

Factors Affecting the Return to Education in Jordan

Usama Al-Qalawi¹ , Arqam Al-Rabbaie¹ , Othman Hel Al-Dhaimesh² , Qusai M. Talafha¹ 

¹Department of Economics, Business School, The Hashemite University, Zarqa, Jordan, alqalawi@hu.edu.jo

²Accounting Department, Ahmad bin Mohammad Military College, Doha, Qatar.

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Abstract

Objectives: The main objective of this paper is to assess the impact of investment in education on the return to education in Jordan.

Methods: This study aimed to assess the effect of the type of education, level of education, and number of years of education as the primary independent variables, in addition to gender, years of experience, and training as control variables, on the earnings of Jordanian workers as the dependent variable. A sample of 190 Jordanian workers was analyzed through an online questionnaire. Since many of the independent variables are qualitative in nature, the Ordinary Least Squares (OLS) method with dummy independent variables was used to estimate the model parameters.

Results: The results of the study show a positive relationship between investment in education and individual wages. In addition, the findings indicate that gender has an impact on wages. Moreover, the results demonstrate that years of experience positively affect wages. However, the impact of training on wages may also be positive.

Conclusions: In light of the results, we recommend that policymakers encourage Jordanians to invest more in education, particularly in higher education. Additionally, policymakers should focus on reducing unemployment and job market saturation by creating special programs to train and rehabilitate unemployed individuals, equipping them with skills relevant to both the local and external labor markets. Government efforts should also be intensified to find new job opportunities abroad by signing agreements with other countries to facilitate the employment of Jordanians in those countries.

Keywords: Return to education, Wage differences, Education and Inequality.

JEL classification codes: I20, J24, I23, I26

العوامل المؤثرة على العائد على التعليم في الأردن

أسامة رويين القلعاوي¹، أرقام الرباعي¹، عثمان هيل الدهيمش²، قصي طلافحة¹

¹ قسم الاقتصاد، كلية الأعمال، الجامعة الهاشمية، الزرقاء، الأردن

² قسم المحاسبة، كلية أحمد بن محمد العسكرية

ملخص

الأهداف: الهدف الرئيسي من هذه الورقة هو تقييم أثر الاستثمار في التعليم كونه استثمار في رأس المال البشري على العائد على التعليم في الأردن. المنهجية: هدفت هذه الدراسة إلى تقييم أثر المستوى التعليمي كمتغير رئيسي مستقل، بالإضافة إلى اثرالجنس وسنوات الخبرة ومكان العمل والتخصص الجامعي كمتغيرات ضابطة على دخل العاملين الأردنيين كمتغير تابع. تم اختيار عينة مكونة من 190 عاملاً أردنياً من مجتمع البحث لجميع العمال الأردنيين من خلال استبانة وزعت عبر الإنترنت بطريقة عشوائية. نظراً لأن العديد من المتغيرات المستقلة هي ذات طبيعة نوعية. تم استخدام طريقة المربعات الصغرى الاعتيادية (OLS) مع المتغيرات المستقلة الوهمية لتقدير معاملات النموذج النتائج: وأظهرت نتائج الدراسة أن هناك علاقة إيجابية بين الاستثمار في التعليم وأجور الأفراد. بالإضافة إلى ذلك، تشير النتائج إلى أن الجنس له تأثير على الأجور. علاوة على ذلك، أظهرت النتائج أن سنوات الخبرة لها تأثير إيجابي وكبير على الأجور. في حين أن التدريب قد يؤثر على الأجور بشكل إيجابي.

الخلاصة: وفي ضوء النتائج، نوصي صانعي السياسات بتشجيع الأردنيين على الاستثمار بشكل أكبر في التعليم وخاصة التعليم العالي. بالإضافة إلى ذلك، يجب على صانعي السياسات التركيز بشكل أكبر على الحد من البطالة وتشجيع سوق العمل، وإنشاء برامج خاصة لتدريب وتأهيل عاطلين عن العمل لتزويدهم بالمهارات المناسبة لسوق العمل المحلي والخارجي، فضلاً عن تكثيف الجهود الحكومية لإيجاد فرص عمل جديدة. فرص خارج البلاد من خلال توقيع اتفاقيات مع دول أخرى لتسهيل توظيف الأردنيين في تلك الدول. الكلمات الدالة: العائد على التعليم، الفروق في الأجور، التعليم وعدم المساواة.



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1. Introduction

The return to education is grounded in the theory of human capital, which suggests that investment in education increases future productivity and profitability. Economists also consider education to be central to labor market analyses and productivity studies.

Several studies indicate a positive link between education and increased productivity. Educated workers contribute not only to their own productivity but also to that of their colleagues. Moreover, education indirectly influences a family's health status, enhances social cohesion and political participation, and increases the stock of human capital. Similarly, a report published by the OECD in 2006 found that a one-year increase in intermediate education raises per capita productivity by 3% to 6%. However, Becker (1985) argues that it is essential to consider education as an economic factor when planning educational policy. Education not only improves worker efficiency but also promotes income equality among individuals.

An Organization for Economic Cooperation and Development (OECD) report (2019) indicates that individuals aged 25–64 without secondary education earned 21% less than those in the same age group with secondary education. Furthermore, individuals with a university degree earned about 57% more than those without. There was also an increase in returns to 44% for those with a bachelor's degree and 91% for those with a master's or doctoral degree.

In the same context, Becker (1994) emphasizes the importance of the rate of return on education when assessing the effectiveness of investment in human capital. He suggests that the number of years of education and training affects the marginal return on education. Furthermore, individuals should continue their education as long as the marginal return exceeds the opportunity cost of financing it. Likewise, Mincer (1974) noted that the time spent in school and years of work experience significantly influence educational outcomes.

Heckman et al. (2018) pointed out that the returns on education vary across different levels of educational attainment, regions, family backgrounds, and teacher-to-student ratios. Moreover, they suggest that global investment in education brings benefits such as poverty reduction, political and economic stability, and the prevention of armed conflicts and civil wars. Similarly, the World Bank report (2019) shows that education contributes to increased potential returns, expanded employment opportunities, improved societal health, and empowers disadvantaged groups to have a voice in both society and the political systems of developing countries.

Furthermore, Becker (2002) notes that both the level and degree of education help explain the wage gap. The global economy can only achieve sustained growth and prosperity through advancements in education. Developed countries tend to specialize in exporting capital-intensive commodities, while developing countries focus on producing and exporting goods that rely on cheap labor. Therefore, increasing spending on education is considered crucial in developing countries, as it helps reduce the poverty gap.

Despite the abundance of research on the link between education and its returns, empirical studies from developing nations are rare (Glewwe, 2002; Barouni & Broecke, 2014). Most of what is known about the economic benefits of education comes from studies conducted in developed countries. This study aims to fill that gap by applying the Mincer theory to estimate the returns on education in Jordan.

The research seeks to identify the factors that influence Jordanians' earnings (salary). The core problem addressed in this study is based on the following questions:

1. What is the effect of the number of years of education on the return on education in Jordan?
2. What is the effect of years of experience on the return of education in Jordan?
3. Is there a gender pay gap existing in the Jordanian job Market?

4. is working abroad increase the return on education in Jordan?

The structure of this paper is as follows: Section 2 presents the theoretical framework related to the return on education. Section 3 offers a literature review that discusses the study variables upon which the research hypotheses and theoretical model are based. Section 4 describes the education system in Jordan. In Section 5, the research data and methodology are explained. Section 6 presents the study's findings. Finally, Section 7 provides the conclusions and recommendations.

2. Theoretical Framework for Return to Education

Many theories contribute to our understanding of how education impacts economic outcomes. These theories were first introduced by the work of Becker (1964) and Mincer (1974). They argued that education is a form of investment that increases human capital and, in turn, productivity, through the enhancement of skills and knowledge, ultimately leading to higher future income. Becker (1964) used the present value of future income, maximized by the chosen level of education, less the cost of education. This idea was further developed by Mincer (1974), who provided an empirical approximation of human capital theory. Mincer used the logarithm of earnings as the dependent variable and included measures of schooling, experience, and other related variables as independent variables. This empirical model has since been adopted and extended by many other studies.

Another influential theory related to the returns on education is the signaling hypothesis, introduced by Spence (1974). He posited that while employers can observe an employee's education, they cannot directly observe productivity. Therefore, educational qualifications serve as a signal of an employee's abilities and productivity. Similarly, the Screening Hypothesis suggests that additional years of schooling increase wages because they provide employers with a mechanism to differentiate between productive and unproductive employees. These theories have been expanded both theoretically and empirically in various studies. However, this study adopts a specific version of human capital theory, extending from Mincer's framework.

3. Literature Review

Most previous studies have identified a positive relationship between returns on education and educational attainment. Dietrich et al. (2020) indicate that increasing educational attainment leads to higher returns, as more educated individuals receive higher wages due to increased productivity. A report published by the OECD in 2006 suggests that a one-year increase in intermediate education raises per capita productivity by between 3% and 6%. Similarly, Kocourek and Nedomlelová (2018) found that higher education has the most significant impact on worker productivity, and returns from secondary and higher education in 125 countries during the period 1999–2014 showed an upward trend.

In the same context, Psacharopoulos (1981) observed that the rate of return on elementary education in the 1970s was higher than that on secondary education across all private and public education levels. However, this pattern shifted during the 1980s and 1990s. Colclough et al. (2010) support this view, confirming that the rate of return on primary education has declined since the early 1990s, in contrast to the rising returns on higher education. Similarly, Trostel (2005) investigated the returns on education in 11 countries and found that the returns on primary and secondary education had increased, while the returns on higher education had diminished. Along the same lines, Montenegro and Patrinos (2014) found that as the level of education increased over time, the returns on education decreased, possibly due to the diminishing marginal efficiency of investment in education. On average, the return on education was 11% for every five years of schooling. However, during the period 2011–2013, although the level of education increased by 4%, the return on education rose by more than 4%.

From a broader perspective, Psacharopoulos and Patrinos (2018) found that, between 1950 and 2014, the rate of return on private education in 139 countries was 9%, suggesting that investing in education yields better returns than investing in other assets, such as stocks and bonds. In the United States, the return on investment in stocks and bonds was 2.4% during the period 1966–2010, compared to a 10% return on investing in education. Moreover, the authors found that the returns on education exceeded the cost of borrowing or the discount rate, and that employers tended to hire workers with higher skills. They also noted that the returns on education in the 21st century were greater than those in the 20th century. Additionally, Psacharopoulos and Patrinos (2004) found that the rate of return on education was higher in low- and middle-income countries. The highest returns were observed in Latin America and the Caribbean, with an average of 11%, followed by sub-Saharan African countries, with a return of 10.5%.

In contrast, the average return on education in East Asia was the same as the global average of 8.7%. The average return in high-income OECD countries was 8%, while the lowest return was observed in Middle Eastern and North African countries at 5.7%, attributed to corruption and poor academic performance. Furthermore, the study's results revealed that returns on education varied across economic sectors, with the private sector yielding an 11% return compared to 9% in the public sector. These findings suggest that reducing government spending in developing countries negatively affects the education sector.

In a similar vein, Peet et al. (2015) used a survey to estimate the returns to education for 25 developing countries during the period 1982–2012. They found that returns to education were not homogeneous across geographical areas and gender; they were lower in rural areas and higher for females. Additionally, returns were higher in Latin America and Africa than in Asia and Eastern Europe. Psacharopoulos (1977) noted that education and experience accounted for 70% of the variance in relative returns in Morocco.

Schultz (1960) and Denison (1962) argued that increasing educational attainment boosts a country's national stock of human capital, thereby raising its gross domestic product (GDP). Similarly, Bernasek (2005) found that an increase in the educational attainment of the labor force in the U.S. between 1915 and 1991 contributed to average gains of 23% in productivity growth and approximately 10% of GDP growth, which was a key source of wealth creation. Saxton (2000) also stated that 12% to 20% of average annual production growth in the U.S. is attributable to increasing levels of education, as educated individuals contribute to more inventions and innovations that positively impact economic growth and reduce public spending.

Moreover, researchers have explored returns on education for men and women. Becker (2009) indicates that the economic success of both individuals and countries depends on the level of investment in education. In the U.S., investment in human capital for both men and women constitutes 70% of total capital, with spending on education, training, health, and development accounting for more than 20% of GDP. During the 1987 stock market crash, known as Black Monday, when the New York Stock Exchange lost 22% of its value, investments in human capital were unaffected by such disasters. Psacharopoulos (1994) pointed out that investment in women's education is more profitable than investment in men's education, and that the returns from the private sector are higher than those from the public sector. He also emphasized that investment in education remains an attractive opportunity, whether from a private or public sector perspective. Similarly, Patrinos et al. (2019) found that the return on education for females was higher than for males. However, they also discovered that the average return on education was higher in the public sector, with an annual rate of 7.9%, compared to 6.5% in the private sector. Hanoch (1967) suggests that annual earnings for men in Kinshasa depend on the quality of education, among other factors. Furthermore, wage differences among heads of households in Michigan were found to be influenced by factors

such as education, age, profession, city size, geographic mobility, employment status, and incentives.

Blagg and Blom (2018) pointed out that the factors affecting the return on higher education include the cost of higher education, the length of study, the probability of obtaining a degree, the student's demographic background, and local economic conditions. Furthermore, Ashenfelter and Krueger (1994) suggest that an additional academic year increases individual returns by about 10%.

Shapiro (2006) found a strong relationship between education and employment growth rates in the U.S. during the period 1940–1990. A 10% increase in education in urban areas was accompanied by a 0.8% increase in the employment growth rate. However, the study did not examine the impact of higher education on wage growth or the value of homes and rents. Moreover, a report released by the OECD in 2017 shows a link between education and personal depression rates. Depression among the uneducated is double that of those with higher education. The crime rate decreases with higher levels of educational enrollment, and increasing earnings can be a significant incentive for individuals to pursue education and training.

The role of work experience in returns is discussed by Olivetti (2006), who argued that women's returns to experience have increased by 25% over several decades, while the rate for men has increased by 6%. In addition, Garcia-Louzao et al. (2023) used data from Spain to measure how human capital accumulation affects wages. They found that experience, representing human capital accumulation, is a key factor contributing to the gap in returns, especially for jobs with fixed contracts.

Beam et al. (2020) studied the returns to education, experience, and training for young workers. They found that having experience and a degree is essential for securing a job. Additionally, vocational training significantly increases the likelihood of employment, particularly for male workers. Additionally, Bauer and Haisken-DeNew (2001) assessed the impact of education and experience on wages using a German panel data set (GSOEP). They found that in jobs requiring mental work, the return to schooling increases with greater experience, both in the current firm and previous firms. Lee and Ihm (2020) also estimated the difference in the rate of return on investment between males and females. They found that females have a higher rate of return to education than males across educational phases, except for graduate education.

All the aforementioned studies demonstrate that investment in education, measured through various techniques, is crucial in determining future returns. In addition, other variables, such as experience, training, and gender, significantly influence returns to education and must be considered when studying this topic.

4. The education system in Jordan

The basic education system in Jordan consists of ten years of primary education. After completing primary education, students can choose between two years of secondary academic or secondary vocational schooling. Following secondary education, students may pursue a two-year diploma or a bachelor's degree. After obtaining a bachelor's degree, students have the option to undertake a one-year higher diploma or a two-year master's degree, after which they may apply to pursue a four-year doctoral degree. Table 1 summarizes the education system in Jordan.

Table 1: Education Levels in Jordan

Age	Years	Cumulative years	Education
6–18	12	12	High school level
19–20	2	14	Diploma level
19–22	4	16	Bachelor's level
23–24	1	17	High diploma level
23–25	2	18	Master's level
25–28	4	22	Ph.D. level
Note: The table is adapted from the author's 2022			

5. Data and methodology

The data were collected from online questionnaires distributed via Google Forms to over 1,000 Jordanians living both inside and outside Jordan. Unfortunately, we received only 192 completed questionnaires, and ultimately, we were able to use only 190 due to the presence of a significant outlier in the variable values.

The sampling technique used in this study is called snowball sampling, a non-probability method where existing participants recruit new subjects from among their acquaintances. As a result, the sample group expands like a snowball, particularly through social media platforms.

By employing snowball sampling, we ensured that our study included participants most relevant to our research objectives. This method enabled us to gather extensive and reliable data on the impact of educational investment on salary from a diverse group of individuals with varying levels of education, years of schooling, and areas of specialization.

Additionally, this approach allowed us to rapidly and efficiently expand our sample to individuals with specific educational qualifications and professional experiences that may not be easily reached through standard sampling techniques. Furthermore, it helped us build trust with participants, enhancing the quality of the data collected while minimizing the cost of sampling.

The targeted respondents were Jordanians aged 18 years or older, currently employed either inside or outside Jordan. According to the Ministry of Labor, the number of Jordanian workers is 1,038,649, with women comprising 18.75% of the workforce (Ministry of Labor, 2021). Kandah (2022) reported that around 800,000 Jordanian expatriates were working abroad in 2018, constituting approximately 11.4% of the total number of Jordanian citizens.

The variables used in this study are divided into two categories: quantitative variables and dummy variables. Table 2 provides the definitions and abbreviations for these variables.

Table 2: Definition of variables

Variable	Abbreviation	Definition
Salary	SLR	A quantitative variable that reflects the amount of money an individual annually earns, measured in Jordanian dinar (JD).
Years of education	YEAR	A quantitative variable that reflects the number of years of education needed to get the acquired certificate.
Level of education	HSCHL	A dummy variable with a value equal to one if the highest acquired education level is a high school certificate and equal to zero otherwise.
	DPLM	A dummy variable the equal to one if the highest acquired education level is a diploma degree and equal to zero otherwise.
	BCH	A dummy variable the equal to one if the highest acquired education level is a bachelor's degree and equal to zero otherwise.
	HDPLM	A dummy variable the equal to one if the highest acquired education level is a high diploma degree and equal to zero otherwise.
	MSTR	A dummy variable the equal to one if the highest acquired education level is a master's degree and equal to zero otherwise.
	PHD	A dummy variable the equal to one if the highest acquired education level is a Ph.D. degree and equal to zero otherwise.
Specialty at university	ENG	A dummy variable with a value equal to one if the university specialty is in an engineering field and equal to zero otherwise.
	MDCL	A dummy variable with a value equal to one if the respondent has a university specialty in the field of medicine and equal to zero otherwise.
	SCN	A dummy variable with a value equal to one if the respondent has a university specialty in the field of science and equal to zero otherwise.
	SCL	A dummy variable with a value equal to one if the respondent has a university specialty in the field social science and equal to zero otherwise.
	MNGRL	A dummy variable with a value equal to one if the respondent has a university specialty in the field management and economic, and equal to zero otherwise.
Years of experience	EX	A quantitative variable that reflects the amount of experience attained until the day of completing the questionnaire in years.

Variable	Abbreviation	Definition
Number of Training courses	TR	A quantitative variable that reflects the number of Training courses attained during life time, until the day of completing the questionnaire in years.
Gender	MALE	A dummy variable with a value equal to one if the person is male and equal to zero otherwise.
	FEMALE	A dummy variable with a value equal to one if the person is female and equal to zero otherwise.

The descriptive statistics for all variables used in this study are presented in Table 3. The table indicates that 30% of the respondents are female, which is higher than the overall population percentage. Additionally, the percentage of Jordanians working abroad is 12.1%, slightly above the population percentage. The respondents reported an average of 18 years of schooling, a salary of 1,132.8 JD, and 12.7 years of experience.

Table 3: Descriptive statistics

	Mean	Maximum	Minimum	Std. Dev.	Sum	Observations
YEAR	17.9947	22	12	2.7535	3419	190
SLR	1132.7580	5600	200	953.1775	215224	190
HSCHL	0.0105	1	0	0.1023	2	190
DPLM	0.0263	1	0	0.1605	5	190
BCHLR	0.5053	1	0	0.5013	96	190
HDPLM	0.0053	1	0	0.0725	1	190
MSTR	0.1579	1	0	0.3656	30	190
PHD	0.2947	1	0	0.4571	56	190
ENGNRNG	0.0684	1	0	0.2531	13	190
MDCL	0.0421	1	0	0.2014	8	190
SCN	0.1316	1	0	0.3389	25	190
SCL	0.4105	1	0	0.4932	78	190
MNGRL	0.3474	1	0	0.4774	66	190
EX	12.7368	42	0.5	10.0161	2420	190
TR	9.9684	200	1	17.9373	1894	190
MALE	0.7000	1	0	0.4595	133	190

Relying on the Mincer (1958) function, this study estimates the factors affecting earnings in Jordan. Over the years, researchers have favored the Mincer function for estimating the returns on education. Mincer (1958) argues that schooling and labor market experience are key sources of differences in returns. Furthermore, variations in returns may depend on the size of human capital and gender.

We employed the Ordinary Least Squares (OLS) regression method with dummy variables, as it is a popular and effective

technique for determining the impact of categorical factors on a dependent variable. The OLS method can handle dummy variables and measure their effects, allowing researchers to directly compare different groups of categorical variables. It can assess differences in intercepts between groups and facilitate the use of interaction terms. Additionally, OLS permits hypothesis testing for both quantitative and qualitative variables and can estimate non-linear effects between independent variables and the dependent variable (Gujarati, 2021).

Three slightly different models were estimated. All models used yearly salary (SALARY) as the dependent variable, along with years of experience (EX), the number of training courses (TR), and a male dummy variable (male) as control variables. In Model 1, we included the following dummy independent variables to account for the level of education (PHD, MSTR, HDPLM, BCHLR, and DPLM). Model 2 incorporated the number of schooling years (YEAR), while Model 3 included the area of specialization (ENGNRNG, SCL, MNGRL, MDCL).

Each of these three models measures the investment in education in a slightly different way. The first model tests the effect of the level of education, while the second model focuses on the number of years of education. The third model examines the area of specialization, capturing how different fields of study influence earning potential. Thus, each model approaches the investment in education from a distinct perspective, capturing various characteristics of this investment.

Using these three models, we can carefully analyze the effect of educational investment from different viewpoints. The first model evaluates the qualitative aspect of education (the level of qualification), the second model assesses the quantitative aspect (the length of education), and the third model considers the importance of specific fields of study. Each approach highlights unique characteristics of educational investment, enhancing our understanding of how education affects earnings. This comprehensive approach ensures that we account for all significant factors that could influence the relationship between education and salary.

Furthermore, utilizing these three models allows for robustness checks and validation of findings. By comparing results across models, we can identify consistent relationships and ensure the reliability of our conclusions. The diverse educational aspects captured by these three models strengthen the overall analysis and provide a more detailed and dependable understanding of the effects of educational investment on salary.

Model 1

$$SLR = \beta_0 + \beta_1 EX + \beta_2 TR + \beta_3 MALE + \beta_4 BCHLR + \beta_5 DPLM + \beta_6 BCH + \beta_7 HDPLM + \beta_8 MSTR + \beta_9 PHD + e_i$$

Model 2

$$SLR = \beta_0 + \beta_1 EX + \beta_2 TR + \beta_3 MALE + \beta_4 YEAR + YEAR*EX + e_i$$

Model 3

$$SLR = \beta_0 + \beta_1 EX + \beta_2 TR + \beta_3 MALE + \beta_4 SCL + \beta_5 SCN + \beta_6 ENG + \beta_7 MDCL + e_i$$

Note that each dummy variable excludes one possible category to avoid the problem of the dummy variable trap.

6. The results

We first conduct diagnostic tests on the study variables to ensure the suitability of using OLS regression. One of the most important tests in this context is the pairwise correlation test, which effectively captures potential multicollinearity issues. Table 4 presents the correlations between variables in the three models.

The results of the pairwise correlation test indicate that all variables in the three models have correlations that do not exceed 0.8, with the exception of the correlation between the PhD dummy variable (PHD) and the number of years of study (YEAR), which has a correlation of 0.94. However, since these two variables are not included in the same model, we can safely conclude that the three models are not affected by multicollinearity.

Table 4: Collinearity Test (Pairwise Correlation Test)

	EX	TR	MALE	DPLM	BCH	HDPLM	MSTR	PHD	YEAR	SOC	SCN	ENG	MDCL
EXP	1.0000												
TR	0.1601	1.0000											
MALE	0.2650	0.1825	1.0000										
DPLM	0.1316	-0.0181	0.0359	1.0000									
BCH	-0.2821	-0.1795	-0.2803	-0.1661	1.0000								
HDPLM	0.0073	-0.0283	-0.1111	-0.0120	-0.0735	1.0000							
MSTR	-0.0957	0.1629	0.0000	-0.0712	-0.4376	-0.0315	1.0000						
PHD	0.3088	0.0702	0.2973	-0.1063	-0.6533	-0.0470	-0.2799	1.0000					
YEAR	0.2472	0.1098	0.2789	-0.2391	-0.7340	-0.0263	0.0008	0.9428	1.0000				
SCL	0.1658	0.0158	0.1261	-0.1372	-0.3726	-0.0607	0.0788	0.4226	0.4691	1.0000			
SCN	0.0487	-0.0489	-0.1189	-0.0640	0.0426	0.1869	-0.0832	0.0216	0.0178	-0.3248	1.0000		
ENG	0.1054	0.0424	0.0409	0.2159	0.0180	-0.0197	-0.0602	-0.0380	-0.0754	-0.2262	-0.1055	1.0000	
MDCL	0.1029	-0.0070	0.0801	0.1293	0.0502	-0.0153	-0.0189	-0.1355	-0.1905	-0.1750	-0.0816	-0.0568	1.0000
Authors calculation													

Next, we checked for the heteroskedasticity problem, which concerns the unequal variance of the residuals in a regression. Table 5 shows the results of the tests conducted for the three models.

Table 5. Heteroskedasticity Test

	Chi-Square statistics			Null Hypothesis	Conclusion
	Model 1	Model 2	Model 3		
The Breusch Pagan test	6.5892 (0.5851)	2.4229 (0.6585)	9.8705 (0.1960)	Homoskedasticity	No Heteroskedasticity
The White test	12.7758 (0.9567)	6.3256 (0.9335)	15.2431 (0.9134)	Homoskedasticity	No Heteroskedasticity

P-value is between parentheses.

Author's calculation

The results of the Breusch-Pagan test and the White test fail to reject the null hypothesis of homoskedastic residuals for the three models. Therefore, we conclude that the models do not suffer from heteroskedasticity.

Next, we checked for the autocorrelation problem, which concerns the assumption of independence of the residuals in the three models. Table 6 presents the results of these tests.

Table 6. Autocorrelation Test

	Chi-Square statistics			Null Hypothesis	Conclusion
	Model 1	Model 2	Model 3		
Breusch-Godfrey Serial Correlation LM test	3.5643 (0.6137)	3.5861 (0.6104)	8.7054 (0.1214)	No Autocorrelation	No Autocorrelation

P-value is between parentheses for 5 lag residuals.

Author's calculation

The results of the Breusch-Pagan Serial Correlation LM test fail to reject the null hypothesis of no autocorrelation for the three models. Thus, we conclude that the models do not suffer from an autocorrelation problem.

Table 7 presents the estimates for Models 1, 2, and 3. Model 1 represents the effect of various levels of education on employee monthly returns. We included five out of six dummy variables in the model to avoid the problem of the dummy variable trap, specifically including the (DPLM), (BCHLR), (HDPLM), (MSTR), and (PHD) dummies while excluding the (HSCHL) dummy. All the estimated education coefficients were statistically insignificant at the 5% significance level, except for the (PHD) and (MSTR) dummies, suggesting that the Ph.D. and Master's levels do affect the return on education.

This result implies that, if all other variables remain constant, workers in the Jordanian labor market with a diploma, bachelor's, or high diploma degree receive the same salary as those with only a high school degree. Furthermore, a worker with a Ph.D. earns 1,691 JD more monthly than a worker with a high school degree, while a worker with a master's degree earns 1,055 JD more monthly than a worker with a high school degree. This outcome may result from the high unemployment rate and saturation of the Jordanian job market, especially for workers with high diploma degrees or below.

In addition, Model 1 suggests that if all other variables remain constant, an increase in experience by one year will increase monthly returns by 22.7 JD, and male workers will earn, on average, 255.3 JD more monthly than female workers. However, this model finds that training does not significantly affect monthly returns.

Model 2 used the number of schooling years (YEAR) variable to represent the effect of years of study on workers' salaries. The coefficient was positive and statistically significant at the 1% significance level. The results indicate that if all other factors remain constant, the monthly return will increase by 178.3 JD for every additional year of study. Furthermore, the model suggests that, if all other variables remain constant, an increase in experience by one year will lead to an increase in monthly return of 23.55 JD, and male workers will earn, on average, 268.9 JD more monthly than female workers. Once again, this model finds that training does not significantly affect monthly returns.

Model 3 estimated the effect of investment in education on monthly returns through the area of specialization. The results show that a female worker with a managerial specialization earns, on average, 244.6 JD monthly, as represented by the intercept. All other areas of specialization do not yield higher income than managerial specialization, except for social specialization, which earns 552 JD more than females with managerial specialization. Moreover, the results indicate that each additional year of experience increases monthly income by an average of 30.1 JD. Additionally, each training course adds on average, 6.1 JD to the monthly return.

All these results show that investment spending in all forms of education increases monthly returns in Jordan. However, this increase in returns is relatively small compared to the returns to education in other countries. These results can be attributed to the high unemployment rate and the saturation of the Jordanian job market, especially for workers with high diploma degrees or below. Moreover, the Jordanian job market suffers from a mismatch between the education system and job market needs, leading to elevated unemployment rates among educated job seekers.

It is also worth mentioning that the structure of the Jordanian economy relies heavily on public sector jobs regulated by the Civil Service Bureau (CSB). These jobs do not generate high returns on educational investments. Additionally, the CSB announced that approximately 388,000 applicants are seeking employment openings (The Jordan Times, 2021).

Furthermore, Jordan faces significant economic challenges, such as a large national debt and limited resources that restrict the ability to create jobs and stimulate the economy, impacting opportunities for graduates. Additionally, the educational system lacks sufficient resources for research and development, which may hinder education's ability to promote economic growth.

Table 7: The OLS Estimation using salary as dependent variable.

Coefficients						
Variable	Model 1	P-value	Model 2	P-value	Model 3	P-value
C	-273.3842	0.6112	-2526.8000***	0.0000	244.5481*	0.0692
EX	22.6673***	0.0020	23.5147***	0.0008	30.0598***	0.0003
TR	4.3919	0.1507	4.7250	0.1133	6.1344*	0.0717
MALE	255.2973**	0.0414	268.9169**	0.0282	466.5371***	0.0008
DPLM	507.4010	0.4015	-	-	-	-
BA	580.5999	0.2687	-	-	-	-
HDPLM	633.5352	0.4781	-	-	-	-
MSTR	1054.9383**	0.0495				
PHD	1691.3481***	0.0014	-	-	-	-
YEAR	-	-	178.2677***	0.0000	-	-
SCL	-	-	-	-	552.1111***	0.0001
SCN	-	-	-	-	62.4238	0.7494
ENG	-	-	-	-	-261.3126	0.4012
MDCL	-	-	-	-	0.9715	0.9969
R²	45.38%	-	45.00%	-	29.9%	-
Notes: P-value in parentheses. Estimation was obtained using the E-views program						

7. Conclusion and Recommendations

This study aims to estimate the effect of education on the monthly salary of workers in the Jordanian labor market. The study considers three models to determine the factors affecting salary in this market. An Ordinary Least Squares (OLS) estimation method was used. The results show that higher education levels and more years of education positively and significantly affect wages. This finding supports Mincer's (1958) assertion that investments in human capital impact earnings levels. Moreover, this implies that an individual's earnings increase with greater investments in human capital. This result is

consistent with the findings of Dietrich et al. (2020), Montenegro and Patrinos (2014), and Ashenfelter and Krueger (1994); however, it may be limited to Jordan due to a high unemployment rate and job market saturation across most education levels.

Additionally, the results indicate that total years of experience positively and significantly affect wages, in accordance with Mincer (1974) and Psacharopoulos (1977). This implies that employers often reward employees with better salaries because they believe that over time, these employees will have developed their skills and productivity. In line with Peet et al. (2015) and Patrinos et al. (2019), we found that gender does affect wages after controlling for education level, specialty, and experience. Finally, the study found that working in social fields has a higher return than in other fields, while working in engineering, medical, or scientific fields has an average return that is not significantly different from the return of workers in managerial positions.

In light of these results, we recommend that policymakers focus more on reducing unemployment and job market saturation. Furthermore, they should create special programs to train and rehabilitate unemployed individuals to provide them with appropriate skills for both the local and international labor markets. Additionally, the government should intensify efforts to find new job opportunities abroad by signing agreements with other countries to facilitate the employment of Jordanians.

Research Gaps

Although returns to education have been studied extensively, only a limited number of studies have analyzed the return to years of education and how it varies by university specialty. Therefore, it is worth exploring the relationship between salary, years of education, and university specialty. Future studies could investigate whether foreign education is of better quality, which is crucial for enhancing educational standards and may lead to higher salaries.

Data availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Disclosure statement

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Author contribution statement

O.D. and A.A. conceived the presented idea. O.D. and Q.T. developed the theory. U.A. performed the measurements, while A.A. and U.A. were involved in planning and supervising the work. O.D., U.A., and A.A. processed the experimental data, performed the analysis, drafted the manuscript, and designed the figures. U.Q. conducted the regression analysis. All authors aided in interpreting the results and contributed to the manuscript. All authors discussed the results and provided comments on the manuscript.

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Appendix 1: The Questioners in Arabic

قياس العوائد الاقتصادية على التعليم

تهدف هذه الدراسة للتعرف على العائد الاقتصادي المتأني من الاستثمار في التعليم عن طريق الحصول على شهادات علمية متقدمة بدئا من شهادة الثانوية العامة ثم البكالوريوس مروراً بالماجستير والدكتوراه وغيرها. علماً أن المعلومات التي سنحصل عليها من الاستبانة ستستخدم لأغراض البحث العلمي فقط راجين منكم عدم كتابة الاسم والدقة عند ملئ الاستبانة مع التقدير .

1- هل حصلت على عمل

- نعم
○ لا (إذا كانت الاجابة لا.. فلا داعي لاكمال الاستبانة)

2- مكان العمل (داخل وخارج الأردن)

- داخل الأردن
○ خارج الاردن

3- الجنس

- ذكر
○ أنثى

4- اعلی شهادة علمية حصلت عليها من الشهادات العليا المرفقة

- ثانوية عامة
○ دبلوم
○ بكالوريوس
○ دبلوم عالي
○ ماجستير
○ دكتوراة

5- مجال اعلی شهادة علمية حصلت عليها من المجالات المرفقة

- المجال الطبي
○ المجال الهندسي
○ المجال العلمي
○ مجال العلوم الإنسانية
○ مجال العمل الاداري

6- الراتب الشهري بالدينار الاردني (ادخل الارقام باللغة الانجليزية فقط)

7- الخبرات ومصادر الدخل الأخرى

8- سنوات الخدمة بعد اعلی درجة علمية (ادخل الارقام باللغة الانجليزية فقط)

9- سنوات الخدمة الاجمالية (ادخل الارقام باللغة الانجليزية فقط)

- ☐ نوع العمل
- ☐ أكاديمي (جامعي)
- ☐ طبي
- ☐ هندسي
- ☐ اداري
- ☐ اخري

10- عدد الدورات التي حصلت عليها (ادخل الارقام باللغة الانجليزية فقط)

11- هل لديك مصادر دخل اخرى من خارج المؤسسة التي تعمل بها

- ☐ نعم
- ☐ لا

12- كم تدخر من دخلك الشهري (ادخل الارقام باللغة الانجليزية فقط)

13- يمكنك هنا ان تكتب اي ملاحظة ترغب بايادائها على الاسئلة المطروح او الاستبانة مع بالغ الشكر

Measuring the economic returns on education

This study aims to identify the careful economic return on investment in education by obtaining advanced academic degrees, starting with a high school diploma, then a bachelor's degree, and moving on to a master's degree, doctorate degree, and others. Note that the information that we will obtain from the questionnaire will be used for scientific research purposes only. We ask that you do not write the name and accuracy when filling out the questionnaire, with appreciation.

1- Have you got a job?

- ☐ Yes
- ☐ No (if the answer is no, there is no need to complete the questionnaire)

2- Place of work (inside and outside Jordan)

- ☐ Inside Jordan
- ☐ Outside Jordan

3- Gender

- ☐ Male
- ☐ Female

4- The highest academic degree obtained from the attached higher degrees

- ☐ High school
- ☐ Diploma
- ☐ Bachelor's degree
- ☐ Higher diploma
- ☐ Master
- ☐ Ph.D.

5- The field of the highest academic degree obtained from the attached fields

- ☐ Medical field
- ☐ Engineering field
- ☐ Scientific field
- ☐ The field of humanities
- ☐ Administrative work field

6- Monthly salary in Jordanian dinars (enter numbers in English only)

.....

7- Experience and other sources of income

.....

8- Years of service after the highest academic degree (enter numbers in English only)

.....

9- Total years of service (enter numbers in English only)

- ☐ Type of work
- ☐ Academic (university)
- ☐ Medical
- ☐ Geometric
- ☐ Administrative
- ☐ Other

10- Number of courses you took (enter numbers in English only)

.....

11- Do you have other sources of income from outside the organization you work for?

- ☐ Yes
- ☐ No

12- How much do you save from your monthly income (enter numbers in English only)

.....

13- Here you can write any comment you would like to make regarding the questions asked or the questionnaire, with great thanks