly for women in the past two decades (Baiza, 2013; Burde & Linden, 2013; Najam & Johnston, 2023). However, these hard-won gains are now under serious threat due to the current ban on women's education. When the Taliban returned to power in August 2021 (Najam, 2023), they banned the education of girls above sixth grade in March 2022 and further restricted women's access to education by banning them from all universities in December 2022. Forbidding women's access to secondary and tertiary education, and work opportunities, will have a negative impact on future economic growth. In 2019, 39% of the 9.1 million students in public general education were female students compared to 32% of the 3.7 million students in 2002. This represents a nominal increase of 203 percent in the total number of female students in public general education. In fact, the number could be slightly higher if we were to account for the number of female students in private schools. Despite such exponential growth in access to educational opportunities, there exists limited empirical evidence on the economic return to schooling, especially for women. Such evidence is critical for understanding the economic losses the country will face when women are denied access to education and work. We aim to fill this gap by providing the first rigorous evidence on the return to schooling and estimating potential economic losses.

This paper contributes to three main strands of literature. First, to the literature on education in conflict and war situations, which highlights that armed conflict can undermine long-term economic development (Blattman & Miguel, 2010; Collier, 1999), lead to loss of human capital and productivity (Becker et al., 2024; Boag, 1916; Kiker, 1966; Miguel & Roland, 2011; Riaño, 2024; Waldinger, 2016), lower labor market earnings (Blattman & Annan, 2010), and reduced years of schooling (Arunatilake et al., 2001; Chamarbagwala & Morán, 2011; Ichino & Winter-Ebmer, 2004; Ito et al., 2024; Patrinos, 2022; Shemyakina, 2011). Second, the literature on fragile, conflict, and violence (FCV) settings, which shows that conflict is negatively associated with educational attainment among the exposed cohort(s) (Akbulut-Yuksel, 2014; Akresh & de Walque, 2008; Bertoni et al., 2019; Dabalen & Paul, 2014; Diwakar, 2015; Justino et al., 2013; Pivovarova & Swee, 2015; Singh & Shemyakina, 2016; Verwimp & Bavel, 2014). Finally, the literature on the role of compulsory schooling underscores numerous benefits of mandated education, including its impacts on educational attainment and earnings (Angrist & Krueger, 1991; Card, 2001; Harmon & Walker, 1995; Patrinos et al., 2021; Patrinos & Sakellariou, 2005), preventing dropout and promoting equity (Oreopoulos, 2007), and improving social outcomes (Clark & Cummins, 2020). A growing number of studies show that education has a causal effect on nonpecuniary outcomes, including a person's physical

health (Clark & Royer, 2013; Powdthavee, 2010), their propensity to get a divorce (Oreopoulos & Salvanes, 2011), and positively affecting attitudes toward climate change (Angrist et al., 2024).

We use labor force and household surveys to show the returns to education overall, and for men and women. Further, we control for endogeneity and use the compulsory schooling law to causally estimate the returns to schooling. We complement our analysis of the return to schooling by using macro-level indicators to estimate the return of an additional year of schooling in the population on gross national income per capita, which we then use to simulate the economic loss from restricting female education. The returns to education in Afghanistan are low on average and the labor force participation rate of women is low. The return to schooling is lowest in Afghanistan among all countries studied (Montenegro & Patrinos, 2023). At only 4 percent, it is dramatically low compared to a worldwide average of 10 percent (Psacharopoulos & Patrinos, 2018). However, women have a much higher rate of return to education. Thus, every year of schooling produces a larger increment in earnings for women than it does for men. Women's returns are much higher at 13 percent compared to just 3 percent for men. Their contribution to the economy is therefore proportionately larger. We project that banning women from education and work could cost the country annually more than \$1.4 billion.

Since the 1970s, Afghanistan has endured continuous instability. The overthrow of the last king triggered the invasion by the Soviet Union in 1979. A Soviet-backed state ruled until 1993, followed by a period of Mujahideen rule, civil war, and the Taliban's rise to power in 1996. The Taliban regime was toppled by the invasion of the United States in 2001, leading to the establishment of the Islamic Republic of Afghanistan, which fell in 2021, marking the Taliban's return. These upheavals have caused widespread disruptions, deeply affecting educational opportunities, particularly for women. The ban on women's education by the Taliban in the late 1990s, for political purposes such as establishing group cohesion (Berman, 2009; Berman & Laitin, 2008), negatively impacted access to public goods, including education. Noury & Speciale (2016) show that the Taliban's religious rule, such as banning girls' schooling, reducing girls' enrollment, and prohibiting women from working, negatively influences their labor market experiences and subsequent expectations on the returns to education. Brunner & Mihailov (2023) find that girls who missed out on the chance of start school due to the ban in the 1996–2001 period were worse off in the long run, experiencing up to a 50 percent reduction in their average years of schooling, literacy probability, and primary school completion probability, compared to women in the control provinces that were not under Taliban rule. Efforts by the Afghan government, local and international communities in the post-2001 era led to a substantial expansion of enrollment in primary schooling (Najam & Johnston, 2023). A randomized evaluation on the impact of village-based schools on children's academic performance in rural northwestern Afghanistan shows that they significantly increased enrollment and test scores among all children, but particularly for girls (Burde & Linden, 2013). Moreover, policies such as affirmative action were implemented to enhance women's access to tertiary education. Najam (2024) shows that a gender quota increased the proportion of women in public universities and helped close the gender gap. However, existing restrictions on women's education will have a detrimental effect on their well-being and negative impacts on future economic growth.

We show that, on average, the return to schooling in Afghanistan is lower than the global average; yet the return on women's schooling is four times greater than that of men. Given the ban on women's schooling, we discuss the economic impact of the contraction of women's education and anticipate that our forecast will serve as a starting point for more sophisticated analyses of the implications of banning schooling for the entire female population. The Taliban's ban on women's education beyond the sixth grade and prohibitions on work, and the latest order that all women employed in public agencies, that are not allowed to work, will be paid a flat salary of only 5,000 AFN (\approx \$72) provide unique scenarios for future studies to assess the impact of dramatic policy changes on the returns to schooling in the context of a developing country

with radical religious rule. Women employed in public agencies prior to the regime changes continue to be on the government payroll and receive their salaries with noticeable interruptions and delays. Though authorities have terminated contracts for contracted employees in public agencies, women employees are not allowed to commute to public offices except for critical public service agencies such as health facilities and passport authorities. The ruling, which initially affected every female public employee, was later clarified to only affect those women who are on payroll and yet must stay at home.

2 Study Setting

Afghanistan has faced a series of significant political upheavals since the early 1970s, as illustrated in Figure 1. These turbulent events have brought widespread disruptions, deeply affecting every aspect of life for the Afghan people. The repercussions include large-scale migration and displacement, with millions forced to flee their homes due to conflict and war. Educational progression has been particularly hindered. Directly, by limiting access to educational facilities and increasing safety concerns, and indirectly, by disruptions such as displacement and severe economic shocks, which undermine the stability and support systems essential for sustained education. Displacement forces families to prioritize immediate survival over schooling, while also facing limited availability of educational opportunities in their host communities. Economic hardships reduce the resources available for education, leading to widespread educational disparities and a generation of students deprived of educational opportunities.

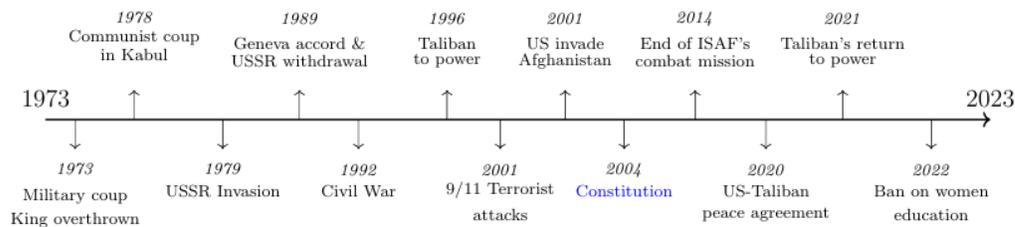


Figure 1: Timeline of major events in Afghanistan (1973–2021)

Note: USSR = Union of Soviet Socialist Republics; ISAF = International Security Assistance Force.

The average years of schooling follows an upward trend by birth cohort, with younger cohorts having higher levels of education, as shown in Figure 2. Figure 2 is constructed by taking the average years of education among individuals born in a given year. Education is originally reported in categories in surveys, which we convert to years of schooling using the schooling system in Afghanistan. We limit the data to individuals between ages 7 and 65 years at the time of the surveys (2007, 2014, and 2020). The official primary school entrance age in Afghanistan is 7. For instance, children born in 1991 were expected to start school in 1998 (after age 6 and turning 7). This cohort is anticipated to begin secondary schooling (grade 7) in 2004. There are stark gender disparities in educational attainment over the years, but encouraging trends emerge among the youngest cohort—those born after 2001.

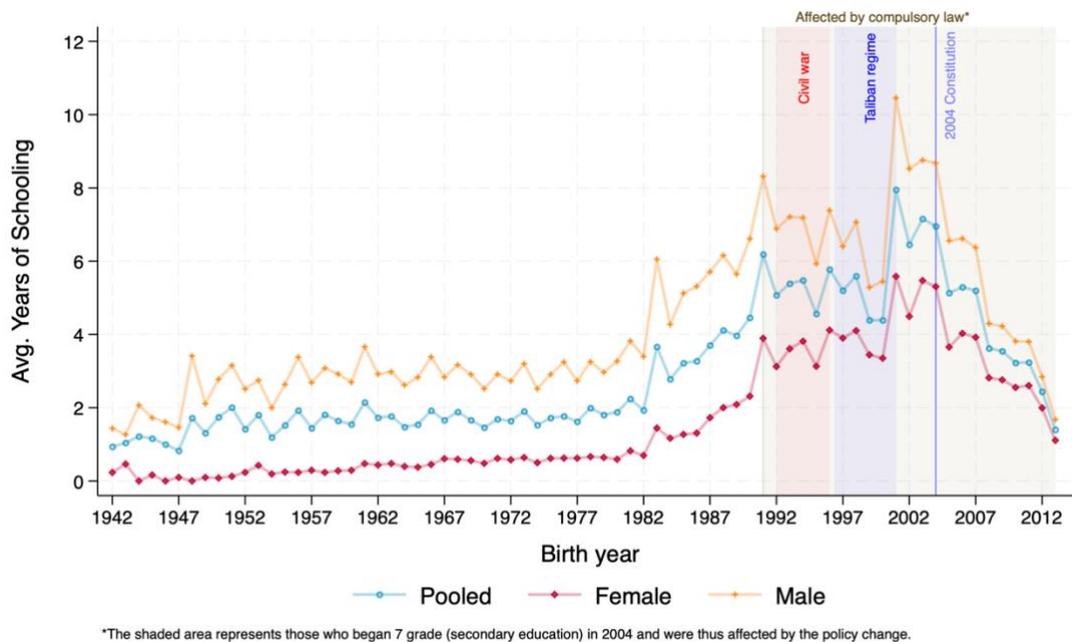


Figure 2: Average years of schooling by birth-year (7–65 years old)

Note: Data is limited to individuals between the ages 7 to 65 years at the time of the survey. The youngest cohorts (those born after 2003) are expected to be in school, subsequently average years of schooling decreases.

The latest report by [World Bank \(2024\)](#) on the state of women’s gender equality in 190 economies places Afghanistan as the fourth lowest-performing economy, much lower than its neighbors except the Islamic Republic of Iran. This also positions Afghanistan as one of the lowest-performing economies among the countries classified as fragile and conflict-affected situations (FCS) by the World Bank. Access to education, particularly higher levels of education coupled with job opportunities in FCS contexts, is extremely critical as a beacon of hope and a means for ending poverty and spreading prosperity. Nonetheless, limited enrollment, low completion rates, and restricted progression into secondary and tertiary education, along with poor job prospects, pose major obstacles to realizing the full economic potential of human capital, particularly within marginalized communities. Women have positively contributed to the economic growth of Afghanistan through their technical expertise in public and private institutions, leadership of women-owned businesses, and education of future generations at all levels. We believe that the systematic exclusion of women can lead to economic losses and long-term negative consequences in other domains such as health and child mortality.

3 Data

We compiled data on salaried workers from three waves of nationally representative household surveys in Afghanistan: the National Risk and Vulnerability Assessment (NRVA) in 2007, the Afghan Living Condition Survey (ALCS) in 2014, and the Income, Expenditure, and Labor Force Survey (IEL) in 2020. The research team obtained these datasets from the National Statistical and Information Authority (NSIA) under a restricted use agreement. We believe that combining data from the three survey waves offers a more comprehensive understanding of the returns to education by accounting for macro-level shocks, which can drive results in a single period. The analytical sample includes working-age individuals (14–65 years old) who reported their monthly income. NRVA 2007 reports labor force participation and wages for household members 16 years of age and older, while ALCS 2014 and IEL 2020 report labor information for household members aged 14 years of age and older. To calculate annualized income, we first converted the monthly income reported in Afghan currency to United States dollars using the official exchange rates from the annual statistical books published by the NSIA. We then multiplied the converted amount by 12 to estimate yearly income. To simplify the interpretation of returns to schooling on annualized income as a percent change in a person’s income, we took the natural logarithm of the annualized income.

The surveys report individuals’ education levels, which we convert into years using the official education system structure. School education in Afghanistan follows a 6-3-3 system: 6 years of primary education, 3 years of secondary education, and 3 years of high school. In tertiary education, individuals can pursue either a 2-year associate degree or a 4-year undergraduate degree, followed by a graduate degree.

We report the descriptive statistics for the analytical sample in Table 1. Column 1 provides pooled summary statistics, while columns 2 to 4 show survey-specific statistics. The average annualized income is \$1,892, and 10 percent of the sample is women. Two-thirds of salaried workers are employed in the public sector, and the average age is 34. About 20 percent were of the age that would have been affected by an increase in compulsory general education from grade 6 to grade 9 at the time of the 2004 constitution—the constitution was formally ratified on January 26, 2004, and the academic year in majority of the country starts on March 21, 2004; hence, we expect them to be the first cohort impacted by the policy change. Education was compulsory up to grade 6 until the 2004 constitution, which increased the mandatory years of schooling to grade 9. Therefore, the first cohort likely to be affected by this policy is individuals born in 1991, as they were on the verge of transitioning to secondary education and starting grade 7.

Table 1: Descriptive statistics of the analytical sample

	Survey Wave			
	Pooled	NRVA 2007	ALCS 2014	IEL 2020
	(1)	(2)	(3)	(4)
Annualized income (USD)	1891.25 (1390.15)	1241.84 (976.44)	2276.80 (1532.45)	1952.63 (1259.11)
Female	0.10 (0.30)	0.14 (0.34)	0.08 (0.28)	0.08 (0.27)
Experience	18.81 (14.04)	21.10 (13.92)	18.44 (14.12)	16.93 (13.69)
Experience square	551 (654.69)	638.66 (683.36)	539.41 (650.14)	473.99 (618.06)
Public sector	0.66 (0.47)	0.67 (0.47)	0.67 (0.47)	0.64 (0.48)
Age	34.07 (11.82)	35.90 (12.21)	33.37 (11.84)	33.24 (11.10)
Compulsory law	0.22 (0.41)	0.01 (0.10)	0.22 (0.41)	0.45 (0.50)
<i>N</i>	13135	3811	5869	3455

Note: Standard deviation in Parenthesis. Compulsory law indicates the share of respondents born in or after 1991 who were on the verge of starting 7 grade and affected by the 2004 constitution—increased compulsory education from 6 to 9 grade.

Finally, for the economic analysis, we use macro-level historical data on average years of schooling and gross national income per capita in constant 2017 purchasing power parity (PPP) terms from the Human Development Index country profile for Afghanistan (<https://hdr.undp.org/data-center/specific-country-data#/countries/AFG>). We also compile data on population growth, labor force, and female-to-male labor force participation ratio from the World Bank Open Data repository (<https://data.worldbank.org>).

While these surveys are among the few nationally representative repeated cross-sectional household surveys reporting on the labor activities of adults in the household, there are some potential limitations. For instance, labor market outcomes for those aged 14 and 15 years old are missing for 2007. Additionally, the coverage of women working as salaried workers is limited, corresponding to the lower labor force participation rate of women in the country. Furthermore, the absence of information on the school type and degree of salaried workers restricts our ability to analyze differential returns to education by school type and/or degree, if any. However, we provide the first rigorous evidence on the monetary rate of return to schooling in Afghanistan and highlight the scale of economic loss the country will experience if women's access to education and work remains restricted. We hope this will serve as a starting point for future work.

4 Empirical Strategy

We estimate the return to schooling in Afghanistan using the Mincer equation, which relates earnings to schooling and labor market experience. By using the Mincer equation, we can estimate the average increase in earnings from an additional year of schooling. To estimate the return to schooling, we employ ordinary least squares estimation in equation 1:

$$\ln(wage)_{ipt} = \alpha + \beta Edu_{ipt} + \gamma Exp_{ipt} + \theta(Exp_{ipt})^2 + \phi K_p + \psi W_t + \epsilon_{ipt} \quad (1)$$

The outcome variable is the log of the annualized income of individual i in province p and year (survey wave) t . β is the estimate of interest, representing the return to an additional year of schooling. γ indicate years of labor market experience, while θ is the square of experience. ϕ and ψ are province and survey-wave fixed-effects, respectively. And ϵ_{ipt} is a clustered standard error at the province level.

The main estimation issue with private returns to schooling is the possible endogeneity of the schooling decision. That is, whether people with higher ability choose more education. If that were the case, because these people would likely have earned higher wages even if they had not received more schooling, the coefficient on schooling would be biased upwards. Researchers have attempted to clarify whether this is an important concern by comparing the ordinary least squares (OLS) coefficient on schooling with an approach that causally estimates the returns to schooling, usually using the instrumental variable (IV) coefficient in regressions in which years of schooling are estimated with a plausible exogenous shock, which would in principle purge the coefficient of bias (Card, 2001; Duflo, 2001). IV estimates frequently surpass OLS estimates, indicating that OLS estimates are not biased upward (Oreopoulos, 2006; Patrinos & Psacharopoulos, 2020), contradicting the conventional understanding of ability bias. The method relies to exogenous sources of variation in educational attainment, like changes in compulsory schooling laws. The premise is that schooling returns differ among individuals, and institutional changes impact the educational decisions of specific individuals, not the average person. Thus, higher returns to schooling due to compulsory schooling are common in the literature Oreopoulos (2006), especially in developing countries (Duflo, 2001; Patrinos & Sakellariou, 2005).

Consequently, we use an instrumental variable approach, exploiting the expansion of compulsory education law in the country, owing to the 2004 constitution, to estimate the causal rate of return to schooling. The 2004 Afghan Constitution—approved early January 2004, a few months before the start of the new academic year in March—expanded mandatory schooling from grade 6 to grade 9. In Afghanistan, we expect students who would have completed sixth grade and were qualified to begin secondary schooling to be impacted by this expansion. In principle, this is the cohort that was born in 1991—the first cohort affected by the policy change. We use this increase in compulsory schooling as an instrument and estimate its relevance via Equation 2:

$$Edu_{ipt} = \alpha + \beta CompulsorySchool_t + \gamma Exp_{ipt} + \theta(Exp_{ipt})^2 + \phi K_p + \psi W_t + \epsilon_{ipt} \quad (2)$$

The outcome of interest, Edu_{ipt} , represents the years of schooling for individual i in province p and year t . β is the estimate of interest, providing evidence on the relevance of the instrument for years of schooling, which we visually investigate via an RD plot using *rdplot* Stata package by (Calonico et al., 2017) in Figure 3. The remaining terms are the same as described in Equation 1. Then, we use the predicated value \hat{Y}_{ipt} from Equation 2 to estimate the causal return to schooling via the model in Equation 3:

$$\ln(wage)_{ipt} = \alpha + \hat{Y}_{ipt} + \gamma Exp_{ipt} + \theta(Exp_{ipt})^2 + \phi K_p + \psi W_t + \epsilon_{ipt} \quad (3)$$

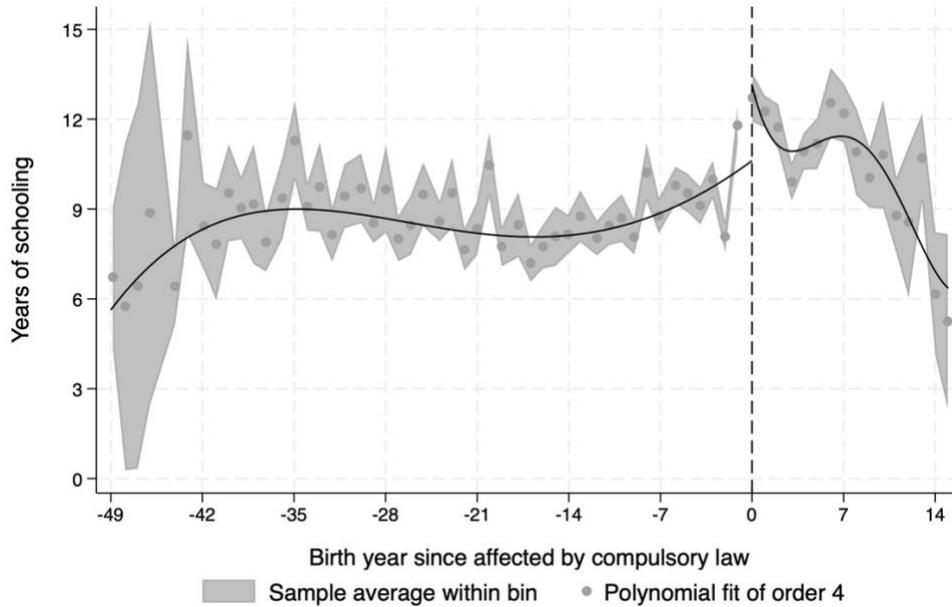


Figure 3: Average years of school among salaried workers
 Note: Data is limited only to salaried workers aged 14–65 years old in the survey waves.

We should expect at least theoretically that because of the compulsory law we should see an increase in the average years of schooling among the affected cohorts. That is what we show in Figure 3 and Table 2; nonetheless, after controlling for experience and its squared term, we find a substantial reduction in the average years of schooling of the affected individuals. We argue that these individuals are the youngest cohorts (maximum of 16 years old in 2007; maximum of 23 and 29 years old at the time of the 2014 and 2020 surveys, respectively.) and might have lower level of schooling compared to the older cohorts with similar years of experience. Thus, while only regressing the instrument on years of schooling and controlling for provinces and survey fixed-effects leads to an increase in years of schooling, as shown in Figure 3 and Table 2; but, once we control for individual labor market experience the younger cohort tends to have lower years of schooling (4.5 years) and lower wages (17 percent), with similar direction of estimates for women and men. These are estimates of reduced form by regressing the instrument on years of schooling and log of annualized income, while controlling for experience and its squared term. The ratio of the reduced forms shown in absolute terms— $17/4.5 = 3.7$ —is the coefficient which we attain from the IV.

Table 2: Effects of Compulsory Laws on Years of Schooling

	w/o controls			w/ controls		
	Pooled	Female	Male	Pooled	Female	Male
	(1)	(2)	(3)	(4)	(5)	(6)
Compulsory law	2.608*** (0.273)	2.666*** (0.406)	2.531*** (0.282)	-4.504*** (0.479)	-3.793*** (0.735)	-4.519*** (0.474)
Experience (imputed)				-0.593*** (0.074)	-0.390*** (0.099)	-0.605*** (0.071)
Experience square				0.006*** (0.001)	0.001 (0.002)	0.007*** (0.001)
Constant	8.750*** (0.059)	10.436*** (0.097)	8.582*** (0.061)	17.970*** (0.786)	17.368*** (0.924)	17.949*** (0.781)
N	13145	1289	11854	13145	1289	11854
Province FE	X	X	X	X	X	X
Survey-Wave FE	X	X	X	X	X	X

Note: Significance level: *0.1 ** 0.05, ***0.01. The dependent variable is level of schooling in years. The coefficient can be interpreted as unit change in years of schooling.

5 Results

We report our estimates of the monetary rate of return for an additional year of schooling in Table 3. Estimates are presented for both OLS and instrumental variable estimators, with the preferred estimates of interest being the 2SLS estimates reported in Columns 4 to 6. Columns 1 and 3 indicate the average rate of return for one more year of schooling among salaried workers, while the remaining columns show gender-specific monetary returns for an additional year of schooling. We find positive return rates for an additional year of schooling on average, as well as by gender, regardless of the estimator used. We find that the rate of return for women is much higher than that for men in Afghanistan.

An additional year of schooling is associated with a 2.5 to 4.0 percent increase in average annualized income among salaried workers, as seen in Columns 1 and 3 in Table 3. While the rates of return are positive, they are much lower than the global average of 10 percent (Psacharopoulos & Patrinos, 2018). The rates of return vary significantly by gender. An additional year of schooling is associated with a 7 to 13 percent increase in the annualized income of women, which is almost four times greater than that for men, which is 2 to 3 percent. Similarly, in Türkiye, a compulsory schooling reform produced a significantly lower return to schooling for men (Patrinos et al., 2021). The result holds when we include additional controls such as average years of household schooling, urban and Kuchi (Nomad) indicators, and years of experience, as shown in Table B.1. Moreover, we report survey-specific estimates in Appendix A; see Table A.1, Table A.2, and Table A.3 for survey-specific results for 2007, 2014, and 2020, respectively.

This significant disparity in rates of return by gender suggests that the marginal benefit of education is substantially higher for women in Afghanistan, subsequently their contribution to the country's economic growth. One possible explanation is that women with higher levels of education may have better access to higher-paying job opportunities compared to their less educated counterparts, prior to the dramatic events of August 2021. World Bank (2023) indicates that unemployment has more than doubled since the Taliban

took control and is substantially higher among youth and women. Additionally, the higher rates of return for women may reflect the relatively lower initial levels of female education in Afghanistan, meaning that each additional year of schooling represents a more significant improvement in skills and productivity. Investing in female education can have far-reaching implications for the socio-economic development of Afghanistan, as educated women are more likely to invest in the health and education of their children, creating a virtuous cycle of human capital development.

Table 3: Monetary Return from an Additional Year of Schooling

	OLS			2SLS		
	Pooled	Female	Male	Pooled	Female	Male
	(1)	(2)	(3)	(4)	(5)	(6)
Education (years)	0.025*** (0.004)	0.066*** (0.01)	0.023*** (0.003)	0.038** (0.016)	0.127*** (0.034)	0.029* (0.015)
Experience (imputed)	0.023*** (0.004)	0.023*** (0.006)	0.022*** (0.004)	0.028*** (0.008)	0.038*** (0.008)	0.025*** (0.008)
Experience square	-0.000*** (0.000)	-0.000 (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000 (0.000)	-0.000*** (0.000)
Constant	6.843*** (0.067)	5.849*** (0.112)	6.942*** (0.073)			
R-squared	0.21	0.26	0.22			
N	13135	1288	11845	13135	1288	11845
Province FE	X	X	X	X	X	X
Survey-Wave FE	X	X	X	X	X	X
First stage F-statistics						
Kleibergen-Paap				87.42	26.51	89.69
Cragg-Donald				1004.64	83.58	902.46

Note: Significance level: *0.1 ** 0.05, ***0.01. The dependent variable is log of annualized income in USD. The estimates can be interpreted as percent change in annual earnings.

We also report the annualized income breakdown by gender and education level in Figure 4. There are striking gender gaps in average income across all education levels; nevertheless, there is a greater premium at higher levels of education, especially for women. There are larger gains for women and men attaining higher education relative to those with high school or associate degrees.

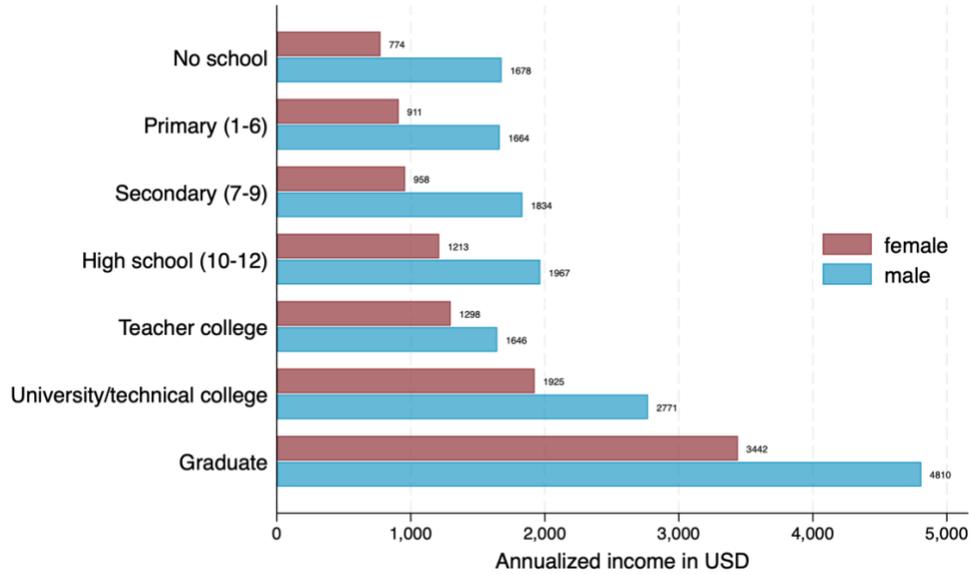


Figure 4: Annualized income by education level and gender

5.1 The Cost of Banning Women from Education and Work

We show that banning women from education and work has a substantial impact on economic growth in Afghanistan. We estimate the economic impact of such ban in two steps. First, we estimate the rate of return for an additional year of schooling in the population using a macro-Mincer equation. We use the logged gross national income (GNI) per capita in constant 2017 purchasing power parity (PPP) terms as the outcome variable, and average years of schooling in the population (S), labor force participation rate (LFPR), population growth rate (Pop), and the first lag (L1) of GNI as the independent variables. We estimate the following model, Equation 4, using country-level indicators:

$$\ln(GNI)_t = \alpha + \beta S_t + \gamma LFPR_t + \theta Pop_t + \psi L1.\ln(GNI)_{t-1} + \epsilon_t \quad (4)$$

We show that an increase of one additional year in the average years of schooling in the population is associated with a 10 percent increase in GNI per capita.

Second, we compute the average relative contribution of women to the mean years of schooling, which is 18 percent, and to labor force participation, which is 21 percent, for the period 1991–2022. Then, we construct adjusted values for years of schooling and labor force participation over this period, assuming zero contribution of women to both. Using the estimates from our initial model for all the variables, we predict the adjusted GNI per capita for the 1991–2022 period. We find that if women had zero contribution to the average years of schooling and labor force participation, the GNI per capita on average could have been 3 percent lower over this period compared to what it has been, as shown in Figure 5. The average GNI per capita in Afghanistan is \$1,794 (constant 2017 PPP); consequently, a 3 percent reduction results in a loss of \$54 (constant 2017 PPP) per year per person in the country. In other words, the country would have lost around \$1.37 billion (constant 2017 PPP) annually. We calculate this by multiplying \$54 by the average population (25.42 million) during this period.

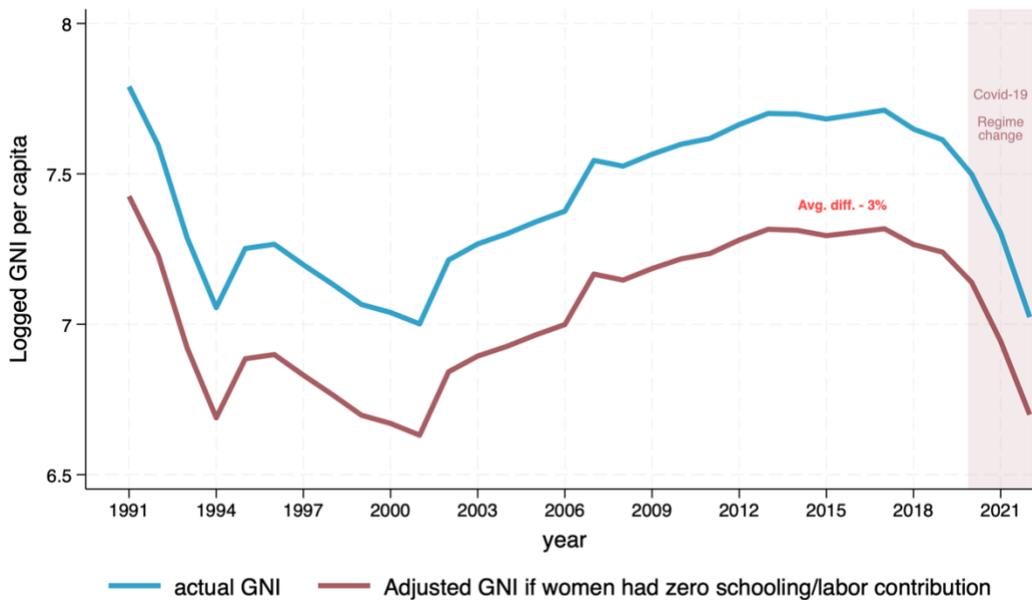


Figure 5: Logged gross national income (GNI) per capita in constant 2017 PPP

6 Discussion and Conclusion

This paper provides a case study on the private, monetary returns to schooling in a developing and fragile/post-conflict country. In Afghanistan, the returns to schooling are generally low, and the labor force participation rate for women has historically been and remains low. However, Afghan women who received additional schooling due to compulsory education laws and entered the labor market experienced significant positive returns of 13 percent, which is higher than the worldwide average of 10 percent (Psacharopoulos & Patrinos, 2018). This indicates that women can make substantial contributions to productivity in the Afghan labor market. Consequently, recent bans on female schooling and work in Afghanistan will not only hinder social development and personal growth for millions of women but will also severely impair economic growth efforts.

The findings also have significant implications for models of education in economic development. Women's education and workforce participation are major contributors to the economy, and without their involvement, development efforts will suffer considerably. Their economic contribution is disproportionately large, and banning women from education and work could cost the country over

\$1.4 billion. Given that Afghanistan's GNI is \$67.5 billion PPP (https://datacommons.org/place/country/AFG?utm_medium=explore&mprop=amount&popt=EconomicActivity&cpv=activitySource,GrossNationalIncome&hl=en), this loss represents an annual 2 percent decline in the national income. These bans on women's education and work are projected to significantly impact future schooling, wage growth, and national income growth.

It is important to note that Afghanistan's severe instability has created a labor market with unique characteristics. Since the 1970s, instability has caused widespread disruptions, severely affecting educational and employment opportunities, particularly for women. The return of the Taliban to power led to a ban on education for girls above the sixth grade and university education, as well as a prohibition on work for women. These actions jeopardize the substantial progress previously made in expanding educational and employment opportunities for women. Wars, invasions, conflicts, and legislative and regulatory changes have continually affected the development of the education system, leading to labor market fluctuations. These factors contribute to the decline in economic growth, and the long-term economic implications of this human capital decline will persist unless the bans on women's education and employment are lifted.

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A Survey wave specific estimates

1. NRVA 2007

Table A.1: Rate of return to an additional year of schooling (NRVA 2007)

	OLS			2SLS		
	Pooled	Female	Male	Pooled	Female	Male
	(1)	(2)	(3)	(4)	(5)	(6)
Education (years)	0.030*** (0.005)	0.047*** (0.014)	0.028*** (0.005)	0.136** (0.065)	0.031 (0.025)	0.130* (0.076)
Experience (imputed)	0.023*** (0.007)	0.010 (0.010)	0.024*** (0.007)	0.055** (0.022)	0.006 (0.012)	0.055** (0.025)
Experience square	-0.000** (0.000)	-0.000 (0.000)	-0.000*** (0.000)	-0.000** (0.000)	-0.000 (0.000)	-0.001** (0.000)
Constant	6.263*** (0.105)	5.845*** (0.169)	6.345*** (0.109)			
R-squared	0.06	0.25	0.07			
N	3811	511	3293	3811	511	3293
Province FE	X	X	X	X	X	X
Survey-Wave FE	X	X	X	X	X	X
First stage F-statistics						
Kleibergen-Paap				41.91	39.28	34.21
Cragg-Donald				37.39	19.91	24.20

Note: Significance level: *0.1 ** 0.05, ***0.01

2. ALCS 2014

Table A.2: Rate of return to an additional year of schooling (ALCS 2014)

	OLS			2SLS		
	Pooled	Female	Male	Pooled	Female	Male
	(1)	(2)	(3)	(4)	(5)	(6)
Education (years)	0.022*** (0.006)	0.092*** (0.011)	0.017*** (0.005)	0.046** (0.018)	0.154*** (0.034)	0.034** (0.014)
Experience (imputed)	0.022*** (0.006)	0.037*** (0.009)	0.018** (0.007)	0.034*** (0.011)	0.054*** (0.010)	0.027** (0.010)
Experience square	-0.000*** (0.000)	-0.000** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000 (0.000)	-0.000*** (0.000)
Constant	7.169*** (0.119)	5.606*** (0.160)	7.319*** (0.112)			
R-squared	0.13	0.49	0.12			
N	5869	486	5379	5869	486	5379
Province FE	X	X	X	X	X	X
Survey-Wave FE	X	X	X	X	X	X
First stage F-statistics						
Kleibergen-Paap				154.39	32.53	155.13
Cragg-Donald				806.40	66.40	718.95

Note: Significance level: *0.1 ** 0.05, ***0.01

3. IEL 2020

Table A.3: Rate of return to an additional year of schooling (IEL 2020)

	OLS			2SLS		
	Pooled	Female	Male	Pooled	Female	Male
	(1)	(2)	(3)	(4)	(5)	(6)
Education (years)	0.026*** (0.004)	0.023** (0.011)	0.028*** (0.005)	0.025*** (0.006)	0.054 (0.032)	0.026*** (0.007)
Experience (imputed)	0.026*** (0.005)	0.009 (0.008)	0.027*** (0.005)	0.026*** (0.005)	0.014 (0.011)	0.026*** (0.005)
Experience square	-0.000*** (0.000)	-0.000 (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000 (0.000)	-0.000*** (0.000)
Constant	6.914*** (0.092)	6.830*** (0.204)	6.904*** (0.100)			
R-squared	0.16	0.14	0.18			
N	3455	279	3173	3455	279	3173
Province FE	X	X	X	X	X	X
Survey-Wave FE	X	X	X	X	X	X
First stage F-statistics						
Kleibergen-Paap				368.63	19.65	384.16
Cragg-Donald				1028.93	35.16	951.52

Note: Significance level: *0.1 ** 0.05, ***0.01

B Supplemental analysis

B.1 Pooled estimates

Table B.1: Rate of return to an additional year of schooling—extended models

	OLS			2SLS		
	Pooled	Female	Male	Pooled	Female	Male
	(1)	(2)	(3)	(4)	(5)	(6)
Education (years)	0.023*** (0.004)	0.050*** (0.008)	0.017*** (0.003)	0.039* (0.021)	0.145*** (0.050)	0.026 (0.018)
Experience (imputed)	0.023*** (0.004)	0.021*** (0.006)	0.021*** (0.004)	0.027*** (0.007)	0.040*** (0.010)	0.024*** (0.007)
Experience square	-0.000*** (0.000)	-0.000* (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000 (0.000)	-0.000*** (0.000)
Avg. years of HH schooling	0.001 (0.003)	0.024** (0.010)	0.011*** (0.003)	-0.015 (0.019)	-0.049 (0.034)	0.002 (0.015)
Urban	0.148*** (0.028)	0.198*** (0.067)	0.142*** (0.026)	0.143*** (0.031)	0.056 (0.112)	0.140*** (0.028)
Kuchi (Nomad)	-0.121 (0.178)	0.303 (0.466)	-0.147 (0.184)	-0.112 (0.187)	0.294 (0.747)	-0.142 (0.189)
Constant	6.815*** (0.064)	5.762*** (0.105)	6.905*** (0.072)			
R-squared	0.21	0.28	0.22			
N	13134	1287	11845	13134	1287	11845
Province FE	X	X	X	X	X	X
Survey-Wave FE	X	X	X	X	X	X
First stage F-statistics						
Kleibergen-Paap				84.98	38.91	77.92
Cragg-Donald				802.75	57.11	719.84

Note: Significance level: *0.1 ** 0.05, ***0.01