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RETURN TO EDUCATION IN AZERBAIJAN. DOES GENDER MATTER?

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ABSTRACT. The return to education and the gender wage gap are essential issues in the public policy decision-making. Return to wage from attainment of each additional educational level can be a valuable incentive to stimulate people towards higher levels of schooling. The study investigates the return from a higher level of education to hourly earnings and the gap in "returns" due to gender identity differences in the case of Azerbaijan, a resource-rich developing country. We argue that a return to hourly wage from an additional level of education is positive and moderated by gender identity. Based on a pooled cross-sectional dataset ($N = 4548$, $n_{male} = 2617$; $n_{female} = 1931, Mean_{age} = 34.18$), empirical results support the research hypothesis and display a continuous positive return from education attainment. Simultaneously, a lesser return is identified for females. The gender return gap extends further for post-bachelor degrees. The results of this research can help deliver the message of "to earn more, learn more" at the micro-level and aid public policy officials in designing educational and gender-related policies at the macro level.

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Introduction

Educational investments and their impact on people`s lives have been an important field of interest and widely studied by economists worldwide. However, a more profound and comprehensive study of this subject started in the middle of the 20th century. For instance,

Fisher (1946) accentuated the significance of education for the economy, arguing that education should be viewed as an economic policy tool. One of the most influential theories of the 20th century was Human Capital Theory pioneered by Schultz (1961) and Becker (1964). According to Becker (1964), human capital is an aggregate of individuals' innate abilities as well as skills and knowledge accumulated over time that, if used effectively, lead to an increase in earnings and other positive effects. Thus, he claims a positive relationship between investment in education and individual earnings.

Having been a part of the former Soviet Union for over 70 years, Azerbaijan inherited the Union's education structure features. However, in Azerbaijan, the early years of transition were characterized by production levels notably decreased due to the dissolved relationships among former Soviet Union members, high unemployment rate, unstructured labour force and education system (see Aliyev & Suleymanov, 2015). Starting from the early 2000s, Azerbaijan enjoyed large inflows of oil revenues, and one of the national priorities was to transform "black gold into human capital". Despite the increased budget revenues from 2003 to 2009 (see Aliyev & Gasimov, 2018), the major share of the public expenditures was directed towards infrastructure developments and general government spending rather than the development of human capital (European Commission manuscript, 2011). Unexpectedly, Azerbaijan's public spending on education is lower than that of Armenia, Georgia, and Kazakhstan (Mammadova, 2016)

In recent years, several trends have been observed in Azerbaijan's education system, some distressing. According to Rahmanov et al. (2016), the number of persons with primary education increased while the portion of workers with secondary and tertiary education decreased in the total labour force, which negatively impacted human capital development. The authors also compared the result across CIS and CEE countries and concluded that the share of labour force with primary and tertiary education in Azerbaijan is below the regional average. Another problem that Azerbaijan is currently facing is the deteriorating quality of education, especially tertiary, which is essential for creating a pool of highly skilled specialists. Guliyev (2016) closely studied the factors contributing to the impaired quality of education. The results indicate that the most prominent aspects are low public spending on education, low pre-school enrollment, poor quality of secondary education, and low tertiary education enrollment. According to the estimations, approximately 77% of the school graduates are not enrolled in universities, and, as widely believed by many, the state quota allocation system is at fault (Guliyev, 2016). Furthermore, Guliyev (2016) also claims that one reason for the ill quality of tertiary education is insufficiently structured master's level programs. As the author claims, "poor replica of their counterparts in the west and do not offer advanced specialist training".

Considering aforementioned claims, Azerbaijan's case fits the phenomenon popularized by Dore (1976) and referred to as "diploma disease" where education is viewed as a ritualistic process to attain specific qualifications rather than actual learning. Referring to Allahveranov and Huseynov (2013), there is a significant mismatch between the skills provided by education institutions and the skills demanded by the economy. For instance, the study conducted by World Bank (CEM 2009) reveals that the majority of the higher education institutions' graduates specialized in education, while employment in this sector constitutes only around 9% featured to low wages.

However, in contempt of certain unsatisfactory tendencies in the education system overall, education and returns to education remain a topic of current interest not only on governmental but also on a societal level. Unfortunately, notwithstanding the keen demand for analysis in this field, the number of available and relevant studies that consider factors specific to Azerbaijan are highly limited. The current study focuses on private returns to post-secondary education and its impact on individual earnings with special attention on gender matters. The

research aims to apply the theory suggested by Becker (1964) to the case of Azerbaijan and determine the relationship between educational attainment and individual earnings using Mincer's equation.

1. Literature review

Empirical studies regarding return to education were conducted from many different angles such as individual, social, macroeconomic, location, gender, etc. Return to education is commonly considered in two main dimensions: social and private returns. The series of studies were dedicated to the analysis of the returns to education (Psacharopoulos and Patrinos, 2004; Jin, 2008; Filiztekin, 2011; Romele and Purgailis, 2013; Schündeln and Playforth, 2014; Romanello, 2017, Heckman, Humphries and Veramendi, 2018; Shafait et al., 2021 among others). For instance, Psacharopoulos and Patrinos (2004) came to several conclusions by analyzing the data set for the number of countries. First, they determined that individual returns to education exceed social returns. Moreover, they concluded that return to education is higher for women than for men. Expectations for higher benefits can be manifested in different forms like expectations connected with the process of studying (Starčič & Lebeničnik, 2020) or higher financial outcomes after finishing it. The last can cause educational migration flows, which, in their turn, significantly affect the long-run macroeconomic results in the sphere of higher education, especially for donor countries, as it is proved by Mishchuk et al. (2019). Education Statistics Bulletin (2005) analyzed both private and social returns to obtaining bachelor's degree in Canada. Psacharopoulos and Patrinos (2018) reviewed their previous study and analyzed over a thousand estimates from the mid-1950s to 2014 for about 140 countries worldwide. The analysis has shown that private return to education globally increased, while social returns are still as high as before.

Another aspect broadly studied by analysts concerning returns to education is variations in returns due to location. In other words, individuals living in urban and rural areas tend to have different returns (Asadullah, 2006; Ordaz-Diaz, 2008; Backman, 2013; Zhang, Li and Xue, 2015; Luo, 2017; Yang, 2017; Wang and Wu, 2018; Kiss et al., 2019). A similar distribution is typical for the countries by level of economic development and enterprises grouped by economic results. Particularly, Samoliuk et al. (2021) stress that there is an obvious relationship: profitable enterprises support educational programs more frequently as well as more developed countries have a higher share of educational expenses with relevant higher results in performance achieved due to the involvement of skilled employees. As for the enterprises, the similar findings are obtained by Lewandowska (2021).

There is also a wide range of studies considering the linkages between different levels of education and their returns (Harmon et al., 2000; Agrawal, 2011; Cuaresma and Raggl, 2014; Fink and Peet, 2014; Tansel, 2016). However, considering that primary and secondary education is compulsory in Azerbaijan, this study will mainly focus on the returns to post-secondary education. There is a plethora of research analyzing the returns to post-secondary education. For instance, Steeg, Wiel and Wouterse (2014) investigated and compared returns to PhD and Masters levels of education in the Netherlands over the broad spectrum of various groups, including gender, experience, the field of study and so forth. Several insights were obtained in the following directions: First, average annual returns to doctorate education vary around zero during the initial twenty years of career. Second, results significantly alter according to gender: While annual return for women accounts for 10 per cent by the pass of the twenty years after graduation, this return amounts to a negative 7 per cent for men. Moreover, compared to Masters, PhD graduates earn less during the first years after graduation, but higher returns in the later years compensate for this discrepancy. Yunus and Said (2016) studied the

education sector in Malaysia using HIS (Household Income Survey) data for the years 2002-2007. The research findings suggest that diploma holders experienced an approximately 5.5% increase in return to education over the indicated period. The study once again supports the premise of linearity of the relationship between earnings and education level proposed by Becker (1964). Taskinsoy (2012) scrutinized the relationship between wages and tertiary education, more specifically bachelor's, master's degrees and PhDs, comparing the evidence for Malaysia and OECD countries, most notably the USA. The estimations for Malaysia suggest increasing education level salary patterns similar to the observations made in the US and other OECD members. However, Malaysia's main difference from the US is an extremely high return to a master's degree. Compared to the US, where the wage disparity between bachelor's degree and master degree graduates makes only $6,400, in Malaysia, this gap accounts for $22,016, which is considerably higher than in the US. Return for PhD graduates in Malaysia is 26.6% higher than the return for master degree holders.

In recent years, studies concerning the demography patterns, specifically gender, in education have come into notice (Ziaran et al. 2021; Kubak et al. 2021). According to the education at a glance, OECD (2009), benefits of the tertiary education are higher for females compared to males in the number of OECD member countries, the most particularly in Australia, Austria, Canada, Germany, Ireland, Korea, the Netherlands, Norway, Spain, Switzerland and the UK. Psacharopoulos and Patrinos (2004, 2018) also concluded that return to education is higher for women than men. The average return to the one year of education for women continues to grow, indicating increased attention on girls' education. Magdalyn (2013) studied returns to education in Indonesia and its relation to gender, location, and industrial structure using the Mincer method. The data used for this research was collected across all 33 provinces of Indonesia, resulting in several outcomes. First, the study showed that an additional year of education leads to about an 8% increase in an employee's wage. Second, compared with males for females, the rate of return is higher by 1.6%. Moreover, the study suggests that for urban areas rate of return is higher than for rural areas.

Bhutoria (2016) analyzed individual returns to education in the UK. As a result of the analysis, a positive linkage between private returns to education and formal education was established. The study displayed that the individuals that completed tertiary education tend to have higher wages. In addition, graduating from the tertiary level of education offers higher returns to women than men.

On the contrary, most studies especially focused on developing countries indicate lower returns to females than males (Farooq, 2011; Arshad et al., 2014; Kanjilal-Bhaduri and Pastore, 2017). Aslam (2005) studied the wage and education relationship from a gender prism in Pakistan. Although the returns to education in Pakistan are substantially higher for women than men, total labor market returns are still higher for men (Aslam, 2005). As a result, this paradox might be one of the potential reasons families prefer to have their sons educated than daughters. Belfield et al. (2018) studied the relationship between wages and attaining a higher education degree for individuals aged 29. The results are consistent with the linearity proposition of Becker (1964). Focusing on gender variations, the average return of the college/university graduates is substantially higher for females (the difference in the average return for women and men is 20%). The authors channel this to the fact that the females with a high education degree usually tend to work more hours on average than those without it.

Nonetheless, globally, evidence still displays a wide gender wage gap between male and female diploma holders. For example, Carnevale, Rose and Cheah (2011) claim that gender earnings disparity between men and women irrespective of the working hours across all education levels. In addition, they claim that women with doctoral degrees earn as much as men with the bachelor's degree. According to the report made by the US website PayScale.com

(2019), in general, females in the USA tend to earn less than males with the same qualifications. Another negative trend contributing to gender inequality is that employers usually do not treat women and men equally with the same education level.

There are some possible reasons for such disparity in wages. One of the potential reasons can be the differences in the career they pursue and their study programs. For instance, females are usually involved in the fields that offer lower economic benefits. Another possible reason for the gender wage gap can lay in the caregiving role of women in the family when females leave the workforce due to family considerations.

In Azerbaijan, the number of studies dedicated to analysing the education sector, especially returns to education is extremely limited. To our best knowledge, the only existing evidence is the study conducted by Peet et al. (2015). Peet et al. (2015) examined the return to education in a number of the developing countries in the world, one of them being Azerbaijan. According to the study, the average return to education in Azerbaijan is 3.7%. The highest rate of return was indicated for secondary education, while the lowest rate was observed in primary education. Contrary to the linearity relationship of Becker (1964), returns to tertiary education were lower than the secondary (only 3.8%).

Regarding gender inequality, UNDP's Human Development Report (2007) reveal that women with tertiary and specialized secondary education are favoured in labor market, while females with primary and general secondary education experience significant difficulties with employment. The scenario is different with males: regardless of the education level, men are better accommodated to obtain an appropriate job than women. The study also showed a gender gap in income where females tend to earn less than males performing the same job in almost all sectors. Wallwork (2016) studied the gender gap in Azerbaijan and concluded that females are largely excluded from the high-paying sectors such as construction, finance, mining and security. In addition, the results indicate the great disparity in men and female earnings within the same sector. For instance, males employed in the construction sector earn 54% more than females; males earn 70% more than males in mining sectors. Even in the education sector, with the seemingly high female concentration, men still make more than females by 15%. The gender wage gap against females is also found in Maharramli (2018).

The number of studies regarding the return to education in Azerbaijan is old, highly limited or insufficient. The existing studies are primarily descriptive and focus on general trends and issues in the education sector without concentrating on more specific results such as returns to education. Therefore, the current research will contribute to the existing literature with its most recent survey data-based findings supported by robust empirical evidence. However, to get a higher educational degree or not is one of the most important debated issues currently in Azerbaijan, especially at higher education institutions, in the context of its return to individual earnings.

2. Sampling

Current research targets to evaluate the returns to educational attainment in the Azerbaijan labor market. The sample space covers all employees in the corresponding country. However, collecting data about the employees in the agriculture sector (which employs 37-38% of total active labor force) is highly challenging due to (1) being family farming dominated (mostly unregistered jobs) with irregular returns, and (2) difficulties to reach rural population. Meanwhile, willingness to participate in surveys is also very low in rural areas. Therefore, samples primarily represent the employees in urban areas of Azerbaijan.

Data is obtained from social surveys conducted by ASERC (2018a; 2018b; 2019). Pooled cross-sectional dataset of 3 social surveys is used in empirical estimation: Social-Survey

-1 ($N = 3308, n_{emp} = 1830$, conducted during 01.03.2018-01.06.2018), Social-Survey -2 ($N = 2208, n_{emp} = 1317$, conducted during 01.10.2018-01.01.2019), and Social Survey-3 ($N = 1884, n_{emp} = 1401$, conducted during 01.03.2019-01.06.2019). The overall sample size (including observations with missing values) is 4548 ($n_{male} = 2617$; $n_{female} = 1931, Mean_{age} = 34.18$).

According to the State Statistical Committee of Azerbaijan Republic (SSCAR), the total amount of economically active labor force is around 5.1 million, of which 4.9 million are employed. Therefore, the employed sample size is large enough to know the target population. SurveyMonkey sample size calculator at 99% confidence level and 5% error margin concludes that the sample size should be 666, which is at least two times less than the sample size of each survey individually and six times less than the total pooled sample size.

In all surveys, respondents are selected randomly over the country. Online and face-to-face survey methods are used to collect data. In each survey, more than 2000 survey blanks have been printed and distributed in addition to internet-based data collection via Google Drive through sharing on social media (Facebook and Instagram, paid and unpaid) and sending emails to thousands of people living in Azerbaijan.

3. Model specification

The wage equation developed by Mincer (1958) is recognized as the traditional method of assessing the economic value of investing in human capital. Standard Mincer's earning function evaluates the rate of return from an additional year of education. The standard Mincer equation is as follows:

$$\ln(W)_i = \ln(W)_0 + \delta_1 * S_i + \delta_2 * X_i + \delta_1 * X_i^2 + \varepsilon_i \quad (1)$$

Where W and S denote the hourly wage and the schooling years, respectively. X represents job experience.

The current research employs a developed version of the standard Mincer equation expressed in the following form:

$$Wage = f(education\ level,\ job\ experience,\ age,\ gender,\ location,\ employed\ sectors,\ marital\ status) \quad (2)$$

where the hourly wage is a dependent variable, and education level, age, gender, experience, location employed sectors (private, public or own business), and marital status constitutes the group of independent variables. The first and the most crucial explanatory variable is the education level. The fundamental theory developed by Becker (1964) indicates an increasing relationship between education and earnings. The relevance of this theory is supported by the number of studies conducted in this context (Connoly and Gottschalk, 2006; Forbes, Barker and Turner, 2010; Enu et al., 2014; Rycx, Saks and Tojerow, 2015; Garofalo and Agovino, 2016). Simultaneously, according to Human Capital Theory, more experienced individuals tend to earn higher wages (Hægeland and Klette, 1997; Wannakrairoj, 2013).

The next variable relevant to the current discussion is gender status. While there were certain established trends regarding gender with two previous variables, no specific universal relationship was observed. In the case of gender, results vary at different periods and geographic locations. Some studies claim that returns to females are higher than to males (Aslam, 2005; Arrazola and Hevia, 2006; Caamal-Olvera, 2014; Belfield et al., 2018), while other authors

argue that, oppositely, returns to males are higher compared to those of women (Gunawan, 2012).

Updated Mincer equation formulates the theoretical base for empirical model building. Taking other individual-specific dummies and age factors into account allows for more robust results. Therefore, the baseline empirical model specification will be as follows:

$$\log(salary)_i = \alpha_0 + \sum_{m=1}^{9} \beta_m * S_i + \gamma_1 * X_i + \gamma_2 * X_i^2 + \sum_{k=1}^{n} \theta_i * Z_i + \delta_1 * SS1_i + \delta_2 * SS2_i + u_i \quad (3)$$

The dependent variable is hourly salary taken as a natural logarithm, measured in manat. S_i include educational specific dummies ($School_i$ (highest educational attainment is graduation from school or not), $Collage_i$ (highest educational attainment is graduation from colleges / vocational schools or not), $Master_i$ (highest educational attainment is being a master degree holder or not), and PhD_i (the respondent has PhD degree or not)) Meanwhile, S_i also includes interaction terms of the educational dummies ($School_i * Female_i$, $Collage_i * Female_i$, $Bachelor_i * Female_i$, $Master_i * Female_i$, $PhD_i * Female_i$) with a gender-specific dummy ($Female_i$ – equals 1 if the respondent is female, 0 otherwise) which allows estimating any substantial discriminatory return gap against females, if there is. X_i denotes job experience, which is expected to have an inverse U-shaped return to individual earnings.

Z_i covers control variables, including age, marital status-related ($Married_i$ – equals 1 if the person is married, 0 otherwise, $Widowed_i$ – equals 1 if the person is widowed or divorced, 0 otherwise, the reference group is unmarried (singles + engaged) respondents.), and location-specific ($Baku_i$ – equals 1 if the respondent is living in Baku (Azerbaijan's capital), 0 otherwise, and $Absheron_i$ – equals 1 if the respondent is living in the Absheron region (the region around Baku city), 0 otherwise) dummies. Finally, to take time-related heterogeneity into account, $SS1_i$ and $SS2_i$ are dummy variables included to represent Social Survey -1 (equals 1 if the respondent belongs to the first survey, 0 otherwise) and Social Survey -2 (equals 1 if the respondent belongs to the second survey, 0 otherwise), respectively.

Appendix A presents descriptive statistics (number of observations, mean value, minimum, maximum, and standard deviation) of model variables.

Descriptive and empirical methods are employed. Ordinary Least Squares (OLS) and Robust Least Squares are applied to estimate model parameters simultaneously. The multiply stage modelling approach (including control variables to the model at different stages) is followed instead of a single equation-based estimation and interpretation.

4. Research findings

4.1. Descriptive results

Figure 1 displays the distribution of hourly earnings at different levels of educational attainment. Not surprisingly, there is an increasing trend in earnings in response to higher schooling. Although the average earning difference between comprehensive school and college graduates is very small (even negative), the return of higher educational attainment to hourly salary is substantially large and positive. The earning difference between comprehensive school and college graduates can be explained by the low quality of college education at which the majority are females. Note that the gap is positive for females.

Overall, figure 1 displays a positive association between individual hourly earnings and educational attainment, increasing the gap against females at higher education levels. On average, PhD degree holders earn approximately 2.23 times more per hour than comprehensive school graduates. The corresponding indicator is 2.44 for males and 2.16 for females.

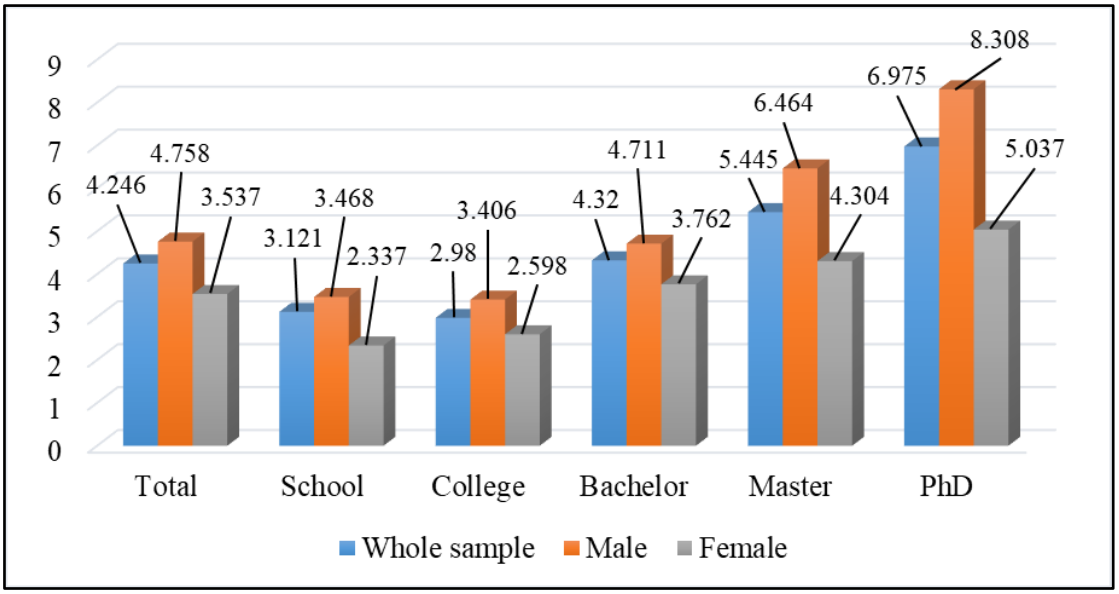

Figure 1. Average hourly earnings (in AZN) vs educational attainment
Source: Authors' own creation according to survey data.

Table 1. Educational attainment and earnings gap (in %)

	For the whole sample				
	School	**College**	**Bachelor**	**Master**	**PhD**
School	0	-4.52	38.42	74.46	123.5
College		0	44.97	82.72	134.1
Bachelor			0	26.04	61.46
Master				0	28.1
	For males				
	School	**College**	**Bachelor**	**Master**	**PhD**
School	0	-1.79	35.84	86.39	139.6
College		0	38.31	89.78	143.9
Bachelor			0	37.2	76.35
Master				0	28.53
	For females				
	School	**College**	**Bachelor**	**Master**	**PhD**
School	0	11.2	60.97	84.17	115.5
College		0	44.8	65.66	93.88
Bachelor			0	14.41	33.89
Master				0	17.03

Note: Calculations are based on average per-hour earnings by educational level (see figure 1). Comparison logic: high-to-low.
Source: own calculation

Based on the average per-hour earnings by educational level, we can calculate the mean value of the earning gap between any two people with different levels of schooling. Table 1 tabulates the results for the whole sample and separately for males and females.

Regarding the gender issue, descriptive analyses findings reveal a great probability of wage discrimination against females. Average per-hour earnings are always less compared to males. Females with no education after school earn 32.6% less than males with the same schooling level. The gap is 23.7% for college and 20.14% for bachelor graduates, while 33.42% for master's and 39.37% for PhD degree holders. More precisely, the gap decreases up to a bachelor's degree while expanding further at master and PhD. Expansion of the gap at a higher degree of educational attainment is an important issue in gender equality, which recalls findings in Maharramli (2018).

4.2. Empirical results

Empirical evidence on return to educational attainment matters much more scientifically than descriptive analyses inference. Table 2 presents results from estimating equation (3) at different model specifications by OLS. The first model does include educational and social survey related dummies, while other model specifications cover gender-based educational interaction terms and some other control variables included to avoid omitted variable biasedness. Hence, multiple equation-based estimations provide more reliable empirical evidence.

Table 2. OLS results

Independent variables	**Model (1)**	**Model (2)**	**Model (3)**	**Model (4)**	**Model (5)**
$School_i$	-0.3585*** (0.033)	-0.3211*** (0.039)	-0.3372*** (0.041)	-0.3390*** (0.041)	-0.3283*** (0.041)
$College_i$	-0.3305*** (0.035)	-0.2119*** (0.048)	-0.2479*** (0.048)	-0.2470*** (0.048)	-0.2368*** (0.041)
Bachelor	*Ref. group*				
$Master_i$	0.2124*** (0.032)	0.3021*** (0.043)	0.2882*** (0.043)	0.2914*** (0.043)	0.2843*** (0.043)
PHD_i	0.5299*** (0.057)	0.7151*** (0.073)	0.6422*** (0.073)	0.6344*** (0.073)	0.6191*** (0.072)
$School_i{*}female_i$	-	-0.2872*** (0.060)	-0.2777*** (0.061)	-0.2767*** (0.062)	-0.2945*** (0.062)
$College_i{*}female_i$	-	-0.3219*** (0.059)	-0.3139*** (0.059)	-0.3189*** (0.059)	-0.3324*** (0.059)
$Bachelor_i{*}$ $female_i$	-	-0.1262*** (0.034)	-0.1354*** (0.034)	-0.1420*** (0.034)	-0.1486*** (0.034)
$Master_i{*}female_i$	-	-0.3004*** (0.054)	-0.3025*** (0.054)	-0.3019*** (0.054)	-0.3136*** (0.054)
$PhD_i{*}female_i$	-	-0.5797*** (0.109)	-0.5957*** (0.107)	-0.5922*** (0.108)	-0.5983*** (0.107)
Job_exper_i	-	-	0.0259*** (0.003)	0.0252*** (0.004)	0.0242*** (0.004)
$Job\_exper_i^2$	-	-	-0.0005*** (0.00008)	-0.0004*** (0.002)	-0.0004*** (0.00009)
Unmarried	*Ref. group*				
$Married_i$	-	-	-	0.0819*** (0.032)	0.0858*** (0.032)
$Widowed_i$	-	-	-	0.1984*** (0.065)	0.2046*** (0.064)
Age_i	-	-	-	-0.0045*	-0.0038

				(0.002)	(0.002)
$Baku_i$	-	-	-	-	0.0992*** (0.026)
$Absheron_i$	-	-	-	-	0.1291*** (0.036)
$SS1_i$	-0.0302 (0.028)	-0.0414 (0.027)	-0.0132 (0.027)	-0.0110 (0.027)	-0.0059 (0.027)
$SS2_i$	-0.2548*** (0.030)	-0.2483*** (0.029)	-0.2165*** (0.030)	-0.2165*** (0.030)	-0.2059*** (0.030)
C	1.2456*** (0.024)	1.2997*** (0.027)	1.1226*** (0.034)	1.2109*** (0.062)	1.1225*** (0.066)
No. of Inc. Obs.	3940	3940	3879	3877	3874
R-Squared	0.109	0.136	0.155	0.157	0.161
Statistics and Residuals Diagnostics tests results					
Model (1)	σ=0.725; χ^2_{HETR} = 3.5262 [0.0018]; JB_N = 204.5 [0.0000]; F_{FF} = 0.4181 [0.5179]				
Model (2)	σ=0.714; χ^2_{HETR} = 3.2937 [0.0002]; JB_N = 217.1 [0.0000]; F_{FF} = 0.0088 [0.9253]				
Model (3)	σ=0.707; χ^2_{HETR} = 2.5425 [0.0017]; JB_N = 260.6 [0.0000]; F_{FF} = 2.0242 [0.1549]				
Model (4)	σ=0.706; χ^2_{HETR} = 2.2643 [0.0028]; JB_N = 263.2 [0.0000]; F_{FF} = 2.0195 [0.1554]				
Model (5)	σ=0.705; χ^2_{HETR} = 2.1156 [0.0039]; JB_N = 276.1 [0.0000]; F_{FF} = 2.0429 [0.1530]				

Notes: Dependent variable is $\ln(Salary)_i$. σ is the standard error of regression; and χ^2_{HETR} denote chi-squared statistics to test the null hypotheses of no heteroscedasticity in the residuals; JB_N indicates statistics to test the null hypotheses of the normal distribution; *, ** and *** denote significance levels of 10%, 5%, and 1% levels, respectively; Standard errors are in (). Probabilities are in [].
Source: own calculation

Results confirm continuous positive returns from additional schooling in Azerbaijan ($p < 0.01$). Ceteris paribus, compared to bachelor graduates, school graduates receive 35.85% less hourly salary on average, while the gap is negative 33.05% for college graduates, on average. The difference of hourly earnings between master and PhD degree holders compared to bachelor graduates is positive, 21.24% and 52.99%, respectively (see the model (1)). These results are supported by descriptive analyses inference according to figure 1, above.

Results of models 3-5 display very close coefficients for educational dummies and interaction terms. After adding a group of control variables step-by-step, the change does not significantly change the main parameters of interest. In all cases, educational dummies and interaction terms are statistically significant at 1% significance level ($p < 0.01$).

Results display an inverse U-shaped association between job experience and individual hourly earnings (threshold level = 30.25), consistent with Mincer's equation (see Mincer, 1958). Note that the hourly earnings of an employee are also a function of job experience (p<0.01), marital status (p<0.01), and living area (p<0.01). However, adding these variables to the model did not substantially change the coefficients of educational dummies and interaction terms.

According to diagnostics test results, the models have no functional misspecification problem. Although heteroscedasticity problems and non-normal distribution of results are detected, the sample size is large enough to minimize or almost remove any possible significant

negative impact on the results and empirical inference. Using Robust Least Squares estimation method also ends with similar results that confirm our empirical results' reliability (see Appendix A).

Table 3 reports wage differences at different educational attainment levels according to model (5) parameters in table 1. The table is also highly informative for understanding gender-related wage gaps at the same schooling level.

Table 3. Hourly wage gap at different educational attainment levels (disaggregated for males and females)

	School (male)	**School (female)**	**College (male)**	**College (female)**	**Bachelor (male)**	**Bachelor (female)**	**Master (male)**	**Master (female)**	**PhD (male)**	**PhD (female)**
School (male)	0	3.38%	9.56%	-24.1%	32.8%	17.94%	61.2%	29.87%	94.7%	34.88%
School (female)		0	38.6%	5.4%	62.3%	47.44%	90.7%	59.37%	124.2%	64.38%
College (male)			0	-33.2%	23.7%	8.84%	52.1%	20.77	85.6%	25.78%
College (female)				0	56.9%	42.04%	85.3%	53.97%	118.8%	58.98%
Bachelor (male)					0	-14.86%	28.4%	-2.93%	61.9%	2.08%
Bachelor (female)						0	43.3%	11.93%	76.76%	12.78%
Master (male)							0	-31.33%	33.5%	-26.32%
Master (female)								0	64.83%	5.01%
PhD (male)									0	-59.8%
PhD (female)										0

Note: Authors' own calculations according to model 5 in table 1. Comparison logic is "column to the row". Ex., 3.38% means "*ceteris paribus, in average, a female has completed only comprehensive school level earns hourly 3.38% more than a male with the same education level*". *Source: own calculation*

Overall, we find a continuous upward trend in the amount of hourly earnings towards a higher level of educational attainment. Simultaneously, strong evidence of less return to females than males is revealed at all levels of education, except the school level. Among comprehensive school graduates, females receive 3.38% higher than males, on average. Although the difference is not so large, it can be explained by the greater chance of young females finding a better job (mostly not requiring specific skills) than males in the labour market.

Conclusion and discussion

Investment in education is a key to long-term prosperity at the micro and macro levels. However, understanding the patterns of the return to education is essential to build evidence-based public policy proposals and stimulate individuals to invest more and more. Meanwhile,

gender-specific analyses regarding the return to education may play a significant role in to struggle against wage discrimination in society.

The overall conclusion of the research supports the fundamental theory pioneered by Becker (1964) regarding the positive relationship between investment in education and an individual's earnings in the case of Azerbaijan. The return from higher degrees is always positive, which supports the concept of the linearity put forward by some studies (Wannakrairoj, 2013; Yunus and Said, 2016; Law, 2017; Belfield et al., 2018).

In terms of the wage differentials at various levels of education, the study supports the widespread idea regarding the highest returns to tertiary education (Taskinsoy, 2012; Montenegro and Patrinos, 2014; Rizk, 2016; Bhutoria, 2016). From the gender perspective, many studies indicate higher returns for females compared to males (OECD, 2009; Magdalyn, 2013; Steeg, Wiel and Wouterse, 2014; Bhutoria, 2016; Psacharopoulos and Patrinos, 2004, 2018). On the contrary, Azerbaijan's case demonstrates the opposite. With the increased level of education, the wage gap between women and men expands, which also points out the existence of a "glass ceiling" that females often face. Therefore, findings indicate the possibility of wage discrimination against women, which is the pattern commonly observed in many developing countries (Farooq, 2011; Arshad et al., 2014; Kanjilal-Bhaduri and Pastore, 2017).

Findings show weak return from college education after comprehensive (11 year) school. Finding the weak contribution of obtaining a college degree underlines the importance of enhancing overall quality at colleges and vocational schools. Azerbaijani officials should learn international experience – Turkey can be a better example with a very similar culture.

The current system is not stimulating enough, resulting in brain drain and talent loss (continuity ends) in the country. A significant positive return of educational attainment after a bachelor attracts attention to the necessity of state programs to enhance the attractiveness of educational continuity, especially towards getting a PhD. Expanding scholarship opportunities for master's and PhD students at higher education institutions is strongly recommended. Research findings can be used in policy designing toward delivering messages to the beneficiaries that "learn more, earn more".

Many individuals can not have enough education due to various shortcomings (transportation, inappropriate work hours, family related issues, etc.). Positive return from higher educational attainment also brings distance education opportunities to minds. Nevertheless, a distance education certificate is not legally accepted yet. At least, the government can grant licenses to the local universities with enough infrastructure to offer distance learning opportunities. Meanwhile, specific requirements can be identified for the nostrification of distance learning certificates at international universities.

Policy recommendations regarding the gender return gap can vary depending on the reasons. Many unmeasurable or uncontrolled factors (like career gap due to child-caring) may significantly mediate the gap. In contrast, the gap may be primarily the result of gender wage discrimination which requires further research. Possible solutions to shrink the gap can be through (1) expanding the share of females in administrative positions, (2) improving the social security of infant mothers, making work conditions more flexible for them, (3) expanding the quantity and quality of baby caring centres, and supporting the engagement of private sector.

Note that research findings can be applicable and replicable in other countries with similar historical and cultural features.

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Appendix

Appendix A: Robust Least Squares results

Independent variables	1	2	3	4	5
$School_i$	-0.378*** (0.032)	-0.3344*** (0.039)	-0.3606*** (0.039)	-0.3613*** (0.039)	-0.3524*** (0.039)
$College_i$	-0.3239*** (0.034)	-0.1843*** (0.047)	-0.2255*** (0.047)	-0.2241*** (0.046)	-0.2138*** (0.047)
Bachelor	*Ref. group*				
$Master_i$	0.2121*** (0.032)	0.3195*** (0.042)	0.2979*** (0.042)	0.303*** (0.042)	0.2953*** (0.042)
PHD_i	0.5556*** (0.056)	0.7593*** (0.072)	0.6738*** (0.071)	0.6674*** (0.071)	0.6492*** (0.070)
$School_i{*}female_i$	-	-0.2678*** (0.059)	-0.2539*** (0.059)	-0.2483*** (0.060)	-0.2703*** (0.060)
$College_i{*}$ $female_i$	-	-0.3508*** (0.059)	-0.3434*** (0.058)	-0.3474*** (0.058)	-0.3624*** (0.058)
$Bachelor_i{*}$ $female_i$	-	-0.0961*** (0.033)	-0.1112*** (0.033)	-0.1158*** (0.033)	-0.1245*** (0.033)
$Master_i{*}$ $female_i$	-	-0.2986*** (0.053)	-0.2983*** (0.053)	-0.2974*** (0.052)	-0.3115*** (0.052)
$PhD_i{*}female_i$	-	-0.6169*** (0.107)	-0.6436*** (0.105)	-0.6322*** (0.105)	-0.6368*** (0.104)
Job_exper_i	-	-	0.0277*** (0.003)	0.0282*** (0.004)	0.0272*** (0.004)
$Job\_exper_i^2$	-	-	-0.0005*** (0.00008)	-0.0004*** (0.00009)	-0.0004*** (0.00009)
Unmarried	*Ref. group*				
$Married_i$	-	-	-	0.0829*** (0.031)	0.0872*** (0.031)
$Widowed_i$	-	-	-	0.1949*** (0.063)	0.2002*** (0.063)
Age_i	-	-	-	-0.0056** (0.002)	-0.0049** (0.002)
$Baku_i$	-	-	-	-	0.105*** (0.025)
$Absheron_i$	-	-	-	-	0.1372*** (0.035)
$SS1_i$	-0.0205 (0.027)	-0.0319 (0.026)	-0.0036 (0.027)	-0.0008 (0.027)	0.0064 (0.026)
$SS2_i$	-0.2398*** (0.029)	-0.2329*** (0.029)	-0.1941*** (0.029)	-0.1949*** (0.029)	-0.1822*** (0.029)
C	1.2157*** (0.024)	1.2574*** (0.027)	1.0681*** (0.033)	1.1832*** (0.061)	1.0862*** (0.064)
No. of Inc. Obs.	3940	3940	3879	3877	3874
Rw-Squared	0.141	0.176	0.205	0.208	0.214

Notes: Dependent variable is $\ln(Salary)_i$. *, ** and *** denote significance level of 10%, 5%, and 1% levels, respectively; Standard errors are in (). Probabilities are in [ ].