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

Rafiuddin Najam, Harry Anthony Patrinos, and Raja Bentaouet Kattan*

Abstract

This study examines the private monetary rate of return to schooling in a context characterized by prolonged conflict. Using two novel datasets—a series of nationally representative household surveys (2007, 2014, 2020) and administrative data from 22 governmental ministries and one agency (2018)–and empirical approaches such as OLS, Heckman selection correction, and instrumental variable estimation we report return to education in Afghanistan. We find that one additional year of schooling is associated with a 3.4 percent increase in monthly income for wage earners, with higher returns for women, particularly among salaried workers. The schooling premium extends to the broader labor market and is not limited to the public sector, while gender differences are minimal in the latter. We document that the bans on women's employment and schooling can translate to substantial income losses at both individual and national levels. These findings contribute to the literature on the economics of education in conflict-affected settings, demonstrating the essential role of sustained human capital investment.

Keywords: Returns to schooling; Compulsory schooling; Educational attainment; Women Education, Afghanistan
JEL Codes: I26, J31, E24

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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 (Burde & Linden, 2013; Najam & Johnston, 2023; Baiza, 2013). These efforts could be attributed to various policies such as the expansion of compulsory schooling from sixth to ninth grade in the 2004 constitution and gender quotas for admission to higher education in 2016 (Najam, 2024). However, these hard-won gains are under serious threat due to the current ban on women's education. In the aftermath of the Taliban return 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 tertiary education in December 2022, along with ban on women employment. These restrictions could have a lasting impact on the economic growth and human capital of next generations. 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 (National Statistics and Information Authority, 2019). This represents a nominal increase of 203

percent in the total number of female students in public general education. 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 implications of bans on women's education and work at both the micro and macro levels, and we aim to fill this gap.

To empirically examine schooling premiums, we compile two exclusive datasets—nationally representative household surveys and administrative public employee data—which include information on individuals' monthly earnings, allowing rigorous empirical assessment of the private monetary rate of return on schooling in the general population and among public employees in Afghanistan. First, we combine labor force participation and individuals' earnings from the labor module of working adults from three nationally representative household surveys: the National Risk and Vulnerability Assessment 2007, the Afghan Living Condition Survey 2014, and the Income, Expenditure, and Labor Force Survey 2020. Second, we acquire restricted access to administrative data of public employees from 22 governmental ministries and one agency in 2018. In both of these datasets, we have information on the monthly income of working adults, in the household surveys it is only available for wage earners.

We use estimators such as ordinary least squares, the Heckman selection correction model, and instrumental variable approaches (using expansion of compulsory schooling as an instrument) to provide rigorous evidence on the returns to schooling for all working adults, and for men and women separately. We provide complementary economic analysis to show the potential number of working women affected by the bans on women's employment and direct income losses, as well as provide back-of-the-envelope estimates for the economic loss that the entire country would experience as a result of the bans on women's work and education.

We find that on average, the economic return to schooling (estimates from Heckman correction models) is about 3.4 percent, while for males and females, the rates of return are 3.1 percent and 8.6 percent, respectively. It is dramatically lower compared to the worldwide average of 10 percent (Psacharopoulos & Patrinos, 2018; Montenegro & Patrinos, 2023). The IV estimates for those who attained additional years of schooling as a result of compulsory schooling law expansion suggest that the average return is

7.5 percent, which is about 6.9 and 7.1 percent for males and females, respectively. Nevertheless, if we look at the return to schooling among salaried adults with monthly income (excluding daily wage workers and self-employed individuals) working in public and private sectors, the returns are at 8.3 percent on average, while the return for females (16.2 percent) is three times that of males (5.3 percent) among salaried workers. Additionally, the estimates for the return to schooling among public employees are 9.7 percent overall, 9.8 percent for males, and 13 percent for females, suggesting positive returns to schooling in public employment.

This paper makes three distinct contributions to the literature. First, this study presents unique evidence on the role of educational attainment in one of the most challenging environments, complementing existing research in the economics of education within fragile and conflict-affected settings. It does so by utilizing rich micro-level data on the returns to schooling, both in the general population and among public employees. This is particularly relevant in contexts where conventional expectations suggest that returns to education are driven solely by employment in the public sector. However, our findings show that returns to schooling are not limited to public sector employment but extend to the broader labor market.

Second, we complement existing studies on the intersection of conflict and economic development, which highlights that conflict can undermine long-term economic development (Blattman & Miguel, 2010; Collier, 1999), lead to loss of human capital and productivity (Boag, 1916; Kiker, 1966; Miguel & Roland, 2011; Riaño & Caicedo, 2024; Waldinger, 2016; Becker et al., 2024), and lower labor market earnings (Blattman & Annan, 2010). Additionally, literature on the intersection of conflict and educational attainment (Verwimp & Bavel, 2014; Akbulut-Yuksel, 2014; Diwakar, 2015; Bertoni et al., 2019; Justino et al., 2013; Akresh & de Walque, 2008; Dabalen & Paul, 2014; Pivovarova & Swee, 2015; Singh & Shemyakina, 2016; Arunatilake et al., 2001; Chamarbagwala & Morán, 2011; Ichino & Winter-Ebmer, 2004; Ito et al., 2024; Patrinos, 2022; Shemyakina, 2011).

Finally, we advance the literature examining the role of compulsory schooling, including its impacts on educational attainment and earnings (Angrist & Krueger, 1991; Patrinos & Sakellariou, 2005; Card, 2001; Patrinos et al., 2021; Harmon & Walker,

1995), 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 non-pecuniary outcomes, including a person's physical health (Powdthavee, 2010; Clark & Royer, 2013), propensity to get a divorce (Oreopoulos & Salvanes, 2011), and positively affecting attitudes toward climate change (Angrist et al., 2024).

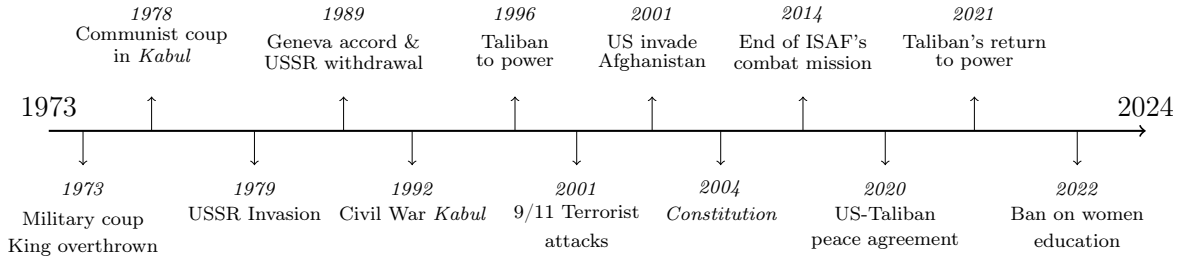
The remainder of the paper is structured as follows. Section 2 discusses the context, while Section 3 details the datasets, Section 4 outlines the empirical approach. Section 5 presents the results and economic implication of banning women, and Section 6 concludes.

2. Study Context

Afghanistan's half-century of political instability and prolonged conflict (Figure 1) provides a challenging yet relevant context to empirically examine the private rate to return to education in conflict-affected settings, particularly providing robust evidence on the marginal effects of additional years of schooling on individuals' earnings. Although the benefits of education extend beyond monetary returns, we focus on these measures to complement existing evidence on the micro-level impact of investment on education in conflict-affected settings.

Cycle of turbulent events since 1973 (Figure 1) have profoundly impacted many aspects of Afghan life. Conflict-induced disruptions often result in the migration and displacement of people, yet the majority remain confined to their localities. These disruptions operate through various pathways, including restricted access to educational facilities, heightened safety concerns, and severe economic shocks that weaken the stability and support systems essential for sustained education. In such contexts, where supply constraints are significant, families may undervalue long-term investments like children's schooling and prioritize immediate survival needs. Assessing the effects of policy changes, such as compulsory schooling initiatives aimed at expanding educational attainment in such settings, is particularly relevant. Such analysis underscores the importance of sustained efforts, even during the most challenging periods of active armed conflict, in generating lasting benefits for both individuals and the nation as a whole.

Figure 1. Timeline of major events in Afghanistan (1973–2024)



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

The general education system in Afghanistan comprises twelve years of schooling, structured as a 6-3-3 system: primary education (Grades 1–6), lower secondary education (Grades 7–9), and upper secondary education or high school (Grades 10–12). Tertiary education includes programs offering associate, undergraduate, and graduate degrees. The official entry age for primary school is seven, although early enrollment is rarely possible. The educational ban on women's schooling in the late 1990s, for political purposes such as establishing group cohesion (Berman & Laitin, 2008; Berman, 2009), had a continuing long-term negative impact on women educational attainment (Brunner & Mihailov, 2023; Noury & Speciale, 2016). Nevertheless, the post-2001 era witnessed an expansion of educational opportunities (Najam & Johnston, 2023), including initiatives aimed at improving learning outcomes and increasing access to tertiary education for female students (Burde & Linden, 2013; Najam, 2024). The 2004 Constitution (Figure 1) expanded compulsory schooling from six to nine years. The Constitution, which was ratified on 01/26/2004, was the product of a Loya Jirga (Grand Council), a grand consultative meeting of representatives from across the country held from 12/13/2003 to 01/04/2004. The academic year in the majority of the country begins on 03/21/2004; hence, we expect this to be the first cohort impacted by the policy change.

Afghanistan is among the poorest countries and is set to remain so without decisive changes to address its existing challenges (World Bank, 2024a). The bans on women's education—secondary education in September 2021 and tertiary education in December 2022—and restrictions on women's employment imposed by the de facto authorities are likely to exacerbate the worsening conditions for women, who comprise 49% of the population (National Statistics and Information Authority, 2022), with cascading effects on the entire economy.

As of February 2025, women are allowed to attend general education up to the sixth grade in public and/or private schools. The employment situation remains highly dynamic; in principle, women are not allowed to work in either the public or private sector outside the home, with certain restrictions also limiting remote employment. However, exceptions exist, such as allowing women to work in critical areas like health services. Nonetheless, there has been a substantial reduction in women's employment in public agencies and the private sector, given the limited job prospects in the country and the economic contraction the country has been experiencing (World Bank, 2023).

This dire situation for women is reflected in Afghanistan's ranking as the fourth lowest-performing economy in terms of gender equality (World Bank, 2024b) among 190 economies, significantly lagging behind its neighbors, except Iran, and among countries classified as fragile and conflict-affected situations (FCS). Access to education–particularly at higher levels–combined with job opportunities is critically important in FCS contexts to eliminate the vicious cycle of poverty and conflict. However, limited enrollment, low completion rates, low progression to secondary and tertiary education, and poor job prospects remain significant barriers to realizing the full economic potential of human capital in FCS contexts. Despite enormous challenges, women have positively contributed to the economic growth of Afghanistan through their technical expertise in public institutions—accounting for 24.3% of public employees (National Statistics and Information Authority, 2019)—and private organizations, women-owned businesses (United Nations Development Programme, 2024), and the education of future generations at all levels, with women comprising 35% of teachers in general education in 2019.

3. Data

We use two major datasets—nationally representative household surveys and a public employees dataset—which include information on individuals' monthly earnings, enabling a comprehensive analysis of the private monetary rate of return on schooling in Afghanistan, a fragile context characterized by prolonged conflict and instability, a situation that is becoming increasingly prevalent. We provide a detailed description

of our datasets below.

3.1. Household Surveys

We combine datasets on labor force participation and individuals' earnings from three nationally representative household surveys: the National Risk and Vulnerability Assessment (NRVA) 2007, the Afghan Living Condition Survey (ALCS) 2014, and the Income, Expenditure, and Labor Force Survey (IEL) 2020[1]. These are multipurpose nationwide household surveys, representative at the province level (administrative level 1), conducted by the National Statistical and Information Authority (NSIA). These surveys are identical despite the changes in their names. The core modules remain constant, with some changes in the length of questions in each module and/or rotations of the modules by survey wave. The surveys capture information on a wide range of indicators at both the household and individual levels, including educational attainment, agriculture and livestock, household income and expenditures, shocks, food consumption, maternal and child health, housing situation, disability, gender, and labor force participation, as well as community-level information such as commodity prices and access to markets and public services. These year-round surveys employ a multi-stage random sampling methodology, ensuring representative sample at the provincial level to track development indicators and demographic changes that guide public policies. We obtained this information under restricted use from the NSIA, for which we are grateful. For this study we exclusively leverage the labor module which captures detailed information on the labor market participation of adults, including earnings and types of jobs.

We focus mainly on the primary source of income, which provides information on the primary monthly income of individuals who are salaried workers in the public or private sector, as well as those who are self-employed with paid or unpaid employees. Additionally, we consider the average daily wage rate for daily laborers.[2] We impute the

[1]There are three additional rounds of these surveys—NRVA 2005, NRVA 2011, and ALCS 2016—which do not include information on individuals' earnings, a critical component for our analysis.

[2]NRVA 2007 asks for the daily wage rate and the number of days worked during the past month. In ALS 2014, it asks for the average daily wage rate and the number of days worked in the last week. In ALS 2020, it asks for the number of days worked and the average daily wage for day labor in the past 12 months. We winsorized these wages at 5% to rectify nonsensical values across all surveys.

monthly earnings of a daily laborer by multiplying the average daily wage rate by the estimated number of days worked in a 30-day period.

The NRVA 2007 collected data from 20,576 households, covering 152,284 individuals. Similarly, the ALCS 2014 surveyed 20,786 households, encompassing 157,262 individuals, while the IEL 2020 interviewed 18,344 households, providing information on 136,848 individuals. Our analysis focuses on individuals for whom the labor module was administered: 73,359 individuals aged 16 and older in the NRVA 2007, 84,605 aged 14 and older in the ALCS 2014, and 72,265 aged 14 and older in the IEL 2020. Across all surveys, monthly earnings are reported solely for employed individuals—salaried workers in the salaried, self-employed individuals without paid employees, and self-employed individuals with paid employees. To reduce the influence of extreme values and rectify nonsensical values, we have winsorized monthly earnings at the 0.01% level.

We have secured access to disaggregated data on the years of schooling an individual has completed for all survey waves. Hence, we know the highest grade an individual has completed at the time of the survey and monthly earnings of individual active in the labor force. We take the natural log of monthly earnings as our main outcome variable to quantify how an additional year of schooling affects an individual's earnings.

3.2. Public Employees

We complement our main analysis by examining the monetary rate of return to schooling for public employees, using exclusive restricted administrative data on 75,105 public servants from 22 governmental ministries and one government agency in 2018 (1397 in the Afghan calendar). The Administrative Office of the President collected these data in 2018, and we have accessed it under restricted use agreements. The dataset includes public servants from various ministries—excluding military personnel—such as Economy, Finance, Commerce, Higher Education, Culture, Borders, Information and Technology, Justice, Agriculture, Mines, Counter-Narcotics, Public Health, Public Works, Refugees, Rural Development, Social Affairs, Urban Development, Transport, Religious Affairs, Water and Energy, and Women's Affairs. The Ministry of Education is the largest public entity that employed 271,536 individuals in 2018, representing 67 percent of all public non-military employees (National Statistics and Information Authority, 2019).

Our dataset includes only its administrative staff and not teachers in general education, which were about 187,203 in 2019.

The dataset contains information on ministry, gender, birth year (in the Afghan calendar), age, province of origin, rank/grade, education level, and monthly salary in AFN currency. This exploration complements our main analysis and documents empirical evidence on the return to schooling for public servants.

The level of education is reported in categories (no schooling, less than high school, high school, associate, undergraduate, master's, doctorate). The only category without explicit information on the grade/year of schooling is the "less than high school" group, which consists of 3.3 percent of the sample. The "less than high school" category includes individuals with any schooling as low as 1 year to as high as 11 years of schooling. We uniformly assign six years of schooling to this group, which is the average level of schooling for those with income in labor surveys and have completed some level of schooling. About 94 percent of these individuals work in the lowest grades possible (ranks 7 and 8), primarily as support employees (e.g., gatekeepers, cleaners, janitors, cooks, drivers, etc.), which does not require higher levels of schooling. We only observe the education/degree level for public employees and we want to estimate the marginal effect of one additional years of schooling; thus, we assign the following years of schooling based on education level: 0 years for no schooling, 6 years for less than high school, 12 years for high school, 14 years for an associate degree, 16 years for an undergraduate degree, 18 years for a master's degree, and 22 years for those with doctorate degree.

3.3. Descriptive Statistics

We report summary statistics for the general population from labor surveys in and for public employees in Table 1 and 2, respectively.

In Table 1, Column 3 shows the pooled averages for working adults (ages 14–64) at the time of the survey, while Columns 1 and 2 present averages for sub-samples without and with monthly income, respectively. The latter (Columns 2) constitutes our analytical sample of interest, and we use full sample to account for selection into the labor force (having monthly income) via the Heckman selection correction. The average monthly

income is 6,716 AFN (approximately $90USD) with a median of 5,000 AFN. About 50% of the working adult population are women; however, 64% of the sub-sample without monthly wages are women, whereas only 10% of individuals active in the labor force with monthly wages are women. The mean age is 30, with a higher average of 34 years for individuals with income. The share of working adults affected by the policy change in 2004—an increase in compulsory schooling from six to nine years—is 37%, whereas only 17% of adults with income are affected. The average years of schooling is 2.8 years, while individuals with wages, on average, have about 3.60 years of schooling. The distribution of schooling levels shows that individuals with wages are substantially more likely to have higher levels of education. Experience is imputed as $(\text{age} - (6 + \text{years of schooling}))$, with an average of 21 years. Over half of the working adults are married, and about one-third of those without wages are single. Only 0.04% of the working adults are public employees with a monthly salaried income, and one out of six adults with monthly wages is a public employee.

The share of working adults (ages 14–64) is 34.2%, 35.5%, and 30.3% in the 2007, 2014, and 2020 surveys, respectively. Nonetheless, the share of adults with wages dropped significantly in the 2020 survey, highlighting worsening economic conditions as a result of political instability (e.g., peace negotiations with the Taliban, presidential elections) and the COVID-19 pandemic. These surveys are representative at the provincial level, and the share of working adults is highest in Kabul (the capital) at 8.8%, followed by Nangarhar (5.3%), Herat (4.7%), Balkh (3.7%), and Kandahar (3.5%).

Figure 2 shows the average years of schooling among working adults aged 14–64 by birth year across survey waves and a combined dataset. The red vertical line indicates the cohort born in 1991, who were expected to begin secondary schooling in 2004 and were potentially the first cohort affected by the expansion of compulsory schooling. We observe an upward trend, with younger cohorts attaining higher levels of education. Yet stark differences in educational attainment by gender persist, with women having substantially fewer years of schooling. The peak in the 1995 and 1996 cohorts corresponds to individuals enrolled in primary schooling in 2001 and 2002, who might have potentially started secondary schooling prior to the heightened violence in the late 2000's.

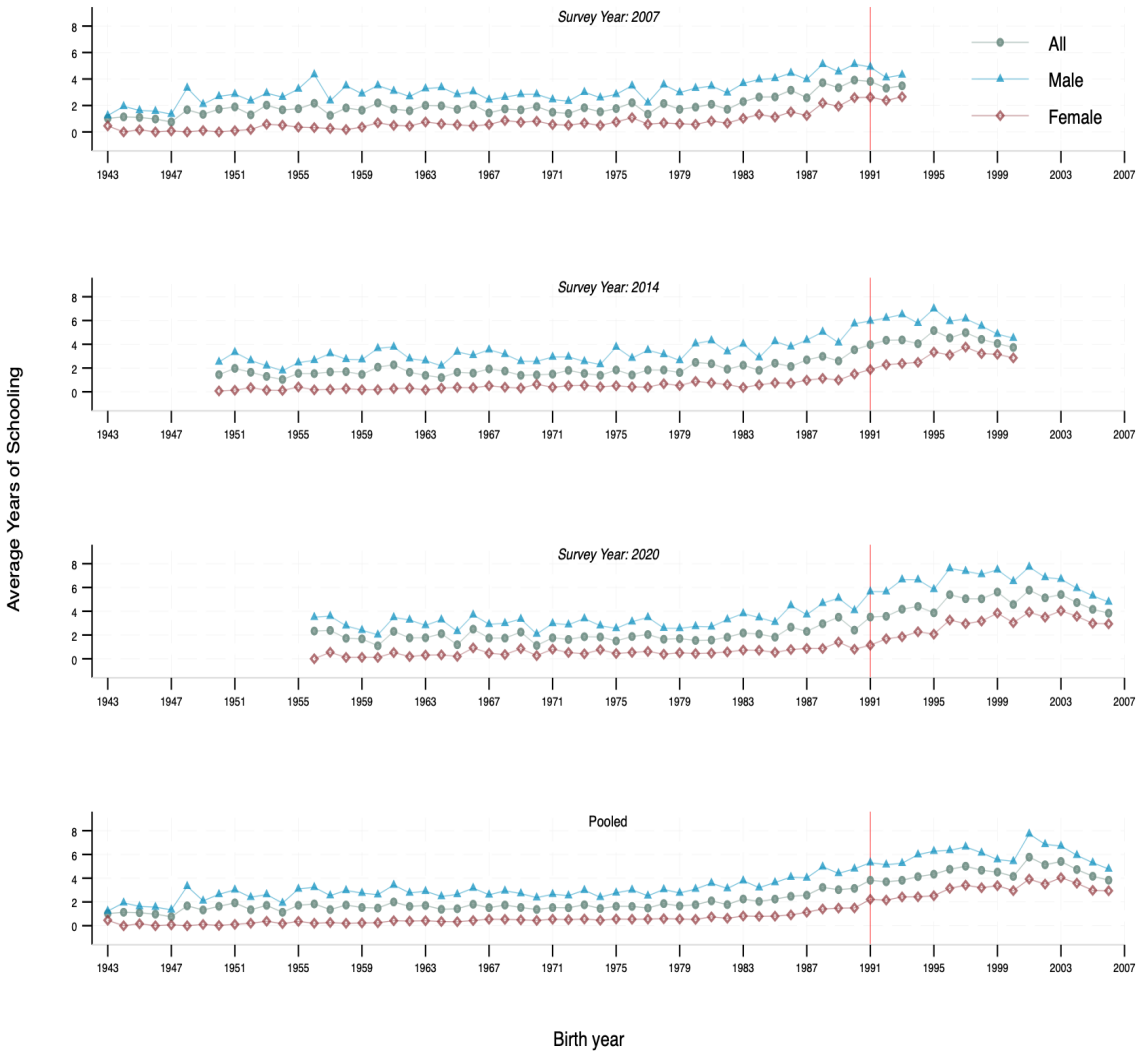
Table 1. Summary statistics – labor surveys

	w/o Wages (1)	w/ Wages (2)	Combined (3)	P-value (1) - (2)
Monthly income in AFN	. (.)	6715.65 (6330.93)	6715.65 (6330.93)	.
Female	0.637 (0.481)	0.091 (0.287)	0.501 (0.500)	<0.001
Age	28.89 (13.230)	34.22 (11.850)	30.23 (13.103)	<0.001
Affected by policy change	0.431 (0.495)	0.171 (0.376)	0.366 (0.482)	<0.001
Years of schooling	2.558 (4.308)	3.601 (5.252)	2.819 (4.585)	<0.001
Education level				
No school	0.698 (0.459)	0.625 (0.484)	0.680 (0.467)	<0.001
Some school	0.180 (0.384)	0.179 (0.383)	0.180 (0.384)	0.461
High school	0.090 (0.286)	0.120 (0.325)	0.098 (0.297)	<0.001
Tertiary	0.030 (0.170)	0.073 (0.261)	0.041 (0.197)	<0.001
Experience (imputed)	20.355 (15.116)	24.622 (13.351)	21.422 (14.810)	<0.001
Experience (imputed)^2	642.82 (783.81)	784.46 (734.19)	678.25 (774.13)	<0.001
Marital status				
Married	0.578 (0.494)	0.797 (0.402)	0.632 (0.482)	<0.001
Widowed	0.034 (0.180)	0.012 (0.110)	0.028 (0.166)	<0.001
Divorced/separated	0.003 (0.054)	0.001 (0.025)	0.002 (0.049)	<0.001
Engaged	0.044 (0.205)	0.040 (0.195)	0.043 (0.202)	<0.001
Single	0.342 (0.474)	0.151 (0.358)	0.294 (0.456)	<0.001
Public employee	0.002 (0.045)	0.151 (0.358)	0.039 (0.194)	<0.001
Survey 2007	0.314 (0.464)	0.426 (0.495)	0.342 (0.474)	<0.001
Survey 2014	0.332 (0.471)	0.425 (0.494)	0.355 (0.478)	<0.001
Survey 2020	0.354 (0.478)	0.149 (0.356)	0.303 (0.460)	<0.001
Province				
Kabul	0.088 (0.284)	0.088 (0.284)	0.088 (0.284)	0.963
Kapisa	0.022 (0.147)	0.017 (0.129)	0.021 (0.143)	<0.001
Parwan	0.026 (0.159)	0.024 (0.152)	0.025 (0.157)	0.002
Wardak	0.026 (0.160)	0.019 (0.138)	0.024 (0.155)	<0.001
Logar	0.026 (0.159)	0.021 (0.143)	0.025 (0.156)	<0.001
Nangarhar	0.052 (0.222)	0.056 (0.230)	0.053 (0.224)	<0.001
Laghman	0.021 (0.144)	0.024 (0.154)	0.022 (0.147)	<0.001
Panjsher	0.027 (0.162)	0.022 (0.146)	0.026 (0.158)	<0.001
Baghlan	0.032 (0.177)	0.028 (0.165)	0.031 (0.174)	<0.001
Bamyan	0.026 (0.159)	0.014 (0.117)	0.023 (0.150)	<0.001
Ghazni	0.034 (0.181)	0.037 (0.188)	0.034 (0.182)	0.002
Paktika	0.027 (0.163)	0.027 (0.162)	0.027 (0.163)	0.531
Paktya	0.026 (0.159)	0.025 (0.155)	0.026 (0.158)	0.071
Khost	0.033 (0.179)	0.026 (0.159)	0.031 (0.174)	<0.001
Kunarha	0.030 (0.172)	0.026 (0.160)	0.029 (0.169)	<0.001
Nooristan	0.018 (0.132)	0.022 (0.147)	0.019 (0.136)	<0.001
Badakhshan	0.031 (0.174)	0.031 (0.172)	0.031 (0.174)	0.440
Takhar	0.032 (0.175)	0.032 (0.176)	0.032 (0.175)	0.734
Kunduz	0.034 (0.180)	0.037 (0.190)	0.035 (0.183)	<0.001
Samangan	0.022 (0.147)	0.016 (0.127)	0.021 (0.142)	<0.001
Balkh	0.036 (0.187)	0.040 (0.196)	0.037 (0.189)	<0.001
Sar-e-Pul	0.022 (0.147)	0.017 (0.130)	0.021 (0.143)	<0.001
Ghor	0.024 (0.153)	0.017 (0.128)	0.022 (0.147)	<0.001
Daykundi	0.024 (0.153)	0.011 (0.105)	0.021 (0.143)	<0.001
Urozgan	0.024 (0.152)	0.018 (0.134)	0.022 (0.148)	<0.001
Zabul	0.021 (0.144)	0.024 (0.154)	0.022 (0.146)	<0.001
Kandahar	0.035 (0.184)	0.034 (0.182)	0.035 (0.183)	0.634
Jawzjan	0.020 (0.140)	0.044 (0.206)	0.026 (0.159)	<0.001
Faryab	0.028 (0.165)	0.038 (0.190)	0.030 (0.172)	<0.001
Helmand	0.031 (0.174)	0.040 (0.197)	0.033 (0.180)	<0.001
Badghis	0.018 (0.134)	0.020 (0.141)	0.019 (0.136)	0.002
Herat	0.044 (0.205)	0.056 (0.230)	0.047 (0.211)	<0.001
Farah	0.020 (0.141)	0.026 (0.158)	0.022 (0.145)	<0.001
Nimroz	0.018 (0.133)	0.022 (0.146)	0.019 (0.136)	<0.001
N	170,731	56,940	227,671	

Note: This table presents the descriptive statistics. Experience is imputed as (age − (6 + years of schooling)).

Conversely, the dip in the average years of schooling for individuals born between 1997 and 2000 could be driven by intensified conflict during the 2008–2012 period, which corresponds to the end of primary schooling and the transition from primary to secondary schooling. The subsequent increase could be due to higher transition rates from primary to secondary schooling, as well as could be a result of large expansion in higher tertiary education, particularly associated programs in post-2011.

Figure 2. Average years of schooling by birth-year (14–64 years old)



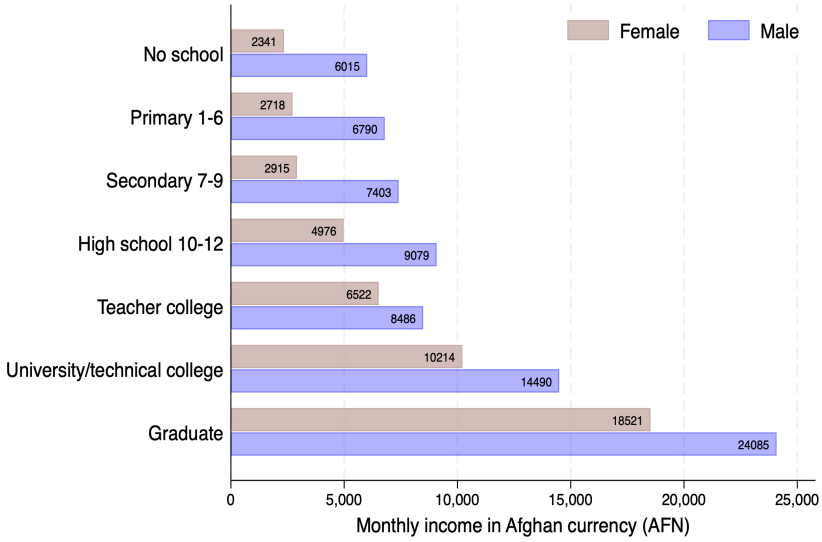
Note: This figure shows the averages years of schooling by birth cohort by survey wave and combined. Data is limited to individuals between the ages of 14 and 64 years at the time of the survey. Thus, while we observe labor market outcomes for the younger cohort, we expect that the youngest cohort could still be in school, return to school in subsequent years, or pursue a higher level of education.

Furthermore, Table 2 highlights descriptive statistics of public employees, excluding military personnel and general education teachers. The average monthly income is 11,639

AFN (approximately $150 USD), with a median of 8,000 AFN. The share of women among public employees is 16% across the 23 agencies in 2018. The mean age is 40 years old, and the share of public employees affected by the policy change—an increase in compulsory schooling from six to nine years in 2004—is 17%. The average years of schooling for public employees is 11 years, with the majority having completed high school or a higher educational degree. Experience is imputed as (age − (6 + years of schooling)), with an average of 23 years. The rank categories indicate the grade of public employees, with one being the highest grade and eight being the lowest. Most of public employees are in grades 4 and 5, with only 6% in grade 3 or higher, and we do not have rank information for employees from the Ministry of Education, which constitute about 16.5% of the analytical sample for the public employees.

Figures 3 and A.1, report simple averages of monthly income in AFN by education level and gender for the general population and public employees, respectively. Descriptively, we observe substantial premium rate of return to higher levels of education in the labor market (Figure 3) and the public sector (Figure A.1). Nevertheless, the gender gap is much more pronounced in the labor market than it is in the public sector, which is expected given that the salary scale in the public sector is predetermined by law, whereas such guidelines do not exists in the broader labor market.

Figure 3. Monthly income in Afghani (AFN) by education level and gender



Note: This figure shows the average income by education level and gender for the working adult population from the labor surveys. The bar-labels shows the average monthly income in Afghani (AFN) for the sub-group.

Table 2. Summary statistics – public employees

	Mean (Std. Dev.) (1)
Monthly income in AFN	11639.53 (10,973.99)
Female	0.163 (0.370)
Age	40.458 (12.511)
Affected by policy change	0.169 (0.375)
Years of schooling	11.361 (5.997)
Education level	
No school	0.192 (0.394)
Some school	0.031 (0.173)
High school	0.262 (0.439)
Associate	0.167 (0.373)
Undergrade	0.286 (0.452)
Graduate	0.062 (0.242)
Experience (imputed)	23.081 (14.634)
Experience (imputed) squared	746.907 (782.265)
Rank	
1 (highest)	0.001 (0.028)
2	0.015 (0.122)
3	0.041 (0.198)
4	0.196 (0.397)
5	0.223 (0.416)
6	0.158 (0.365)
7	0.100 (0.301)
8 (lowest)	0.101 (0.301)
Rank missing	0.165 (0.371)
Ministry of	
Agriculture, Irrigation and Livestock	0.103 (0.304)
Borders and Tribal Affairs	0.014 (0.116)
Commerce and Industry	0.012 (0.107)
Communications and Information Technology	0.032 (0.176)
Counter Narcotics	0.007 (0.081)
Economy	0.012 (0.107)
Education*	0.127 (0.333)
Energy and Water	0.034 (0.182)
Finance	0.092 (0.289)
Hajj and Religious Affairs	0.023 (0.151)
Higher Education	0.156 (0.363)
Information and Culture	0.014 (0.119)
Justice	0.024 (0.154)
Labor and Social Affairs	0.068 (0.252)
Mines and Petroleum	0.014 (0.117)
National Disaster Management Authority (Agency)	0.004 (0.065)
Public Health	0.163 (0.369)
Public Work	0.039 (0.194)
Refugee and Repatriation	0.006 (0.079)
Rural Rehabilitation and Development	0.023 (0.150)
Transport and Civil Aviation	0.013 (0.114)
Urban Development and Housing	0.012 (0.108)
Women Affairs	0.008 (0.086)
N	75,105

Note: This table shows the descriptive statistics for the public employee in 2018. *The number does not include teachers in public general education. Standard deviation in parentheses and experience is imputed as (age − (6 + years of schooling)).

4. Empirical Approach

We start our empirical assessment by examining the monetary private rate of return to schooling using the Mincer equation, which assesses the marginal increase in earnings given an additional year of increase in someone's schooling and labor market experience. Specifically, employing the ordinary least squares (OLS) estimation in Equation 1:

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

The outcome variable is the log of the monthly income of individual i in province p and year (survey wave) t. The coefficient β is the estimate of interest, representing the marginal rate of return to an additional year of schooling. The term γ represents years of labor market experience, which is imputed as (age $-$ (6 + years of schooling)), while θ is the squared term of the imputed labor market experience. The terms ϕ and ψ denote province and survey-wave fixed effects, respectively. ϵ_{ipt} is the robust Standard errors.

Equation 1 estimates the marginal rate of return to schooling; nevertheless, Table 1 shows that differences exist in the observable characteristics of individuals with wages and those without wages, including individuals reported as unpaid family workers. Thus, to attain a precise unbiased estimate for the monetary rate of return on schooling we include individual level controls to account for potential confounders affecting one's income by OLS estimating the model in Equation 2[3].

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

All the terms, except for ωX_{ipt}, which denotes individual-level controls (e.g., gender indicator, employed in public sector, marital status, cohort identifier), in Equation 2 are the same as those in Equation 1. We include experience rather than age, as the latter is highly correlated with the constructed experience variable (age$-$(6+years of schooling)). Furthermore, to account for macro-level changes, such as the availability of educational opportunities across generations and periods (Figure 1), we construct a cohort identifier spanning ten-year intervals from the reference year of 1943 (Figure 2), which we include as a linear control in the model.

[3]We implement a version of this for public employees dataset with controls being experience, experience^2, gender, rank, ministry/agency fixed effect, and Cohort identifier.

To address selection into the labor market, we implement Heckman's two-step correction. In the first step, we estimate a probit model for labor force participation as a function of years of schooling, experience (both linear and squared), gender, marital status, urban residence, the number of children (under six and school-age), and province and survey wave fixed effects. Using the estimated inverse Mills ratio from this selection equation, we then augment our main wage specification (Equation 2) to correct for potential selection bias in our estimates, we implement this using the `heckman` command in Stata.

The expansion of compulsory schooling from six to nine grades in the 2004 constitution presents an exogenous policy shock, enabling an assessment of the causal effect of schooling on earnings. This is particularly relevant in situations where higher-ability individuals choose more education and might have been more likely to earn higher wages even if they had not received more schooling. If so, we might be overestimating the effects of schooling. We are inherently unable to parse out the effects of one's ability; nevertheless, the expansion of compulsory schooling provides a natural experiment, enabling us to estimate the causal local average treatment effect (LATE) for the sub-population affected by the compulsory schooling laws. We use such expansion, owing to the 2004 Afghan constitution, to estimate the causal rate of return to schooling for those affected by the policy—students starting secondary schooling or grade seven in 2004 academic calendar. Since we pool survey data across three survey waves our instrument is the interacted version of exposed individuals with the survey wave, allowing for the instrument to have a different effect across the survey waves. Particularly, we estimate the instrumental variable (IV) specification in Equation 3[4].

$$ln(wage)_{ipt} = \alpha + \beta(Ed_{ipt} = \text{compulsory} \times \text{survey wave}) + \gamma Exp_{ipt} + \theta(Exp_{ipt})^2 + \omega X_{ipt} + \phi K_p + \psi W_t + \epsilon_{ipt} \quad (3)$$

In Table A.1, we show that the expansion of compulsory schooling as a binary indicator for those born in 1991—the first exposed cohort—the expansion in compulsory schooling is associated with an increase of 1.82 years of schooling among wage earners (Column 1) without any controls, with estimates remaining the same for both males and females.

[4]We implement a version of this specification, where the instrument (compulsory schooling) is a binary indicator.

After accounting for province and survey wave fixed effects, the magnitude decreases slightly, though the expansion of compulsory schooling remains positively associated with additional years of schooling. In subsequent columns, instead of treating the expansion as a single binary indicator, we interact the expansion indicators with the survey year and account for province and year fixed effects to attain differential effect by survey wave. The coefficients remain positively associated with years of schooling, and the interaction terms indicate that affected individuals in 2014 and 2020, on average, attained about 0.73 and 1.5 more years of schooling. In later columns, we include experience (imputed), and experience squared to account for labor market experience, aligning with standard literature. However, conditional on individual experience, the affected cohorts, on average, have fewer years of schooling and are more likely to attain higher levels of education in 2014 and 2020. The specifications in Columns 5, 10, and 15 include additional controls, such as indicators for gender, public employment, marital status, and cohort, in addition to the reported variables. Table A.2 provides examples of why, after controlling for experience, the coefficient for compulsory schooling is negative. This occurs in cases where the wages observed for younger cohorts correspond to those who might have left school at a younger age.

Additionally, Tables A.2 and A.3 present the average years of schooling for all adults and for working adults with wages using regression discontinuity visual evidence, respectively. The vertical line in these figures marks the first cohort potentially affected by the expansion of compulsory schooling and indicates a substantial increase in the average years of schooling for the affected cohorts.

5. Results

We report our estimates of the private monetary rate of return to schooling using linear regression (with and without controls), the Heckman two-step selection correction, and an intent-to-treat (ITT) specification from an instrumental variable approach for all, male, and female sub-samples. Additionally, we further subset our analytical sample to individuals born in or after 1980[5] to ensure sample comparability, particularly for the IV specification, those affected or unaffected by the compulsory schooling expansion. We

[5]The age ranges by survey waves are: 2007 (15–27), 2014 (14–34), and 2020 (14–40).

first discuss the results from the labor surveys, then the results for public employees, followed by an economic analysis.

5.1. Labor surveys

Table 3 presents the results for all wage earners: Columns 1–4 display the results for the full sample, Columns 5–8 for males, and Columns 9–12 for the female sub-sample. The primary outcome of interest is the log of monthly income, and the coefficients can be interpreted as a percentage change. Throughout the tables, the coefficient for 'Years of schooling' represents the marginal change in log monthly income that can be attributed from an additional year of schooling.

We find that one additional year of schooling is associated with a 3.4 percent to 7.5 percent increase in monthly income for the full sample (Table 3). The results from the OLS model with controls (Column 2) and the Heckman correction (Column 3) are comparable, both suggesting a 3.4 percent increase in monthly earnings for each additional year of schooling. The IV estimates (Column 4) indicate that individuals affected by the expansion of compulsory schooling law experience a higher rate of return of 7.5 percent per additional year of schooling.

The rate of return is significantly higher for female adults (Columns 9–11) compared to males, whereas these differences are minimal in the IV specification (Columns 8 and 12). For ease of interpretation and presentation, the results from the Heckman selection models (Columns 3, 7, 11) are reported in Columns 3, 7, 11 of Table A.4.

In Table A.3, we report estimates of the rate of return to schooling for a restricted analytical sample of adults born in or after 1980. The estimates are comparable to those in Table 3, indicating a premium rate of return to schooling, with a higher rate for females (Column 9–12) relative to males (Column 5–8). The results from the Heckman selection models (Columns 3, 7, 11) are reported in Columns 3, 7, 11 of Table A.4, where the lambda mills ratio are statistically insignificant for all three models.

Table 3. Effects of an additional year of schooling on log(monthly income)

	All				Male				Female			
	OLS (1)	OLS (2)	Heckman (3)	IV (4)	OLS (5)	OLS (6)	Heckman (7)	IV (8)	OLS (9)	OLS (10)	Heckman (11)	IV (12)
Years of schooling	0.048***	0.034***	0.034***	0.075***	0.041***	0.031***	0.032***	0.069***	0.085***	0.061***	0.086***	0.071**
	(0.003)	(0.004)	(0.002)	(0.015)	(0.003)	(0.004)	(0.002)	(0.014)	(0.007)	(0.007)	(0.013)	(0.031)
Experience	0.032***	0.020***	0.020***	0.055***	0.031***	0.020***	0.024***	0.054***	0.027***	0.021***	0.042***	0.028
	(0.002)	(0.003)	(0.002)	(0.012)	(0.002)	(0.003)	(0.003)	(0.012)	(0.007)	(0.007)	(0.011)	(0.024)
Experience ^2	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000**	-0.000**	-0.001***	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Female		-0.804***	-0.815***	-0.793***								
		(0.058)	(0.043)	(0.056)								
Public employee		0.275***	0.275***	0.204**		0.245***	0.246***	0.184**		0.432***	0.429***	0.395**
		(0.071)	(0.009)	(0.090)		(0.074)	(0.009)	(0.089)		(0.104)	(0.042)	(0.169)
Marital status												
Widowed		-0.032	-0.031	-0.030		-0.081**	-0.101**	-0.085**		0.056	0.148**	0.060
		(0.031)	(0.027)	(0.031)		(0.033)	(0.042)	(0.035)		(0.058)	(0.061)	(0.060)
Divorced		-0.032	-0.034	-0.010		-0.229*	-0.259*	-0.216*		0.368**	0.444**	0.378**
		(0.103)	(0.116)	(0.110)		(0.124)	(0.151)	(0.128)		(0.146)	(0.195)	(0.146)
Engaged		-0.081**	-0.081***	-0.037		-0.077*	-0.088***	-0.037		-0.054	0.024	-0.042
		(0.035)	(0.016)	(0.041)		(0.040)	(0.018)	(0.043)		(0.061)	(0.065)	(0.079)
Single		-0.167***	-0.170***	-0.108***		-0.194***	-0.228***	-0.137***		0.007	0.055	0.019
		(0.027)	(0.016)	(0.032)		(0.031)	(0.024)	(0.033)		(0.050)	(0.042)	(0.066)
Cohort identifier		0.001	0.001	0.027***		0.001	0.001	0.026***		0.000	0.001	0.006
		(0.001)	(0.001)	(0.009)		(0.002)	(0.001)	(0.008)		(0.004)	(0.004)	(0.017)
Constant	7.846***	6.135**	6.165***		7.982***	5.867*	5.664***		6.996***	6.131	4.369	
	(0.046)	(2.851)	(2.056)		(0.043)	(3.066)	(2.120)		(0.095)	(7.669)	(7.475)	
R-squared	0.28	0.36		0.27	0.28	0.29		0.21	0.41	0.42		0.28
N	56,931	56,931	211,256	56,931	51,763	51,763	100,100	51,763	5,168	5,168	111,156	5,168
Kleibergen-Paap F-stat				699.327				682.283				94.732
Cragg-Donald F-stat				662.775				584.871				71.743
Province FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Note: This table presents the monetary rate of return to schooling for all wage earners, male, and female for various specification. The results can be interpreted as percent change in monthly income. 'Experience' is imputed as (age−(6+years of schooling)). See Table A.4 for the Heckman correction selection model results. Standard errors are clustered at the province level. Significance level: *0.1 ** 0.05, ***0.01

We document a large rate of return to schooling for females, whether we use the full (Table 3) or restricted (Table A.3) samples, particularly in the latter case. This assumes that the cohort born in 1991 would have started primary schooling in 1998 and were supposed to transition to secondary schooling in 2004. However, events highlighted in Figure 1 might have impeded such progression, particularly for female students (Noury & Speciale, 2016). Thus, it is possible that older cohorts born prior to 1991 might be transitioning from primary to secondary schooling in 2004 or subsequent years, particularly girls whose education might have been interrupted. We assess the IV estimates if we consider exposed cohorts as those born in or after 1991 and those born in previous years, such as 1988, 1989, or 1990. We report the results for these alternative cohorts as the first cohort exposed to compulsory law schooling in Table A.5. The results remain consistent with our main findings reported in Table 3 and Table A.3. We also explore the possibility of later cohorts (those born at least in 1992) being the first exposed cohort. While this reduces the chances of detecting the effects of compulsory schooling due to weak F-statistics, our estimates, while qualitatively the same, have much larger magnitudes than those reported in Columns (1–9).

In all cases so far, we have considered all wage-earning adults, including salaried monthly workers, daily wage earners, and self-employed individuals with or without employees. A conventional argument is that the return to schooling may not only capture the marginal effects of an additional year of schooling but also reflect returns to capital for self-employed individuals. To shed light on this, we further restrict our analytical sample to working adults with a fixed monthly income, primarily those employed in the salaried. We report the results for all salaried adults in Table 4 and for salaried adults born in or after 1980 in Table A.6.

Table 4. Effects of an additional year of schooling on log(income), salaried sub-sample

	All				Male				Female			
	OLS (1)	OLS (2)	Heckman (3)	IV (4)	OLS (5)	OLS (6)	Heckman (7)	IV (8)	OLS (9)	OLS (10)	Heckman (11)	IV (12)
Years of schooling	0.023***	0.021***	0.032***	0.083*	0.020***	0.017***	0.051***	0.053	0.068***	0.065***	0.115***	0.162*
	(0.004)	(0.005)	(0.007)	(0.043)	(0.004)	(0.004)	(0.008)	(0.036)	(0.007)	(0.011)	(0.030)	(0.091)
Experience	0.019***	0.011***	0.017***	0.065*	0.018***	0.012***	0.033***	0.043	0.011**	0.007	0.030*	0.085
	(0.004)	(0.003)	(0.005)	(0.035)	(0.004)	(0.004)	(0.006)	(0.030)	(0.005)	(0.008)	(0.015)	(0.071)
Experience ^2	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.001***	-0.000***	-0.000	-0.000	-0.000*	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Female		-0.448***	-0.527***	-0.469***								
		(0.053)	(0.057)	(0.062)								
Marital status												
Widowed		0.067	0.080	0.086		0.043	-0.026	0.018		0.256***	0.379***	0.318**
		(0.049)	(0.051)	(0.054)		(0.091)	(0.088)	(0.110)		(0.086)	(0.105)	(0.125)
Divorced		0.426***	0.396*	0.501***		0.188***	0.002	0.215***		0.688***	0.717**	0.820***
		(0.088)	(0.235)	(0.140)		(0.066)	(0.332)	(0.019)		(0.204)	(0.361)	(0.255)
Engaged		0.017	0.018	0.076*		0.026	0.013	0.058*		-0.122	-0.076	-0.000
		(0.030)	(0.026)	(0.042)		(0.032)	(0.028)	(0.033)		(0.108)	(0.099)	(0.172)
Single		-0.114***	-0.144***	-0.046		-0.131**	-0.269***	-0.091**		-0.019	0.013	0.083
		(0.039)	(0.026)	(0.034)		(0.050)	(0.038)	(0.034)		(0.072)	(0.054)	(0.135)
Cohort identifier		-0.001	-0.001	0.045		-0.001	0.000	0.026		-0.003	-0.003	0.064
		(0.002)	(0.002)	(0.030)		(0.002)	(0.002)	(0.025)		(0.007)	(0.006)	(0.062)
Constant	8.572***	10.332***	9.296***		8.669***	9.855***	7.028*		7.606***	13.502	12.812	
	(0.069)	(3.515)	(3.532)		(0.077)	(3.464)	(3.827)		(0.094)	(14.196)	(12.205)	
R-squared	0.34	0.37		0.28	0.35	0.35		0.29	0.46	0.46		0.28
N	13,098	13,098	226,946	13,098	11,820	11,820	113,050	11,820	1,276	1,276	113,896	1,276
Kleibergen-Paap F-stat				213.599				265.466				132.648
Cragg-Donald F-stat				101.051				88.344				13.979
Province FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Note: This table presents the monetary rate of return to schooling for salaried sub-sample (public or private sector) of all, male, and female for various specification. The results can be interpreted as percent change in monthly income. 'Experience' is imputed as (age − (6 + years of schooling)). See Table A.7 for the Heckman correction selection model results. Standard errors are clustered at the province level. Significance level: *0.1 ** 0.05, ***0.01

Table 4 presents the private monetary rate of return to schooling among salaried workers. On average, the rate of return for an additional year of schooling ranges from 2.1 percent (Column 2) to 8.3 percent (Column 4) for all salaried workers. Nevertheless, the premium rate of return is substantially higher for female salaried workers (Columns 9–12) than for male salaried workers (Columns 5–8) across all specifications. In fact, the estimates from the Heckman correction and IV models—11.5 percent and 16.2 percent, respectively—for female workers are two to three times higher than those for male salaried workers. The results for female salaried workers are consistent with those for the sub-sample of salaried workers born in or after 1980, shown in Table A.6. The Heckman selection models results are reported in Table A.7. A possible explanation for large IV estimates for the salaried worker is that recent women graduate with higher levels of education may have had access to better, higher-paying job opportunities compared to their less-educated counterparts before the political changes of August 2021.

5.2. Public employees

For the first time, we provide empirical evidence on the returns to schooling among public employees in the country, using restricted administrative data (Table 5). This analysis complements our main findings on the general population (Section 5.1), offering a unique perspective on the premium rate of return to schooling within the public sector. Columns 1–4 present results for the full sample, while Columns 5–8 and 9–12 examine returns to schooling for male and female public employees, respectively. Columns 4, 8, and 12 report estimates from the IV specification, where we restrict the sample to individuals born in or after 1980.

On average, each additional year of schooling is associated with a 3.8 percent to 9.7 percent increase in monthly income among public employees. The estimates for male public employees range from 3.0 percent to 9.8 percent, while the returns for female public employees range from 3.2 percent to 13 percent. This suggests a fairly comparable premium across genders for each additional year of schooling in the public sector, as also illustrated in Figure A.1.

Table 5. Effects of an additional year of schooling on log(monthly income), Public employees

	All				Male				Female			
	OLS	OLS	IV	IV - 1980	OLS	OLS	IV	IV - 1980	OLS	OLS	IV	IV - 1980
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Years of schooling	0.067***	0.038***	0.097***	0.051***	0.067***	0.039***	0.098***	0.051***	0.064***	0.032**	0.130*	0.049**
	(0.011)	(0.009)	(0.024)	(0.008)	(0.011)	(0.008)	(0.022)	(0.008)	(0.014)	(0.013)	(0.064)	(0.020)
Experience	0.016***	0.008***	0.033***	0.018***	0.017***	0.010***	0.034***	0.019***	0.011***	0.002	0.035	0.012
	(0.003)	(0.003)	(0.011)	(0.004)	(0.003)	(0.003)	(0.010)	(0.004)	(0.003)	(0.002)	(0.021)	(0.008)
Experience^2	-0.000***	-0.000***	-0.000***	-0.000	-0.000***	-0.000***	-0.000***	-0.000	-0.000***	-0.000*	-0.000**	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Female		-0.029*	-0.027	-0.023*								
		(0.015)	(0.017)	(0.011)								
Rank/Grade (reference = 1), 1 highest – 8 lowest												
2		-0.608***	-0.589***	-0.846***		-0.592***	-0.572***	-0.837***		-0.780	-0.705	0.000
		(0.145)	(0.152)	(0.105)		(0.153)	(0.159)	(0.110)		(0.599)	(0.611)	(.)
3		-1.311***	-1.267***	-1.672***		-1.309***	-1.264***	-1.676***		-1.322**	-1.203*	-0.590*
		(0.201)	(0.211)	(0.140)		(0.208)	(0.217)	(0.141)		(0.589)	(0.601)	(0.336)
4		-1.711***	-1.631***	-2.077***		-1.708***	-1.627***	-2.083***		-1.730***	-1.533**	-1.011***
		(0.264)	(0.279)	(0.229)		(0.270)	(0.285)	(0.228)		(0.604)	(0.624)	(0.344)
5		-2.120***	-1.994***	-2.478***		-2.110***	-1.989***	-2.471***		-2.174***	-1.863***	-1.494***
		(0.185)	(0.217)	(0.120)		(0.191)	(0.221)	(0.121)		(0.640)	(0.627)	(0.273)
6		-2.255***	-2.100***	-2.607***		-2.251***	-2.100***	-2.610***		-2.295***	-1.945***	-1.578***
		(0.194)	(0.237)	(0.133)		(0.199)	(0.240)	(0.133)		(0.628)	(0.608)	(0.272)
7		-2.190***	-1.633***	-2.563***		-2.179***	-1.623***	-2.570***		-2.259***	-1.288*	-1.493***
		(0.214)	(0.349)	(0.139)		(0.223)	(0.349)	(0.138)		(0.645)	(0.720)	(0.315)
8		-2.279***	-1.700***	-2.643***		-2.272***	-1.685***	-2.646***		-2.329***	-1.310*	-1.595***
		(0.210)	(0.370)	(0.133)		(0.222)	(0.369)	(0.136)		(0.634)	(0.738)	(0.303)
Rank missing		-2.130***	-1.616***	-2.479***		-2.116***	-1.608***	-2.481***		-2.293***	-1.217	-1.597***
		(0.252)	(0.350)	(0.204)		(0.264)	(0.348)	(0.205)		(0.666)	(0.801)	(0.320)
Cohort identifier		0.000	0.021**	0.006**		0.001**	0.022**	0.006**		-0.003**	0.026	0.003
		(0.000)	(0.008)	(0.002)		(0.000)	(0.008)	(0.002)		(0.001)	(0.017)	(0.003)
R-squared	0.52	0.71	0.61	0.60	0.52	0.71	0.61	0.61	0.54	0.70	0.49	0.50
N	74,620	74,556	74,556	37,764	62,405	62,347	62,347	32,631	12,215	12,209	12,209	5,133
Kleibergen-Paap F-stat			40.111	354.088			43.778	350.295			9.980	187.237
Cragg-Donald F-stat			1270.220	9539.270			1134.656	8585.575			72.609	797.406
Ministry/Agency FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Note: This table presents the monetary rate of return to schooling for plublic employees using the administrative data. The results can be interpreted as percent change in monthly income. 'Experience' is imputed as (age − (6 + years of schooling)). Standard errors clustered at the province level. `IV - 1980` indicates models where we restrict the sample to those born in/after 1980, to compare more alike individuals for the IV estimate. Significance level: *0.1 ** 0.05, ***0.01

Tables A.8–A.11 report results for cases where we use respondent age and age squared instead of experience and experience squared in our specifications. Table A.8 shows expansion of compulsory schooling is positively associated with years of schooling across all specifications. Tables A.9, A.10, and A.11 replicate our main results of Tables 3, 4, and 5, respectively, with age and age squared. Our estimates on the monetary rate of return to schooling are consistent for the OLS and Heckman correction model, and qualitatively for IV estimates except for salaried wage earners, while returns to education for public employees from IV estimates are very substantial. This is because compulsory schooling is a statistically significant predictor of age (the correlation coefficients between age and compulsory schooling status is -0.66 and -0.56 in the labor surveys and public employees datasets, respectively), given the centralized system in the country. We consider all individuals who were potentially in the transition stage to seventh grade starting 2004 academic year to be affected by the policy. By construction, if we control for age, there is no variation in the treatment status of compulsory schooling for individuals born in or after 1991. Thus, using experience and its square as additional controls remains our main specification.

Additionally, Tables A.12–A.14 show the survey wave-specific results. The average private monetary rate of return is consistent with our main findings. Nevertheless, the IV estimates, while economically important, are not statistically significant for the 2007 and 2020 waves. This could be due to limited statistical power, as in 2007, there may have been very few women in the labor market affected by the expansion of compulsory schooling. For 2020, the total number of women in the labor market shrank substantially in the aftermath of the 2019 presidential election and peace negotiations, followed by the COVID-19 pandemic.

5.3. Economic Analysis: Estimating the Cost of Banning Women's Education and Employment

We provide complementary economic analysis to quantify the potential economic impact of bans on women's education and employment. Using back-of-the-envelope calculations based on average gross national income per capita (USD 1793.88 (2017 PPP$)) and the share of women in the labor force from household surveys, we estimate the number of

women affected by the ban on work and the associated direct income loss. Additionally, we assess the broader economic losses for the entire economy using macro-level indicators. For step-by-step details on the latter, see Section B.

About 4.53 percent of female adults aged 14-64 years in the labor surveys are wage earners. The total number of women in the population aged 15-64 years is 8,607,380 (National Statistics and Information Authority, 2022). Thus, the number of women wage earners in the population could be 389,914. When multiplied by the average national GNI in 2017 PPP$, the total direct wage loss equals to USD 699,462,999. These direct income losses for about 400,000 individuals can have multiplier effects and indirect economic consequences in the form of reduced consumption, production, and employment. If we consider that each dollar in direct loss equals an additional 0.5 dollars lost indirectly, our conservative estimate of the total loss is 1.049 billion dollars annually, potentially rising to as high as 2.098 billion if the multiplier effect is around three. The loss is equivalent to a decline of 1.5 to 3 percent in national income, given the Afghanistan's GNI of $86.4 billion PPP[6] in 2022.

We estimate the broader economic impact using country-level indicators detailed in Section B. Our analysis compares the predicted values of actual `ln(GNI)` with an adjusted `ln(GNI)` (Figure A.4), the latter assumes what if women had zero contribution to average schooling and the labor force participation between 1990 and 2022. We find that, on average, the country's GNI per capita would have been about 5 percent lower under this scenario, equivalent to a reduction of approximately USD $90 in annual GNI per capita. Given the official population estimate of 34.4 million in 2022–23 (National Statistics and Information Authority, 2022), this translates to an annual economic loss in the excess of three billion US dollars.

Finally, estimates from National Statistics and Information Authority (2019) indicate approximately 1,254,473 female students were enrolled in general secondary education (grades 7–12), 10,537 in Technical and Vocational Education and Training programs, and 114,252 in public and private universities and higher education institutions. The ban on women's education affects approximately 1.4 million female students beyond sixth grade. Combined with the 400,000 women impacted by employment restrictions, roughly

[6] https://datacommons.org/place/country/AFG?category=Economics#Gross-national-income-(purchasing-power-parity). Last accessed 2/21/2025.

1.8 million women are directly affected by current limitations on women's work and education. Beyond the long-term catastrophic consequences for human development, restricting the mobility and participation of 1.8 million citizens can have immediate and devastating effects on local economic activities.

6. Conclusion

This study documents a significant private monetary rate of return to schooling for the general population as well as for public employees in a context characterized by prolonged conflict and instability–Afghanistan. This case study provides critical insights into the role of educational attainment in challenging contexts, a situation that is becoming increasingly prevalent in more regions. Additionally, our back-of-the-envelope calculation suggests that the country could experience an annual loss of one to three billion dollars if the existing bans on women's education and employment continue. These losses are monumental, affecting economic growth and having devastating long-term implications for the country's development. Furthermore, the decline in human capital due to these restrictions will persist for generations, exacerbating the economic and social challenges.

These 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. We show that the monetary premium of schooling is significantly larger for women, particularly for salaried Afghan women who received additional schooling due to the expansion of compulsory schooling laws and subsequently entered the labor force. There are minimal differences in the rate of return to schooling among public employees.

The gender gap in the rate of return to schooling is higher in the broader labor market compared to the public sector. The marginal benefit of education is substantially greater for women due to their lower schooling rates and labor force participation. Each additional year of schooling leads to a more significant improvement in skills and productivity, making their contribution to the country's economic growth vital. A possible explanation is that women with higher levels of education may have had access to better, higher-paying job opportunities compared to their less-educated counterparts

before the political changes of August 2021. Since then, the unemployment rate has more than doubled, particularly among youth and women (World Bank, 2023). Overall, our findings demonstrate that investing in women's education can have far-reaching benefits. Conversely, depriving women of education and employment can result in significant economic losses and further entrench the cycle of poverty.

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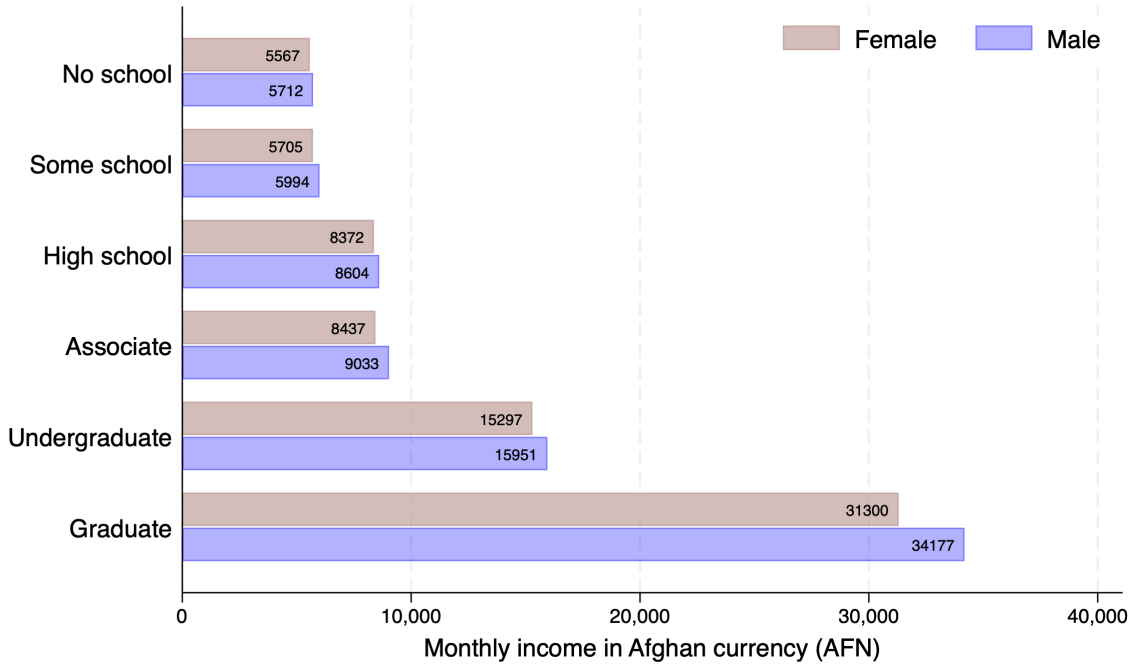
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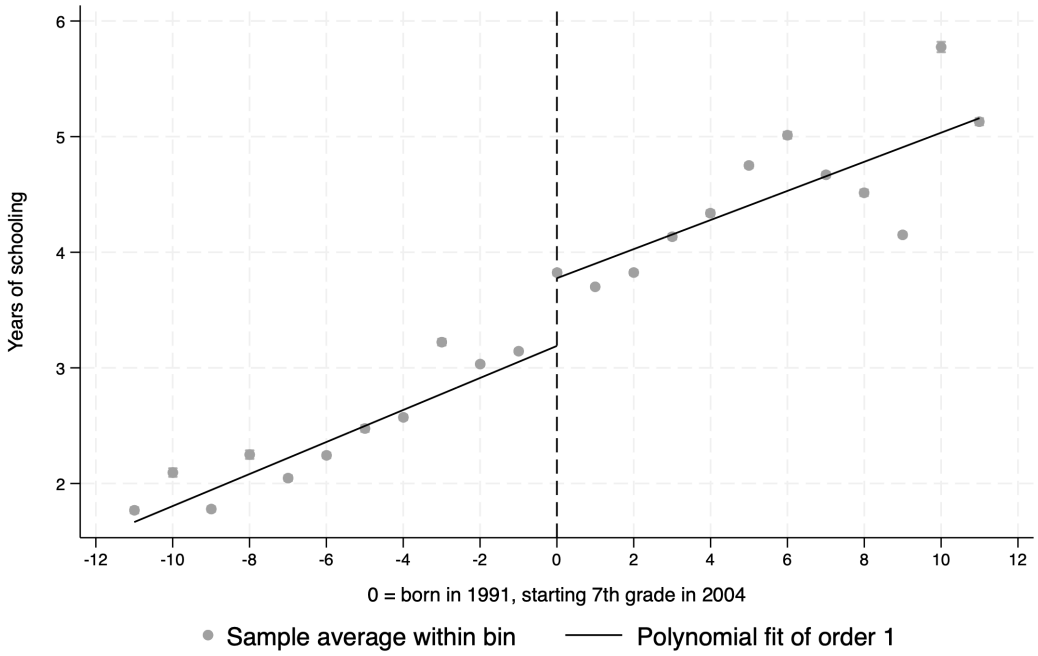
A. Appendix Figures and Tables

Figure A.1. Public employees monthly income in Afghan currency by education level and gender



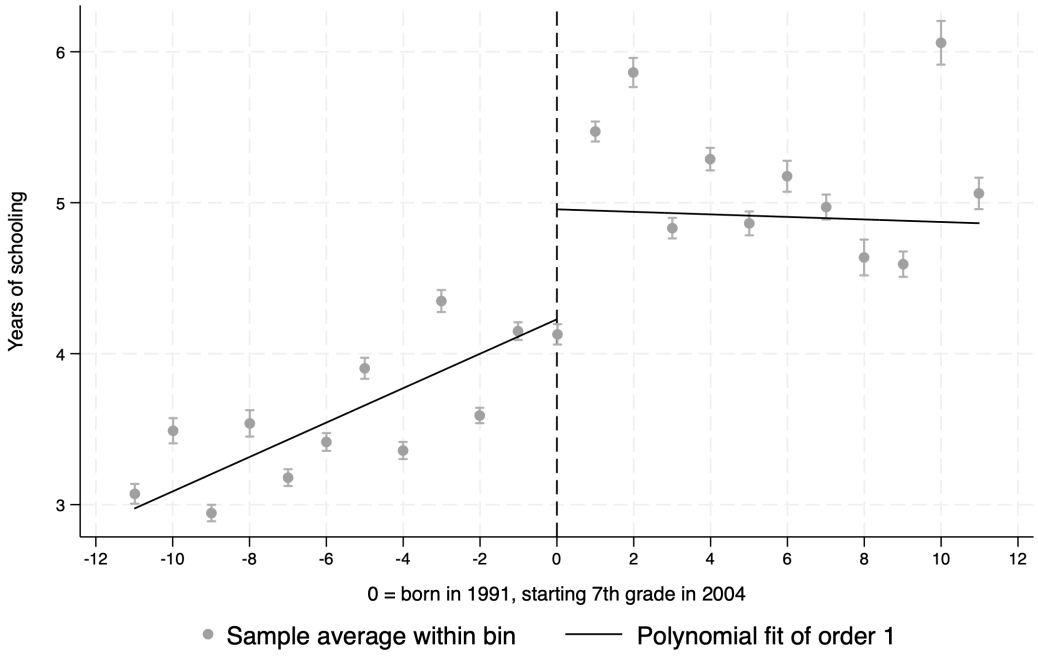
Note: This figure shows the average income by education level and gender for the public employees. The bar-labels shows the average monthly income in Afghani (AFN).

Figure A.2. Average years of schooling for all adults



Note: This figure shows the estimated average years of schooling by birth cohort relative to the first treated cohort using `rdplot` in Stata. The expansion of compulsory schooling in the 2004 constitution is expected to affect individuals born in or after 1991 who would have potentially started secondary schooling in the 2004 academic year. Data is limited only to salaried workers aged 14–65 years old in the survey waves. We control for survey wave and province variables and weighted by age.

Figure A.3. Average years of schooling for adults with wages



Note: This figure shows the estimated average years of schooling by birth cohort relative to the first treated cohort using `rdplot` in Stata. The expansion of compulsory schooling in the 2004 constitution is expected to affect individuals born in or after 1991 who would have potentially started secondary schooling in the 2004 academic year. The sample is restricted to individuals born within ±11 years of the baseline year, 1991. Data is limited only to salaried workers aged 14–65 years old in the survey waves. We control for survey wave and province variables and weighted by age.

Table A.1. Effect of compulsory schooling expansion on years of schooling

	All					Male					Female				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Compulsory	1.821***	1.233***	0.321	-6.203***	-3.278***	1.838***	1.248***	0.449	-6.098***	-3.284***	1.863***	1.305***	-0.423	-6.602***	-2.930***
	(0.268)	(0.141)	(0.317)	(0.241)	(0.075)	(0.257)	(0.143)	(0.317)	(0.256)	(0.080)	(0.638)	(0.257)	(0.655)	(0.481)	(0.191)
Compulsory ×2014			0.726**	1.282***	1.845***			0.609*	1.268***	1.831***			1.609**	1.381***	1.798***
			(0.298)	(0.184)	(0.085)			(0.308)	(0.197)	(0.088)			(0.694)	(0.365)	(0.195)
Compulsory ×2020			1.476***	2.109***	2.261***			1.330***	2.162***	2.272***			2.638***	1.680***	1.880***
			(0.391)	(0.214)	(0.081)			(0.393)	(0.227)	(0.074)			(0.765)	(0.501)	(0.293)
Experience				-0.672***	-0.910***				-0.658***	-0.912***				-0.761***	-0.831***
				(0.036)	(0.007)				(0.036)	(0.007)				(0.053)	(0.013)
Experience^2				0.008***	0.004***				0.008***	0.004***				0.010***	0.004***
				(0.001)	(0.000)				(0.001)	(0.000)				(0.001)	(0.001)
Constant	3.290***	3.390***	3.379***	14.406***	1239.273***	3.334***	3.431***	3.421***	14.273***	1251.026***	2.808***	2.936***	2.897***	14.926***	1018.273***
	(0.435)	(0.024)	(0.025)	(0.452)	(34.162)	(0.423)	(0.024)	(0.024)	(0.466)	(33.108)	(0.715)	(0.059)	(0.068)	(0.537)	(73.106)
R-squared	0.02	0.16	0.16	0.43	0.83	0.02	0.15	0.16	0.42	0.83	0.02	0.24	0.24	0.55	0.88
N	56,931	56,931	56,931	56,931	56,931	51,763	51,763	51,763	51,763	51,763	5,168	5,168	5,168	5,168	5,168
Mean	3.601					3.637					3.236				
Province FE		✓	✓	✓	✓		✓	✓	✓	✓		✓	✓	✓	✓
Year FE		✓	✓	✓	✓		✓	✓	✓	✓		✓	✓	✓	✓
Compulsory × year			✓	✓	✓			✓	✓	✓			✓	✓	✓
Additional controls					✓					✓					✓

Note: This table shows the association between the compulsory schooling law and years of schooling for the full sample, as well as for male and female sub-samples across various specifications. 'Experience' is imputed as (age − (6 + years of schooling)). Additional controls include indicators for gender, being a public sector employee, marital status, and a cohort linear trend. In our IV specification, we use "Compulsory × Survey wave" as an instrument. Standard errors clustered at the province level. Significance level: *0.1 ** 0.05, ***0.01

Table A.2. Explaining the negative schooling coefficient after controlling for experience

	Age	Year born	Experience (years)	Schooling (years)	Affected by compulsory schooling
2014					
Person *A*	23	1991	10	7	1
Person *B*	26	1988	10	10	0
Δ education (A - B)				-3	
2020					
Person *C*	28	1992	9	11	1
Person *D*	35	1985	9	20	0
Δ education (C - D)				-9	

Note: This table shows an example of why, after controlling for experience, the coefficient for compulsory schooling could be negative. This occurs in cases where the wages observed for younger cohorts correspond to those who might have left school at a younger age.

Table A.3. Effects of an additional year of schooling on log(monthly income) – born in/after 1980

	All				Male				Female			
	OLS (1)	OLS (2)	Heckman (3)	IV (4)	OLS (5)	OLS (6)	Heckman (7)	IV (8)	OLS (9)	OLS (10)	Heckman (11)	IV (12)
Years of schooling	0.066***	0.047***	0.051***	0.041***	0.058***	0.042***	0.043***	0.038***	0.103***	0.085***	0.091***	0.064***
	(0.004)	(0.005)	(0.004)	(0.007)	(0.005)	(0.005)	(0.003)	(0.006)	(0.008)	(0.010)	(0.023)	(0.018)
Experience	0.064***	0.046***	0.055***	0.041***	0.060***	0.046***	0.050***	0.042***	0.061***	0.062***	0.068**	0.041**
	(0.006)	(0.005)	(0.007)	(0.007)	(0.006)	(0.006)	(0.007)	(0.007)	(0.014)	(0.010)	(0.028)	(0.020)
Experience ^2	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001*	-0.001**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
Female		-0.782***	-0.870***	-0.784***								
		(0.059)	(0.062)	(0.059)								
Public employee		0.415***	0.416***	0.422***		0.392***	0.393***	0.396***		0.440***	0.440***	0.504***
		(0.065)	(0.012)	(0.066)		(0.066)	(0.012)	(0.067)		(0.116)	(0.054)	(0.124)
Marital status												
Widowed		-0.089	-0.082	-0.088		-0.131	-0.136	-0.131		0.025	0.044	0.019
		(0.089)	(0.071)	(0.089)		(0.088)	(0.102)	(0.088)		(0.149)	(0.132)	(0.146)
Divorced		-0.072	-0.087	-0.074		0.021	0.005	0.019		-0.169	-0.151	-0.169
		(0.215)	(0.199)	(0.215)		(0.165)	(0.264)	(0.164)		(0.287)	(0.335)	(0.287)
Engaged		-0.014	-0.013	-0.020		-0.014	-0.017	-0.018		0.018	0.035	-0.007
		(0.030)	(0.016)	(0.032)		(0.033)	(0.018)	(0.035)		(0.071)	(0.084)	(0.073)
Single		-0.078***	-0.093***	-0.087***		-0.108***	-0.118***	-0.115***		0.110*	0.122*	0.079
		(0.025)	(0.016)	(0.028)		(0.026)	(0.022)	(0.029)		(0.056)	(0.063)	(0.065)
Cohort identifier		0.002	0.002	-0.001		0.001	0.001	-0.000		0.002	0.003	-0.007
		(0.002)	(0.001)	(0.002)		(0.002)	(0.001)	(0.002)		(0.004)	(0.005)	(0.009)
Constant	7.598***	4.673	4.293		7.769***	5.347	5.132*		6.759***	1.733	1.434	
	(0.068)	(3.044)	(2.766)		(0.073)	(3.430)	(2.842)		(0.125)	(8.739)	(9.730)	
R-squared	0.33	0.42		0.34	0.33	0.36		0.29	0.45	0.47		0.32
N	27,481	27,481	134,801	27,481	24,751	24,751	63,148	24,751	2,730	2,730	71,653	2,730
Kleibergen-Paap F-stat				1191.793				1719.902				147.397
Cragg-Donald F-stat				2936.914				2701.504				219.820
Province FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Note: This table presents the monetary rate of return to schooling of adults born in or after 1980 for all wage earners, male, and female for various specification. The results can be interpreted as percent change in monthly income. 'Experience' is imputed as (age − (6 + years of schooling)). See Table A.4 for the Heckman correction selection model results. Standard errors are clustered at the province level. Significance level: *0.1 ** 0.05, ***0.01

Table A.4. Heckman selection results for Models in Table 3 and A.3

	Table 3			Table A.3		
	All	Male	Female	All	Male	Female
	(3)	(7)	(11)	(3)	(7)	(11)
Years of schooling	0.068***	0.051***	0.118***	0.104***	0.090***	0.127***
	(0.002)	(0.002)	(0.004)	(0.002)	(0.003)	(0.005)
Experience	0.117***	0.120***	0.100***	0.203***	0.207***	0.153***
	(0.002)	(0.002)	(0.004)	(0.003)	(0.004)	(0.007)
Experience ^2	-0.002***	-0.002***	-0.002***	-0.004***	-0.004***	-0.003***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Female	-2.028***			-1.775***		
	(0.009)			(0.012)		
Marital status						
Widowed	-0.014	-0.606***	0.395***	0.120	-0.339**	0.453***
	(0.026)	(0.051)	(0.033)	(0.075)	(0.148)	(0.087)
Divorced	-0.365***	-0.912***	0.310**	-0.303	-1.019***	0.341
	(0.113)	(0.169)	(0.137)	(0.196)	(0.334)	(0.219)
Engaged	-0.080***	-0.306***	0.357***	0.012	-0.209***	0.354***
	(0.020)	(0.023)	(0.040)	(0.021)	(0.025)	(0.042)
Single	-0.561***	-0.792***	0.207***	-0.327***	-0.559***	0.262***
	(0.014)	(0.017)	(0.029)	(0.016)	(0.019)	(0.032)
# children under 6 in HH	-0.026***	-0.023***	-0.056***	-0.034***	-0.030***	-0.050***
	(0.003)	(0.003)	(0.006)	(0.004)	(0.004)	(0.008)
# children 7-18 in HH	-0.031***	-0.031***	-0.024***	-0.024***	-0.030***	-0.016***
	(0.002)	(0.002)	(0.004)	(0.002)	(0.003)	(0.005)
Cohort identifier	0.002	0.003*	0.002	0.001	0.002	0.001
	(0.001)	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)
Constant	-5.090*	-6.341**	-7.226	-4.251	-5.773	-4.713
	(2.654)	(3.200)	(5.318)	(3.302)	(3.972)	(6.751)
Lambda	0.007	0.063	0.269**	0.068	0.029	0.054
	(0.030)	(0.039)	(0.128)	(0.046)	(0.053)	(0.211)
N	211,256	100,100	111,156	134,801	63,148	71,653
Province FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓

Note: This table shows the extension (selection models results) for the Heckman correction specifications reported in Table 3 and A.3, the column numbers corresponds to the column number in main Tables. 'Experience' is imputed as (age − (6 + years of schooling)). Standard errors are clustered at the province level. Significance level: *0.1 ** 0.05, ***0.01

Table A.5. Effects of an additional year of schooling on log(monthly income) – Alternative cohorts as an instrument

	Affected if born in/after 1988			Affected if born in/after 1989			Affected if born in/after 1990			Affected if born in/after 1992		
	All	Male	Female	All	Male	Female	All	Male	Female	All	Male	Female
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Years of schooling	0.041***	0.034***	0.065**	0.041***	0.034***	0.065**	0.054***	0.046***	0.083**	0.108**	0.083**	0.248
	(0.009)	(0.008)	(0.026)	(0.009)	(0.008)	(0.026)	(0.012)	(0.010)	(0.032)	(0.049)	(0.039)	(0.170)
Experience	0.026***	0.023***	0.024	0.026***	0.023***	0.024	0.037***	0.034***	0.038	0.084**	0.066*	0.169
	(0.007)	(0.006)	(0.019)	(0.007)	(0.006)	(0.019)	(0.010)	(0.008)	(0.024)	(0.041)	(0.034)	(0.131)
Experience ^2	-0.000***	-0.000***	-0.000**	-0.000***	-0.000***	-0.000**	-0.000***	-0.000***	-0.000**	-0.000***	-0.000***	-0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
Female	-0.802***			-0.802***			-0.798***			-0.783***		
	(0.058)			(0.058)			(0.057)			(0.057)		
Public employee	0.262***	0.239***	0.415**	0.262***	0.239***	0.415**	0.239***	0.221**	0.351*	0.146	0.162	-0.268
	(0.080)	(0.081)	(0.158)	(0.080)	(0.081)	(0.158)	(0.086)	(0.085)	(0.174)	(0.144)	(0.124)	(0.658)
Marital status												
Widowed	-0.031	-0.082**	0.058	-0.031	-0.082**	0.058	-0.031	-0.083**	0.064	-0.028	-0.087**	0.127
	(0.031)	(0.033)	(0.063)	(0.031)	(0.033)	(0.063)	(0.031)	(0.033)	(0.061)	(0.032)	(0.037)	(0.106)
Divorced	-0.028	-0.227*	0.373**	-0.028	-0.227*	0.373**	-0.021	-0.224*	0.390**	0.008	-0.212	0.554**
	(0.104)	(0.124)	(0.150)	(0.104)	(0.124)	(0.150)	(0.106)	(0.125)	(0.146)	(0.124)	(0.131)	(0.249)
Engaged	-0.073*	-0.073*	-0.049	-0.073*	-0.073*	-0.049	-0.059	-0.061	-0.028	-0.001	-0.023	0.175
	(0.038)	(0.042)	(0.080)	(0.038)	(0.042)	(0.080)	(0.039)	(0.042)	(0.084)	(0.064)	(0.059)	(0.230)
Single	-0.156***	-0.189***	0.012	-0.156***	-0.189***	0.012	-0.138***	-0.172***	0.032	-0.060	-0.117**	0.219
	(0.030)	(0.033)	(0.065)	(0.030)	(0.033)	(0.065)	(0.030)	(0.032)	(0.070)	(0.067)	(0.056)	(0.211)
Cohort identifier	0.006	0.004	0.003	0.006	0.004	0.003	0.014**	0.011*	0.012	0.048	0.034	0.097
	(0.004)	(0.004)	(0.012)	(0.004)	(0.004)	(0.012)	(0.007)	(0.006)	(0.016)	(0.030)	(0.025)	(0.090)
R-squared	0.29	0.22	0.28	0.29	0.22	0.28	0.28	0.22	0.28	0.25	0.20	0.09
N	56,931	51,763	5,168	56,931	51,763	5,168	56,931	51,763	5,168	56,931	51,763	5,168
Kleibergen-Paap F-stat	713.381	626.656	243.413	713.381	626.656	243.413	603.998	510.648	246.295	1728.156	1705.497	4.576
Cragg-Donald F-stat	2801.823	2539.403	238.232	2801.823	2539.403	238.232	1340.870	1191.501	138.841	102.208	93.390	12.336
Province FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Note: This table show the monetary rate of return for alternative IV specifications. The results can be interpreted as percent change in monthly income. 'Experience' is imputed as (age − (6 + years of schooling)). Standard errors are clustered at the province level. Significance level: *0.1 ** 0.05, ***0.01

Table A.6. Effects of an additional year of schooling on log(income), salaried sub-sample born in/after 1980

	All				Male				Female			
	OLS (1)	OLS (2)	Heckman (3)	IV (4)	OLS (5)	OLS (6)	Heckman (7)	IV (8)	OLS (9)	OLS (10)	Heckman (11)	IV (12)
Years of schooling	0.036***	0.037***	0.011	0.029*	0.033***	0.031***	0.029*	0.018	0.090***	0.089***	0.116**	0.121***
	(0.009)	(0.009)	(0.014)	(0.014)	(0.009)	(0.009)	(0.016)	(0.013)	(0.013)	(0.019)	(0.051)	(0.038)
Experience	0.038***	0.029***	0.005	0.021*	0.034***	0.030***	0.027	0.018*	0.018*	0.019	0.035	0.046
	(0.008)	(0.007)	(0.013)	(0.011)	(0.009)	(0.008)	(0.017)	(0.010)	(0.010)	(0.014)	(0.031)	(0.028)
Experience ^2	-0.001***	-0.000***	0.000	-0.000***	-0.001***	-0.000***	-0.000	-0.000***	0.000	0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
Female		-0.464***	-0.295***	-0.461***								
		(0.068)	(0.092)	(0.069)								
Marital status												
Widowed		0.060	0.021	0.059		-0.002	0.002	-0.011		0.254	0.326	0.249
		(0.091)	(0.125)	(0.090)		(0.183)	(0.213)	(0.178)		(0.186)	(0.207)	(0.193)
Divorced		0.299*	0.380	0.281*		0.279*	0.284	0.251*				
		(0.164)	(0.414)	(0.152)		(0.155)	(0.397)	(0.142)				
Engaged		0.060**	0.047	0.050		0.062**	0.062**	0.045		-0.067	-0.034	-0.027
		(0.027)	(0.029)	(0.031)		(0.025)	(0.028)	(0.029)		(0.124)	(0.114)	(0.137)
Single		-0.046	-0.016	-0.061*		-0.061	-0.056	-0.085**		0.027	0.054	0.068
		(0.031)	(0.025)	(0.031)		(0.038)	(0.038)	(0.039)		(0.065)	(0.076)	(0.077)
Cohort identifier		0.001	0.000	-0.004		0.001	0.001	-0.007		-0.001	-0.001	0.017
		(0.002)	(0.002)	(0.006)		(0.002)	(0.002)	(0.006)		(0.009)	(0.008)	(0.018)
Constant	8.424***	7.237	8.513*		8.533***	7.343	7.043		7.397***	8.918	8.114	
	(0.143)	(4.679)	(4.693)		(0.148)	(4.729)	(4.764)		(0.164)	(17.223)	(15.050)	
R-squared	0.31	0.34		0.28	0.30	0.31		0.25	0.51	0.52		0.40
N	7,413	7,413	146,340	7,413	6,691	6,691	72,846	6,691	719	719	73,494	719
Kleibergen-Paap F-stat				852.535				1107.483				385.129
Cragg-Donald F-stat				824.512				733.125				87.156
Province FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Note: This table presents the monetary rate of return to schooling for salaried sub-sample (public or private sector) born in or after 1980 of all, male, and female for various specification. The results can be interpreted as percent change in monthly income. 'Experience' is imputed as (age − (6 + years of schooling)). See Table A.7 for the Heckman correction selection model results. Standard errors are clustered at the province level. Significance level: *0.1 ** 0.05, ***0.01

Table A.7. Heckman selection results for Models in Table 4 and A.6

	Table 4			Table A.6		
	All	Male	Female	All	Male	Female
	(3)	(7)	(11)	(3)	(7)	(11)
Years of schooling	0.124***	0.109***	0.207***	0.144***	0.127***	0.225***
	(0.002)	(0.002)	(0.006)	(0.003)	(0.003)	(0.009)
Experience	0.077***	0.074***	0.102***	0.137***	0.139***	0.135***
	(0.003)	(0.003)	(0.007)	(0.004)	(0.004)	(0.011)
Experience ^2	-0.001***	-0.001***	-0.002***	-0.003***	-0.003***	-0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Female	-0.900***			-0.900***		
	(0.014)			(0.018)		
Marital status						
Widowed	0.144***	-0.243***	0.521***	0.213**	-0.200	0.702***
	(0.044)	(0.085)	(0.061)	(0.108)	(0.206)	(0.136)
Divorced	-0.334*	-0.627**	0.094	-0.491	-0.330	-5.625
	(0.194)	(0.290)	(0.290)	(0.349)	(0.392)	(.)
Engaged	0.026	-0.019	0.192**	0.063**	0.003	0.255***
	(0.027)	(0.029)	(0.077)	(0.028)	(0.031)	(0.080)
Single	-0.287***	-0.377***	0.123**	-0.157***	-0.248***	0.214***
	(0.019)	(0.021)	(0.049)	(0.021)	(0.023)	(0.055)
# children under 6 in HH	-0.011***	-0.006	-0.054***	-0.021***	-0.017***	-0.051***
	(0.004)	(0.004)	(0.013)	(0.005)	(0.005)	(0.016)
# children 7-18 in HH	-0.025***	-0.022***	-0.031***	-0.015***	-0.010***	-0.030***
	(0.002)	(0.003)	(0.007)	(0.003)	(0.003)	(0.010)
Cohort identifier	0.002	0.002	-0.001	0.003	0.002	-0.001
	(0.002)	(0.002)	(0.005)	(0.002)	(0.002)	(0.006)
Constant	-6.749*	-6.854*	-2.041	-7.962*	-7.713	-2.983
	(3.621)	(3.957)	(10.154)	(4.509)	(4.955)	(12.369)
Lambda	0.113	0.412***	0.305*	-0.234*	-0.025	0.146
	(0.077)	(0.100)	(0.178)	(0.123)	(0.157)	(0.263)
R-squared						
N	226,946	113,050	113,896	146,340	72,846	73,494
Province FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓

Note: This table shows the extension (selection models results) for the Heckman correction specifications reported in Table 4 and A.6, the column numbers corresponds to the column number in main Tables. 'Experience' is imputed as (age − (6 + years of schooling)). Standard errors are clustered at the province level. Significance level: *0.1 ** 0.05, ***0.01

Table A.8. Effect of compulsory schooling expansion on years of schooling, using age

	All					Male					Female				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Compulsory	1.821***	1.233***	0.321	0.140	0.253	1.838***	1.248***	0.449	0.214	0.324	1.863***	1.305***	-0.423	0.147	0.238
	(0.268)	(0.141)	(0.317)	(0.217)	(0.198)	(0.257)	(0.143)	(0.317)	(0.228)	(0.216)	(0.638)	(0.257)	(0.655)	(0.587)	(0.507)
Compulsory ×2014			0.726**	0.683**	0.393			0.609*	0.590*	0.301			1.609**	1.243*	0.766
			(0.298)	(0.277)	(0.244)			(0.308)	(0.296)	(0.277)			(0.694)	(0.630)	(0.460)
Compulsory ×2020			1.476***	1.394***	1.271***			1.330***	1.289***	1.177***			2.638***	1.950***	1.346**
			(0.391)	(0.358)	(0.316)			(0.393)	(0.369)	(0.340)			(0.765)	(0.679)	(0.629)
Age				0.040	0.073**				0.024	0.055*				0.301***	0.189***
				(0.031)	(0.030)				(0.026)	(0.027)				(0.095)	(0.068)
Age^2				-0.001**	-0.001***				-0.001*	-0.001***				-0.005***	-0.003***
				(0.000)	(0.000)				(0.000)	(0.000)				(0.001)	(0.001)
Constant	3.290***	3.390***	3.379***	3.146***	5.299	3.334***	3.431***	3.421***	3.442***	6.338	2.808***	2.936***	2.897***	-1.255	-3.740
	(0.435)	(0.024)	(0.025)	(0.616)	(12.992)	(0.423)	(0.024)	(0.024)	(0.534)	(14.483)	(0.715)	(0.059)	(0.068)	(1.618)	(28.903)
R-squared	0.02	0.16	0.16	0.16	0.32	0.02	0.15	0.16	0.16	0.29	0.02	0.24	0.24	0.26	0.62
N	56,931	56,931	56,931	56,931	56,931	51,763	51,763	51,763	51,763	51,763	5,168	5,168	5,168	5,168	5,168
Mean	3.601					3.637					3.236				
Province FE		✓	✓	✓	✓		✓	✓	✓	✓		✓	✓	✓	✓
Year FE		✓	✓	✓	✓		✓	✓	✓	✓		✓	✓	✓	✓
Compulsory × year			✓	✓	✓			✓	✓	✓			✓	✓	✓
Additional controls					✓					✓					✓

Note: This table shows the association between the compulsory schooling law and years of schooling for the full sample, as well as for male and female sub-samples across various specifications using Age instead of experience. Additional controls include indicators for gender, being a public sector employee, marital status, and a cohort linear trend. In our IV specification, we use "Compulsory × Survey wave" as an instrument. Standard errors clustered at the province level. Significance level: *0.1 ** 0.05, ***0.01

Table A.9. Effects of an additional year of schooling on log(monthly income), using age

	All				Male				Female			
	OLS (1)	OLS (2)	Heckman (3)	IV (4)	OLS (5)	OLS (6)	Heckman (7)	IV (8)	OLS (9)	OLS (10)	Heckman (11)	IV (12)
Years of schooling	0.035***	0.026***	0.028***	0.035*	0.030***	0.023***	0.023***	0.030	0.069***	0.048***	0.064***	0.029
	(0.002)	(0.003)	(0.001)	(0.020)	(0.002)	(0.003)	(0.001)	(0.018)	(0.005)	(0.005)	(0.008)	(0.055)
Age	0.059***	0.046***	0.070***	0.046***	0.058***	0.046***	0.076***	0.046***	0.038***	0.034***	0.063***	0.036***
	(0.004)	(0.005)	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.009)	(0.010)	(0.016)	(0.012)
Age^2	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.000***	-0.000***	-0.001***	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Female		-0.806***	-1.138***	-0.801***								
		(0.058)	(0.047)	(0.056)								
Public employee		0.280***	0.282***	0.223**		0.253***	0.255***	0.215**		0.443***	0.441***	0.621
		(0.070)	(0.009)	(0.105)		(0.073)	(0.009)	(0.097)		(0.110)	(0.041)	(0.510)
Marital status												
Widowed		-0.030	-0.033	-0.019		-0.068*	-0.163***	-0.064*		0.054	0.144**	0.029
		(0.031)	(0.027)	(0.039)		(0.034)	(0.042)	(0.037)		(0.061)	(0.059)	(0.087)
Divorced		-0.028	-0.077	-0.018		-0.215*	-0.352**	-0.212*		0.361**	0.441**	0.319
		(0.098)	(0.116)	(0.099)		(0.124)	(0.152)	(0.124)		(0.144)	(0.195)	(0.215)
Engaged		-0.029	-0.039**	-0.032		-0.030	-0.065***	-0.032		-0.036	0.042	-0.028
		(0.031)	(0.016)	(0.032)		(0.033)	(0.018)	(0.034)		(0.070)	(0.065)	(0.083)
Single		-0.105***	-0.200***	-0.113***		-0.136***	-0.275***	-0.140***		0.020	0.053	0.053
		(0.023)	(0.017)	(0.027)		(0.027)	(0.023)	(0.026)		(0.060)	(0.039)	(0.142)
Cohort identifier		0.001	0.001	0.001		0.001	0.002	0.001		0.001	0.001	0.001
		(0.001)	(0.001)	(0.001)		(0.002)	(0.001)	(0.002)		(0.004)	(0.004)	(0.004)
Constant	7.239***	5.182*	4.170**		7.370***	5.055	3.771*		6.678***	5.201	2.921	
	(0.079)	(2.931)	(2.086)		(0.097)	(3.172)	(2.170)		(0.155)	(7.567)	(7.556)	
R-squared	0.29	0.36		0.29	0.29	0.30		0.22	0.41	0.42		0.27
N	56,931	56,931	211,256	56,931	51,763	51,763	100,100	51,763	5,168	5,168	111,156	5,168
Kleibergen-Paap F-stat				22.334				22.464				11.706
Cragg-Donald F-stat				77.583				66.135				14.885
Province FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Note: This table presents the monetary rate of return to schooling for all wage earners, male, and female for various specification using age. The results can be interpreted as percent change in monthly income. See Table A.4 for the Heckman correction selection model results. Standard errors are clustered at the province level. Significance level: *0.1 ** 0.05, ***0.01

Table A.10. Effects of an additional year of schooling on log(income), salaried sub-sample using age

	All				Male				Female			
	OLS (1)	OLS (2)	Heckman (3)	IV (4)	OLS (5)	OLS (6)	Heckman (7)	IV (8)	OLS (9)	OLS (10)	Heckman (11)	IV (12)
Years of schooling	0.018***	0.021***	0.039***	-0.002	0.017***	0.017***	0.058***	-0.006	0.055***	0.058***	0.124***	-0.022
	(0.003)	(0.003)	(0.007)	(0.014)	(0.003)	(0.003)	(0.007)	(0.014)	(0.006)	(0.007)	(0.027)	(0.020)
Age	0.045***	0.040***	0.062***	0.042***	0.043***	0.036***	0.085***	0.038***	0.050***	0.053***	0.119***	0.104***
	(0.010)	(0.009)	(0.009)	(0.010)	(0.011)	(0.009)	(0.010)	(0.010)	(0.015)	(0.019)	(0.030)	(0.023)
Age^2	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.000***	-0.001***	-0.001***	-0.001**	-0.001***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Female		-0.463***	-0.635***	-0.420***								
		(0.053)	(0.063)	(0.057)								
Marital status												
Widowed		0.072	0.084*	-0.015		0.067	-0.046	0.062		0.271***	0.442***	-0.132
		(0.047)	(0.051)	(0.068)		(0.087)	(0.092)	(0.091)		(0.089)	(0.102)	(0.144)
Divorced		0.469***	0.407*	0.389***		0.285***	0.030	0.279*		0.692***	0.737**	0.234
		(0.058)	(0.235)	(0.073)		(0.100)	(0.335)	(0.138)		(0.171)	(0.365)	(0.213)
Engaged		0.061**	0.064**	0.059**		0.061**	0.044	0.064**		-0.053	0.021	-0.028
		(0.026)	(0.027)	(0.024)		(0.027)	(0.031)	(0.027)		(0.119)	(0.103)	(0.174)
Single		-0.058*	-0.121***	-0.045		-0.085**	-0.298***	-0.078*		0.049	0.094*	0.173
		(0.030)	(0.029)	(0.028)		(0.041)	(0.044)	(0.040)		(0.081)	(0.057)	(0.117)
Cohort identifier		-0.001	-0.000	-0.001		-0.000	0.001	-0.001		-0.001	-0.002	-0.002
		(0.002)	(0.002)	(0.002)		(0.002)	(0.002)	(0.002)		(0.007)	(0.006)	(0.008)
Constant	7.996***	9.377**	7.290**		8.109***	9.140**	4.500		6.943***	9.764	6.891	
	(0.198)	(3.510)	(3.606)		(0.222)	(3.437)	(4.094)		(0.236)	(14.123)	(12.640)	
R-squared	0.34	0.37		0.28	0.35	0.35		0.29	0.46	0.46		0.28
N	13,098	13,098	226,946	13,098	11,820	11,820	113,050	11,820	1,276	1,276	113,896	1,276
Kleibergen-Paap F-stat				213.599				265.466				132.648
Cragg-Donald F-stat				101.051				88.344				13.979
Province FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Note: This table presents the monetary rate of return to schooling for salaried sub-sample (public or private sector) of all, male, and female for various specification using age. The results can be interpreted as percent change in monthly income. See Table A.7 for the Heckman correction selection model results. Standard errors are clustered at the province level. Significance level: *0.1 ** 0.05, ***0.01

Table A.11. Effects of an additional year of schooling on log(monthly income), Public employees using age

	All			Male			Female		
	OLS	OLS	IV	OLS	OLS	IV	OLS	OLS	IV
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Years of schooling	0.061***	0.034***	0.253	0.061***	0.035***	0.263	0.060***	0.033**	0.252
	(0.010)	(0.008)	(0.176)	(0.009)	(0.007)	(0.195)	(0.013)	(0.012)	(0.198)
Age	0.029***	0.014***	0.031	0.033***	0.016***	0.031	0.023***	0.006**	0.040
	(0.005)	(0.003)	(0.022)	(0.005)	(0.003)	(0.023)	(0.007)	(0.002)	(0.032)
Age^2	-0.000***	-0.000***	-0.000	-0.000***	-0.000***	-0.000	-0.000***	-0.000***	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Female		-0.031**	-0.018						
		(0.015)	(0.032)						
Rank/Grade (reference = 1), 1 highest – 8 lowest									
2		-0.610***	-0.475**		-0.594***	-0.436*		-0.779	-0.709
		(0.144)	(0.215)		(0.150)	(0.244)		(0.602)	(0.693)
3		-1.312***	-1.040***		-1.311***	-1.005**		-1.321**	-1.130
		(0.199)	(0.355)		(0.205)	(0.409)		(0.592)	(0.665)
4		-1.714***	-1.248**		-1.713***	-1.205*		-1.728***	-1.284*
		(0.261)	(0.542)		(0.266)	(0.616)		(0.608)	(0.664)
5		-2.123***	-1.393*		-2.115***	-1.365*		-2.173***	-1.352*
		(0.182)	(0.702)		(0.187)	(0.776)		(0.644)	(0.716)
6		-2.256***	-1.341		-2.253***	-1.301		-2.292***	-1.319
		(0.191)	(0.895)		(0.196)	(0.985)		(0.632)	(0.835)
7		-2.201***	1.165		-2.192***	1.369		-2.260***	0.836
		(0.212)	(2.808)		(0.220)	(3.144)		(0.649)	(2.683)
8		-2.291***	1.203		-2.284***	1.472		-2.333***	0.944
		(0.208)	(2.979)		(0.219)	(3.350)		(0.639)	(2.894)
Rank missing		-2.141***	0.965		-2.130***	1.123		-2.301***	1.174
		(0.250)	(2.611)		(0.261)	(2.899)		(0.671)	(2.846)
Cohort identifier		0.001*	0.003		0.001**	0.004		-0.002**	-0.001
		(0.000)	(0.002)		(0.000)	(0.002)		(0.001)	(0.001)
R-squared	0.52	0.71	-0.23	0.52	0.71	-0.29	0.54	0.70	-0.35
N	74,620	74,556	74,556	62,405	62,347	62,347	12,215	12,209	12,209
Kleibergen-Paap F-stat			3.013			2.308			2.506
Cragg-Donald F-stat			48.424			36.083			9.978
Ministry/Agency FE	✓	✓	✓	✓	✓	✓	✓	✓	✓

Note: This table presents the monetary rate of return to schooling for public employees using the administrative data and age. The results can be interpreted as percent change in monthly income. Standard errors clustered at the province level. `IV - 1980` indicates models where we restrict the sample to those born in/after 1980, to compare more alike individuals for the IV estimate. Significance level: *0.1 ** 0.05, ***0.01

Table A.12. Effects of an additional year of schooling on log(monthly income), 2007

	All				Male				Female			
	OLS (1)	OLS (2)	Heckman (3)	IV (4)	OLS (5)	OLS (6)	Heckman (7)	IV (8)	OLS (9)	OLS (10)	Heckman (11)	IV (12)
Years of schooling	0.039***	0.034***	0.036***	0.101***	0.032***	0.031***	0.035***	0.100***	0.068***	0.046***	0.106***	0.075
	(0.004)	(0.005)	(0.002)	(0.013)	(0.003)	(0.005)	(0.002)	(0.020)	(0.012)	(0.009)	(0.018)	(0.052)
Experience	0.026***	0.020***	0.026***	0.076***	0.028***	0.022***	0.037***	0.080***	0.017	0.014	0.067***	0.034
	(0.003)	(0.004)	(0.003)	(0.010)	(0.003)	(0.003)	(0.004)	(0.015)	(0.011)	(0.012)	(0.017)	(0.042)
Experience ^2	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000	-0.000	-0.001***	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Female		-0.731***	-0.852***	-0.703***								
		(0.094)	(0.054)	(0.089)								
Public employee		0.072	0.072***	-0.089		0.017	0.018	-0.135		0.324*	0.333***	0.184
		(0.079)	(0.016)	(0.082)		(0.078)	(0.017)	(0.094)		(0.163)	(0.072)	(0.245)
Marital status												
Widowed		-0.034	-0.032	-0.029		-0.070	-0.136***	-0.081*		0.016	0.257***	0.035
		(0.036)	(0.034)	(0.038)		(0.042)	(0.052)	(0.047)		(0.081)	(0.087)	(0.071)
Divorced		0.098	0.093	0.173		-0.341***	-0.441*	-0.255**		0.609***	0.810***	0.660***
		(0.123)	(0.171)	(0.134)		(0.106)	(0.244)	(0.106)		(0.184)	(0.282)	(0.191)
Engaged		-0.089*	-0.092***	-0.020		-0.088**	-0.107***	-0.019		-0.036	0.067	0.002
		(0.046)	(0.025)	(0.050)		(0.043)	(0.025)	(0.050)		(0.145)	(0.101)	(0.138)
Single		-0.130***	-0.164***	-0.031		-0.166***	-0.272***	-0.060		0.090	0.167***	0.119*
		(0.036)	(0.022)	(0.047)		(0.040)	(0.031)	(0.054)		(0.076)	(0.064)	(0.061)
Cohort identifier		0.002	0.002	0.042***		0.003**	0.004**	0.045***		-0.004	-0.003	0.009
		(0.001)	(0.002)	(0.007)		(0.001)	(0.002)	(0.011)		(0.005)	(0.006)	(0.026)
Constant	7.577***	3.368	3.150		7.676***	2.200	0.845		6.888***	15.069	12.133	
	(0.054)	(2.679)	(3.125)		(0.049)	(2.575)	(3.234)		(0.169)	(10.671)	(11.587)	
R-squared	0.25	0.32		0.10	0.25	0.25		0.00	0.32	0.33		0.12
N	24,269	24,269	72,038	24,269	21,781	21,781	34,993	21,781	2,487	2,487	37,045	2,487
Kleibergen-Paap F-stat				1343.833				1223.293				125.380
Cragg-Donald F-stat				625.934				528.611				90.385
Province FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Note: This table presents the monetary rate of return to schooling for all wage earners, male, and female for various specification using age. The results can be interpreted as percent change in monthly income. Standard errors are clustered at the province level. Significance level: *0.1 ** 0.05, ***0.01

Table A.13. Effects of an additional year of schooling on log(monthly income), 2014

	All				Male				Female			
	OLS	OLS	Heckman	IV	OLS	OLS	Heckman	IV	OLS	OLS	Heckman	IV
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Years of schooling	0.048***	0.030***	0.037***	0.079***	0.040***	0.027***	0.027***	0.072***	0.094***	0.069***	0.073***	0.086**
	(0.004)	(0.004)	(0.002)	(0.017)	(0.002)	(0.003)	(0.002)	(0.016)	(0.005)	(0.009)	(0.015)	(0.042)
Experience	0.040***	0.025***	0.040***	0.067***	0.037***	0.026***	0.027***	0.064***	0.042***	0.037***	0.040***	0.050*
	(0.003)	(0.003)	(0.003)	(0.013)	(0.003)	(0.003)	(0.004)	(0.012)	(0.007)	(0.007)	(0.013)	(0.029)
Experience ^2	-0.001***	-0.000***	-0.001***	-0.001***	-0.001***	-0.000***	-0.000***	-0.001***	-0.001***	-0.000***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Female		-0.870***	-1.200***	-0.857***								
		(0.092)	(0.064)	(0.089)								
Public employee		0.347***	0.348***	0.276***		0.327***	0.327***	0.267***		0.516***	0.516***	0.459**
		(0.071)	(0.013)	(0.087)		(0.075)	(0.013)	(0.086)		(0.128)	(0.060)	(0.215)
Marital status												
Widowed		-0.087	-0.109**	-0.091*		-0.173***	-0.182**	-0.163***		0.032	0.045	0.029
		(0.053)	(0.047)	(0.051)		(0.058)	(0.072)	(0.059)		(0.061)	(0.082)	(0.058)
Divorced		-0.170	-0.219	-0.155		-0.012	-0.022	0.001		-0.185	-0.173	-0.180
		(0.216)	(0.205)	(0.234)		(0.219)	(0.262)	(0.280)		(0.396)	(0.325)	(0.391)
Engaged		-0.032	-0.063***	0.018		-0.027	-0.032	0.020		-0.008	0.004	0.007
		(0.030)	(0.023)	(0.033)		(0.035)	(0.028)	(0.035)		(0.057)	(0.080)	(0.085)
Single		-0.174***	-0.269***	-0.114***		-0.191***	-0.202***	-0.135***		-0.014	-0.005	0.001
		(0.024)	(0.024)	(0.027)		(0.027)	(0.035)	(0.027)		(0.059)	(0.056)	(0.078)
Cohort identifier		0.000	0.001	0.031***		0.000	0.001	0.029***		0.003	0.003	0.012
		(0.002)	(0.002)	(0.010)		(0.002)	(0.002)	(0.009)		(0.006)	(0.005)	(0.020)
Constant	8.025***	7.646**	5.940*		8.176***	7.493**	7.760**		6.989***	1.362	1.132	
	(0.056)	(3.120)	(3.056)		(0.046)	(3.304)	(3.125)		(0.076)	(12.528)	(10.801)	
R-squared	0.24	0.34		0.18	0.23	0.25		0.08	0.45	0.47		0.27
N	24,163	24,163	80,745	24,163	22,248	22,248	40,471	22,248	1,915	19,15	40,274	1,915
Kleibergen-Paap F-stat				209.129				210.616				53.821
Cragg-Donald F-stat				1192.773				1083.130				116.888
Province FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Note: This table presents the monetary rate of return to schooling for all wage earners, male, and female for various specification using age. The results can be interpreted as percent change in monthly income. Standard errors are clustered at the province level. Significance level: *0.1 ** 0.05, ***0.01

Table A.14. Effects of an additional year of schooling on log(monthly income), 2020

	All				Male				Female			
	OLS (1)	OLS (2)	Heckman (3)	IV (4)	OLS (5)	OLS (6)	Heckman (7)	IV (8)	OLS (9)	OLS (10)	Heckman (11)	IV (12)
Years of schooling	0.048***	0.033***	0.040***	0.044***	0.042***	0.029***	0.036***	0.042***	0.082***	0.068***	0.104**	0.042
	(0.004)	(0.004)	(0.004)	(0.012)	(0.003)	(0.003)	(0.004)	(0.012)	(0.014)	(0.017)	(0.052)	(0.069)
Experience	0.034***	0.018***	0.029***	0.028**	0.030***	0.018***	0.034***	0.031***	0.020*	0.017	0.045	-0.005
	(0.004)	(0.003)	(0.006)	(0.012)	(0.004)	(0.003)	(0.006)	(0.011)	(0.010)	(0.014)	(0.041)	(0.054)
Experience ^2	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.001***	-0.000***	-0.000	-0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
Female		-0.715***	-0.966***	-0.715***								
		(0.104)	(0.117)	(0.104)								
Public employee		0.301***	0.301***	0.286***		0.271***	0.271***	0.254***		0.435***	0.429***	0.500**
		(0.056)	(0.018)	(0.058)		(0.055)	(0.018)	(0.057)		(0.114)	(0.082)	(0.236)
Marital status												
Widowed		-0.070	-0.041	-0.072		0.022	-0.074	0.006		0.075	0.240	0.062
		(0.084)	(0.073)	(0.085)		(0.137)	(0.130)	(0.139)		(0.114)	(0.251)	(0.108)
Divorced		-0.003	-0.059	-0.008		-0.210	-0.334	-0.224		0.328**	0.417	0.317**
		(0.178)	(0.192)	(0.176)		(0.233)	(0.226)	(0.220)		(0.144)	(0.425)	(0.125)
Engaged		-0.047	-0.050	-0.032		-0.028	-0.075*	-0.012		-0.071	0.087	-0.109
		(0.049)	(0.035)	(0.051)		(0.059)	(0.041)	(0.061)		(0.107)	(0.243)	(0.133)
Single		-0.126***	-0.202***	-0.106**		-0.135***	-0.297***	-0.111**		-0.071	0.031	-0.112
		(0.035)	(0.042)	(0.040)		(0.039)	(0.061)	(0.047)		(0.109)	(0.161)	(0.178)
Cohort identifier		-0.000	-0.001	0.007		-0.001	-0.003	0.007		0.009	0.012	-0.005
		(0.002)	(0.002)	(0.008)		(0.002)	(0.002)	(0.008)		(0.009)	(0.009)	(0.035)
Constant	8.199***	9.223**	10.706**		8.357***	10.987***	15.076***		7.500***	-10.942	-18.036	
	(0.077)	(3.997)	(4.603)		(0.065)	(3.851)	(4.905)		(0.163)	(17.241)	(19.814)	
R-squared	0.33	0.41		0.22	0.35	0.37		0.13	0.54	0.56		0.26
N	8,499	8,499	58,473	8,499	7,734	7,734	24,636	7,734	764	764	33,837	764
Kleibergen-Paap F-stat				356.282				314.779				35.451
Cragg-Donald F-stat				721.084				634.590				83.010
Province FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Note: This table presents the monetary rate of return to schooling for all wage earners, male, and female for various specification using age. The results can be interpreted as percent change in monthly income. Standard errors are clustered at the province level. Significance level: *0.1 ** 0.05, ***0.01

B. Economic Analysis: Step-by-step guidance

We undertake a complementary economic analysis using macro-level historical data (1990 to 2022) to quantify potential economic losses the country could experience given bans on women education and work. Specifically, we attain the following information from relevant sources.

1. Data on following indicators from the country profile for Human Development Country Summary - United Nations Development Programme - (https://hdr.undp.org/data-center/specific-country-data#/countries/AFG. Last accessed: 2/8/2025.).
    - Gross National Income (GNI) per capita in constant 2017 purchases power parity (PPP)
    - Mean Years of Schooling (years) in the population
    - Mean Years of Schooling (years) in the population, Female
    - Mean Years of Schooling (years) in the population, Male
2. Country level information from the World Bank Open Data Portal
    - Labor force participation rate, total (% of total population ages 15-64) (modeled ILO estimate) - https://data.worldbank.org/indicator/SL.TLF.ACTI.ZS. Last accessed: 2/8/2025.
    - Ratio of female to male labor force participation rate (%) (modeled ILO estimate) - https://data.worldbank.org/indicator/SL.TLF.CACT.FM.ZS. Last accessed: 2/8/2025.
    - Population growth (annual %) - https://data.worldbank.org/indicator/SP.POP.GROW. Last accessed: 2/8/2025.
    - Population, female (% of total population) - https://data.worldbank.org/indicator/SP.POP.TOTL.FE.ZS. Last accessed: 2/8/2025.

We merge all indicators into one meta dataset containing all the above information in one place for the following steps.

1. Construct the natural log(Gross National Income (GNI) per capita in constant 2017 PPP), which we use as primary outcome of interest to assess how the average years of schooling in the population, labor force participation among adults age 15–64 years old, and population growth are associated with the `ln(GNI)` using the model in Equation 4, which includes the first lag of the `ln(GNI)` accounting for autocorrelation and robust standard error. The results are reported in Table A.15.

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

Table A.15. Determinants of ln(GNI)

	ln(GNI) (1)
Mean years of schooling	0.101** (0.043)
Labor FPR	0.035*** (0.009)
Population growth (annual %)	-0.009 (0.010)
L1. ln(GNI)	0.760*** (0.114)
Constant	0.002 (0.725)
R-squared	0.83
N	32

Note: Robust standard in parentheses. Significance level: *0.1 ** 0.05, ***0.01

2. Then, we use the estimates from Table A.15 to predict the `ln(GNI)` based on Equation 4 for a given year.

   $ln(GNI)_t = .0022814 + (S_t \times .1010725) + (LFPR_t \times .0345452) + (Pop_t \times -.0089921) + (L1.ln(GNI)_{t-1} * .7596452)$

3. To assess what the GNI per capita could have been if women's contributions to mean years of schooling and labor force participation rate were zero (the worst-case scenario possible), we predict values under two conditions: `ln(GNI)` using actual values and adjusted `ln(GNI)` under the hypothetical scenario. To achieve the latter, we need to adjust the mean years of schooling and labor force participation rate by subtracting women's contributions from both, with an assumption that, after subtracting women's contributions, men would not compensate for the difference. The steps are as follows:

   - **Schooling**: First, we compute women's contribution to the mean years of schooling in the population as follows:

     $$\textit{Female schooling contribution \%} = \left(\frac{\text{Share pop. female} \times \text{Female mean years of schooling}}{\text{Mean years of schooling}}\right) \times 100$$

     Then,

     $$\text{Women's contribution to mean years of schooling} = \left(\frac{\textit{Female schooling contribution \%} \times \text{Mean years of schooling}}{100}\right)$$

     This formula estimates the absolute level of women's contribution to the mean years of schooling in the population, which can be attributed to women's average years of schooling. Thus, we can generate an adjusted mean years of schooling for the population, where women's schooling contribution equals to zero, by:

     $$\text{Adjusted mean years of schooling} = \text{Mean years of schooling - Female schooling contribution}$$

- **Labor Force Participation Rate**: Second, we use the 'Ratio of female to male labor force participation rate (LFPR) % (modeled ILO estimate)' to compute the adjusted labor force participation by finding women's contribution, then subtracting it from the actual LFPR.

$$\text{Women's contribution to LFPR} = \left(\frac{\textit{Female to male LFPR \%} \times \text{Actual LFPR}}{100} \right)$$

This formula estimates the absolute contribution of women to the total labor force participation rate. Thus, we can compute the adjusted LFPR, assuming women's contribution is zero, by:

$$\text{Adjusted LFPR} = \text{Actual LFPR} - \text{Women's contribution to LFPR}$$

4. Then, we use the estimates from Table A.15 and the adjusted mean years of schooling and LFPR to attain the adjusted predicted `ln(GNI)` based on Equation 4, for a scenario where women's contribution to both variables approaches zero.

   $ln(GNI)_t = .0022814 + (AdjustS_t \times .1010725) + (AdjustLFPR_t \times .0345452) + (Pop_t \times -.0089921) + (L1.ln(GNI)_{t-1} * .7596452)$

5. We plot the predicted values for the actual `ln(GNI)` and adjusted `ln(GNI)` in Figure A.4.

6. Finally, we compute the difference between the predicted values for the actual `ln(GNI)` and the adjusted `ln(GNI)`, if women had zero contribution to schooling and the labor force during 1990–2022, the country's GNI per capita could have been, on average, about 5 percent lower. This is equivalent to a decrease of about USD $90 in average annual GNI per capita. If we take the official country-estimated population of 34.4 million in 2022–23 (National Statistics and Information Authority, 2022), this amount equals to about three billion US dollars in annual losses for the entire economy.

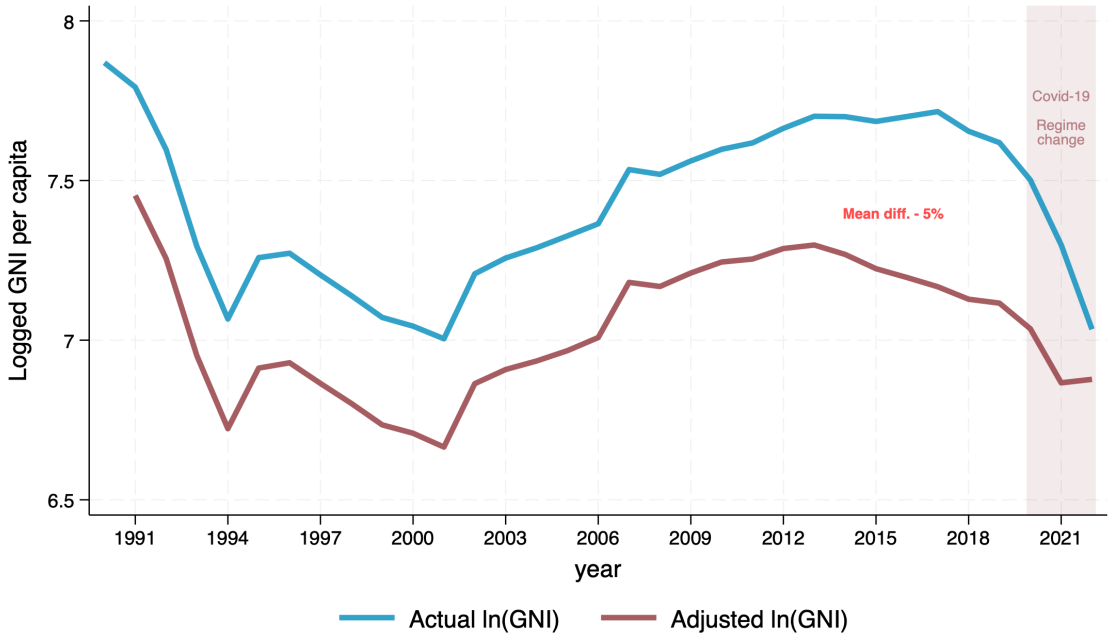


Figure A.4. Logged gross national income (GNI) per capita in constant 2017 PPP

Note: This figure shows the estimates of `ln(GNI)` per capita for both actual and adjusted scenarios based on Equation 4 and Table A.15. The adjusted scenarios consider women's contribution to the mean years of schooling and labor market participation is reduced to zero.