RETURNS TO EDUCATION AND THE UNEMPLOYMENT RISKS: THE CASE STUDY OF THE STATE OF ISRAEL

Xu Changing*[a], PhD
Sun Yat Sen University, Guangzhou, China

Abstract:
Many findings in the economics of education has shown that investment in education continues to be a very attractive investment opportunity in the world today - both from the private and the social point of view. It is the same with Israel. This paper examines a number of education-related aspects of Israeli labor market in the year of 2008 using 3973 samples from the Central Bureau of Statistics of Israel. The paper estimates the returns to education in terms of Jewish and Arab, male and female and compares the differences of the unemployment Risks incidence due to the different gender and ethnicity. The findings indicate that the more year of receiving education, the higher education return in Israel. But the returns to education are very different between male and female, Jewish and Arab groups. The analysis also shows that there exist a great relationship between education level and unemployment risks which the incidence is significant in most cases. Just like the other countries, investment in education continues to be a very attractive investment opportunity in Israel today and in the future.

Key Words: Returns to Education, Unemployment Risks, Israel

Introduction:

Since 1960s,with the development of the theory of human capital, every country pay more attention to the education and regard it as a kind of investment while not only a wealth and consumption. Meanwhile according to endogenous growth theory, human capital as well as research and development (R&D), are the main determinants of growth. In Romer (1986, 1990), Lucas (1988) and Aghion and Howitt (1992) knowledge is the main source of growth, but the precise mechanism leading to growth differs slightly from one work to the other. Spillovers or external effects of human capital underlie –at least if one does not take into account semantic concerns– the same thing: factor payments are higher than what is warranted by strict marginal productivity of workers. Hence, the

[a] Xu Changqing: Associate Professor of Sun Yat-sen University, Guangzhou,China and Post-doctoral fellow cooperated with Prof. Adrain Ziderman at Economics Department of Bar-Ilan University in Israel in 2010. Email Address:c.tsungxu@yahoo.com
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amount of human capital or knowledge is vital for society. Compilations of rate of return estimates to investment in education have appeared in the literature since the early 1970s (see Psacharopoulos 1973, 1981 and 1985). Now more and more interest and effort have been dedicated by labor economists to studying education returns, both from a theoretical and empirical point of view and the results of several empirical studies on the relationship between the education of individuals and their income show that better educated workers earn higher wages in the labor market (Ashenfelter and Rouse, 1998; Card, 1995). Our paper is interested in the Israel education return and devoted to examining the factors that have influenced the development of incomes.

Israel is an immigrating country, which its society is characterized by a national cleavage between Jews and Arabs, and within the Jewish society between Jews whose parents immigrated to Israel from Europe and America (Ashkenazim), and those from Asian and African origin (Mizrahim). Over the years, a clear hierarchy in the stratification system has been institutionalized in Israeli society in general, and in the labor market in particular, where Ashkenazim are at the top of the socioeconomic ladder, Mizrahim are in the middle, and the Arab citizens of Israel occupy the bottom echelons of the socioeconomic hierarchy. Not surprisingly, within each group, men are above women, at least with respect to their earnings. Actually, there are notable differences between male and female, Jewish and Arab in the labor markets. To address the existing relationship between the labor market income and the gender, ethnic identity difference, we think constructing a more harmonious relationship between them is helpful for the society. So the paper introduce the variables of gender and ethnicity to analyze the returns to education.

This paper is aimed at the returns to education in different groups based on OLS and Logit regression, focusing on how gender and ethnic-based factors affected the incomes in Israel. Specifically, we will provide estimates for the extent to which the unemployment risk has happened for different groups based on the data in 2008. The paper is organized as follows: Section 2 discusses the theoretical consideration and we will review the economics theory and previous

literatures. Section 3 presents the data and variables used, and section 4 presents the statistical model we use to evaluate the empirical status and the returns to education based on gender & ethnicity, also we will provide the unemployment probability based on gender and ethnicity. Section 5 discusses the main findings and their implications in the Israeli stratification system.

Theoretical consideration

Since the early 1970s, the research on education return have appeared in economics literature by using OLS. Psacharopoulos(1985) reviewed the returns to education in 61 political entities that had a combined total population in 1983 of something over 1.6 billion persons and updated the global returns to investment in education in 1994. Rates of return have been estimated for such diverse groups as mainland Chinese working in Hongkong(Chung,1989); One type of vocational education that has been singled out as an issue is the separate vocational track of secondary schools(McMahon,1988) . What is often forgotten in vocational education discussion is that there exist some strong education-training complementarities. Psacharopoulos and Velez(1992b), using Colombian data, found a strong positive interaction between training and years of formal education in determining earnings. In a more macro exercise, Mingat and Tan(1988)examines the economics of training provided under 115 physical capital investments. 1980s and 1990s also found several empirical studies carried out with the aim of estimating the returns to schooling in Italy. Brunello and Miniaci (1999) observed the first estimates based on heterogeneous, and not always representative data. More recent studies, starting from the second half of the 1990s, make wider use of the data of Survey of Household Income and Wealth of the Bank of Italy and perform IV estimates of the returns to schooling for this country. Cannari and D'Alessio (1995) chose the family background variables as instruments, obtained an estimate. Colussi(1997) achieve an estimate with the same data and similar instrumental variables. Flabbi (1997) estimates the returns to schooling for females and males separately. Indeed, the aim of Flabbi (1997, 1999) is to shed light on the "hierarchy" issue, i.e. he wants

to clarify whether the higher female returns could be considered a stylized fact of the Italian labor market or whether they depend rather on the estimation methodology applied. The author concludes that the usual hierarchy (i.e. higher female returns) holds in general within an OLS estimation framework, but it is not independent of the specification, while the hierarchy is reversed by the IV estimates. Brunello and Miniaci (1999) and Brunello, Comi and Lucifora(2001) use the data of 1993 and 1995 to estimate the education returns with instrumental variables relating to family background (education and professional position of parents), the school system reform of 1969, and (only in the second study) to a measure of individual risk aversion. Brunello and Miniaci (1999) arrived an OLS estimate and an IV estimate for the male households. Similar values are obtained by Brunello, Comi and Lucifora (2001).

In Israel, Katz and Adrain Ziderman (1980), using Israeli data , found strong screening effects at work. This paper tests the hypothesis that educational attainment acts, inter alia, as a screening device for worker selection by comparing the average educational level of pairs of screened and non-screened groups within similar occupational categories. In a comparison of the Israel labor market between 1974 and 1983, Jacob Weisberg(1995)found that both higher wages and age-earnings profiles were related to higher educational levels, and that for higher educational levels the age-earnings profiles present steeper parabolic shapes. Earnings peak for higher educational levels at later ages was found only for 1974, but not for 1983. For all age groups, estimated coefficients of education are higher in 1983 than in 1974, while the difference between corresponding estimates from the two years increases with the rise in level of education. Interpretation of these empirical findings is related to the substantial technological progress experienced between 1974 and 1983. Over that past 40 years many studies provided macro sociological explanations for the persistence of the socioeconomic gaps among Israeli various ethnic and national origin (Peres 1971; Smooha 1978; Ben Rafael 1982; Lustick 1980; Swirski 1999; Eisenstadt 1967; Khazzoom 1998). The empirical literature on these issues is even more extensive. In the 1970s virtually all studies focused solely on the two

Jewish groups of immigrant men, while the experience of Arabs and women were neglected (Peres 1971; Spilerman and Habib 1976). In the 1980s, the ethnic cleavage within the Jewish groups was still the main subject of inquiry, in light of the persistence of the socioeconomic gaps among Israeli-born children of Mizrahi and Ashkenazi immigrants (second generation immigrants) (e.g., Smooha and Kraus 1985; Nahon 1987). During that period the first empirical studies on the socioeconomic achievements of women relative to men were conducted (e.g., Izraeli and Gaier 1979; Semyonov and Kraus 1983; Cohen, Bechar and Raijman 1987). By the 1990s Arabs were brought back to the Israeli stratification system, and their socioeconomic achievements were systematically explored relative to their Jewish counterparts (e.g., Lewin Epstein and Semyonov 1994; Haberfled and Cohen 1998a). At the same time, comprehensive studies of the ethnic, national and gender-based gaps in educational attainment and labor market performance were conducted (e.g., Lewin Epstein and Semyonov 1993; Haberfeld and Cohen 1998b; Cohen and Haberfeld 1998; Mark 1996; Kraus 2001; Friedlander, Okun, Eisenbach, and Elmakias 2002). Roni Frish(2009) examined the causal effect of education on earnings in Israel.

The standard model used to analyze earning differentials is based on the human capital

earnings function developed by Mincer (1974) that has the form:

$$\ln(Y_i) = \varphi(X_i) + \varepsilon_i \quad (1)$$

where $\ln(Y_i)$ is the natural log of earnings or wages for individual i, X_i is a vector that usually includes a measure of schooling or educational attainment, a measure of the accumulation of experience and some other factors that may affect earnings such as occupation, training, race, gender, abilities, marital status, number of children, seniority in actual job, hours of work, health, region, employment sector, firm size, etc.; and ε_i is a random disturbance term that reflects unobserved characteristics. But in equation (1),we find nothing is said about the functional form of the equation and we can't measure the actual value of the variables. The empirical estimation usually has the following form:

$$\ln Y_i = \beta_0 + \beta_1 S_i + \beta_2 EX_i + \beta_3 EX_i^2 + \beta_4 GEN + \beta_5 ETH + \varepsilon_i \quad (2)$$

where $\ln(Y_i)$ is the natural log of the annual income, S_i is the years of schooling, EX_i is the level of experience (for data reasons, proximately equals to age minus years of schooling minus 6 minus 2 or 3 in Israel), EX_i^2 is the square of the level of experience which is included to account for the commonly observed effect of a declining age-earning profile for a given level of experience. Generally speaking, with the accumulation of experience, the marginal benefit of the labor will increase, so we assign this indictor to reflect the circumstance of marginal return to education. GEN is the variable of different kinds of gender and ETH stands for the variable of ethnic identity.

As to equation (2), we must pay more attention to the following: Firstly, it is important to recall that equation (2) is based on some restrictive assumptions. It assumes that individuals are of equal abilities and face equal opportunities (i.e., it assumes perfect capital and labor markets, which allows us to take earnings as a proxy for marginal productivity). It also ignores direct costs of schooling and overlooks earnings while attending school. Moreover, it assumes a constant return per year of schooling. A closer look at equation (2) also shows us that the parameter for years of education is an estimate of the impact of schooling on wages rather than an internal rate of return on investment. If it were an internal rate of return, it would be a private one, since this specification ignores any subsidization of schooling and omits any positive or negative externalities to schooling. Secondly, equation (2) also omits a potentially very relevant variable: ability. Ability is likely to be positively correlated with schooling, so omitting ability measures from the regression equation will bias the estimated returns to schooling upward. However, ability is difficult to conceptualize and measure, and there is no consensus as to whether it is significant enough to differentiate earnings. For these reasons and because the survey data do not include any variable that could conceivably be used as a proxy of ability, this problem is ignored in our estimations. Thirdly, in this equation, we have to proxy experience by its potential term: age minus years of education minus six and minus 2 or 3. This is a poor proxy. Furthermore, potential experience is an even poorer proxy

for women than for men especially in the case of women who drop out of the labor force to raise children. Therefore, women's potential experience overstates true work experience relative to men's and so it is not surprising to find that women appear underpaid for comparable experience. Fourthly, equation (2) assumes that education is assigned randomly across the population. In reality education is endogenous and the estimation of the relationship between earnings and education may be biased upward or downward depending on the way individuals make their education choices. Like in the case of abilities, there is a lack of adequate instruments in the sample at hand so we were not able to correct the problem of endogeneity of education and it is ignored in our estimations.

In order to distinguish how the gender and ethnic identity affect different group's income and the unemployment incidence how much will happen in different groups, we take in the logistic model as follows :

$$y_i = \alpha + \beta_i x + e_i \quad (3)$$

Whereas y_i is the binary variables which 0 stands for the status of employment and 1 for the unemployment. Therefore we can gain the following:

$$E(y_i \mid x_i) = P(y_i = 1 \mid x_i) = \alpha + \beta x_i \quad (4)$$

$$P(y_i = 0) = 1 - (\alpha + \beta x_i) \quad (5)$$

In this way we can predict the ratio of the different groups unemployment, know the advantage and disadvantage of the different groups and how much extent that education affect the annual incomes in the labor markets.

3.Dataset and variables used

3.1 The Data

We use the cross-section individual survey data from the Central Bureau of Statistics of Israel collected in 2008.The CBS is administered by the Israel government and it contains information on individuals' characteristic such as age, household size, educational attainment, religious status and geographical location, as well as employment status, occupation, earnings and so on. It is the most comprehensive data set for labor market available in Israel to be used for

analyzing returns to education at the aggregated level. Summary statistics are presented in table 1.

The major descriptive points are as follows: There are 2343 males and 1630 females, 2960 Jewish people and 1013 Arabs in the sample. The annual earnings received from the main job are calculated by the gross annual earnings in the paid work in 2008.The mean annual earnings of males and females are 168685.53 and 89111.39 shekels, while the Jewish people and Arabs' mean annual earnings are 157412.33 and 73584.65 shekels respectively. Binary variables (0,1)are used to represent the highest educational qualification of each individual in the sample and in the econometric work we use the individuals who completed primary school as the reference point for comparisons. There are about 11.5% and 6% males and females who have the highest qualification recorded as being primary school or lower, accordingly Jewish people and Arabs are4.4% and 2.3%. And about38.5% and 41.2% of males and females have attained lower and upper secondary education, while Jewish people and Arabs are 38.4% and 43.4%. The higher education level(including undergraduate and postgraduate) to males and females are about apart 50% and 52.7%.,whereas the proportion to higher education for Jewish people and Arabs are57.2% and 33.2% respectively. Another variable to analyze in the study is the potential experience. To mark it relatively exact, we computed it as age minus years of schooling minus 6 minus 3 to man and minus 2 to women(since in Israel the compulsory school starts at the age of 6 and every adult male must serve in the army for 3years, every female must serve in the army for 2 years).To the samples, the usual proxy potential experience is 20.21 years for males,18.06 years for females and 2.49 years for Jewish, 15.98 years for Arabs.

3.2 Some Descriptive and Statistic findings

Our analysis is restricted to the individuals aged from 16 to 67.We have omitted a very small number of individuals whose earnings are significantly different from the population at large; the self-employed; the part-time workers and those who worked in the agricultural sector and the individuals without annual

earnings. In order to distinguish whether the level of education is one of the major factor which affects the annual earnings significantly, we use the ANOVA and Univariate variance statistical analysis to check it and to which extent it was affected. The one way ANOVA statistical outcomes show that in Israel different people with different education level have different annual earnings. Seemingly the higher level of education ,the more annual earnings. This is the fact which is reflected by the human capital and it can be seen in other countries. Is also proved that the level of education has affected the annual earnings significantly. Meanwhile the multiple comparison provided more detailed information between different groups. Because of the test of homogeneity of variances is significant(the Levene Statistic is 342.153),we refused the null hypothesis and we regard the sample doesn't assume the equal variances. Table 2 is the post-hoc of Tamhane of ANOVA.

According to table 2, we can draw a conclusion that there exists a significant difference in the mean annual earnigs in different level of education between the groups in the middle school and higher education. In the primary and secondary education, the education level can't affect the earnings significantly(the sig values are 0.474,0.063 and 1.00),while between the groups of basic education level(including primary, lower secondary and upper secondary) and higher education level(including undergraduate and postgraduate), the mean difference is very significant, in spite of the same level of undergraduate and postgraduate, there still exists significant mean difference(all the sig values are 0.000). In a word, in Israel the level of education can bring about a significant difference between different groups. In light of many literatures of economics, the education acquiring decision has been modeled as an investment increasing individual future income capacity by addressing the aspects of education endogeneity and heterogeneity across individuals due to differences in ability, family background etc. which characterize such a choice (Becker,1967; Card,1994). The main point in estimating returns to education probably derives from the fact better educated workers might well earn higher wages not because of the causal effect of additional schooling, but simply because of greater ability(Ichino,2001).That is to

say, The better education means the better ability and the higher wages. Generally this is to be true, but there exist many methodological problems in estimating returns to schoolings. In fact, the effect of education on income may well vary across individuals situated at different background. Thus it is not the only one factor, except for the education level that affect the annual earnings. There exists other factors, such as experience, ethnicity, age, region etc.. In our study, we bring in other two variables ,i.e, gender and ethnicity to analysis the effect. The statistical outcomes of univariate analysis of variance are shown in the table 3.

Table3 tells us the mean and mean difference of annual incomes in different groups. We can see the total mean annual incoming of primary school, lower secondary, upper secondary, undergraduate postgraduate are the following 67090.46, 79575.79, 81464.24, 152084.33, 236876.03 shekels. Obviously the outcomes are conformed with the ANOVA. In the univariate analysis of variance, besides bringing in two variables, we also considered their interactive factors between them.

The tests of between-subjects effects are presented in the table 4. From this table, it is obvious that the variables of gender, ethnicity, education level and their interactive factors such as gender * education and ethnicity * education has greatly affected the annual earnings. As can be seen from the partial Eta Squared, we know how much is the variables and interactive factors to explain the variance of the resources. They are ranked as follows: education level(.066), gender(.037) , ethnicity(.032), ethnicity * education(.013), gender*education(.009), gender*ethnicity(.002) and gender*ethnicity*
education(.002).

4. Estimation and simulation

4.1 How the year of education affect the annual income?

The paper attempts to use some specialized statistical analysis to do more accurate and more in-depth measure to get the economic rate of return to the current education in Israel, and examine the impact of these factors on different group's income. Through the systematic analysis of economic rates of return to

education, the author's real concern is to show what the relationship between education and income is and how far this kind of relationship will bring about the significant on changing the evolution of the income distribution system under the background of Israeli multi-cultural society. In this section, what we considered is the following factors: education, experience ,experiecne^2, gender and ethnic identity. Table 5 summarizes the different models of our empirical analysis. Using equation (2),we get the estimation results for all the above models in table 6.

The findings from table 5 are: Firstly, the more year of receiving education, the higher education return. From the table, we know the return to education are 6.2%, 7.0%, 6.9%,7.1%,6.4%,7.3%, 6.7%, 10.4%,12.8% respectively from model 1 to modle 9. Moreover, all the coefficient to every modle is significant and positive, which shows the annual income increases with the rising of educational level. But there exist very different returns to education among these models. The return to education is 6.9% according to international common method, namely Mincerian Equation(in model 3, add "experience" and "experience square") .After we add the other two variables, that is, gender and ethnicity, the coefficients of educational year are changed to 7.1% and 6.4% which is close to Mincerian Returns and shows that it is comparatively reflect the objects. But after we added the interaction of education and Ethnic Identity, education and experience, education and gender,(that is model 7, model 8 and model 9), the return to education changed to 6.7%,10.4% and 12.8%, two of them are higher than Mincerian Return, which means that Mincerian Equation underestimate the rate and reflects these variables affected the return to education, especially gender and ethnic identity are very significant. Secondly, the returns to education increase with the development of working experience. All the coefficients of experience are significant, but the interaction of education year and experience does not affect the income significantly(coefficient=0.00). Thirdly, all the coefficients of gender and ethnic identity are negative and significant, which shows that the year of education affect the male and female, Jewish and Arab differently.

4.2 The returns to education comparison based on gender and ethnicity

In 4.1 , we see the year of education, gender, ethnic identity and their interaction have great effects on the annual incomes. In this section, we use the comparison models to compare the difference in groups between gender and ethnicity which are shown in table 7. In the models ,we still use the natural log as the dependent variable. In addition, we list the standardized and unstandardized coefficients. We use the standardized coefficients to explain the difference in the same equation and use the unstandardized coefficients to explain between equations. Similarly, using equation (2),we get the estimation results in table 8.

From table 8,we can conclude: Firstly, gender and ethnicity have greatly affected the income distribution. In model 10 and model 11 compared the difference led by the variable of Ethnicity. The coefficient of the year of education shows that it is 11.6% for male and 4.8% for female(unstandardized coefficient) . The male's return to education is higher than the female's and in the group of male, the return to education is more seriously affected by education year. When comparing to the standardized coefficients, in the male's equation, we can see in both of the equations, excluding the offseting functions of experience and experience square, the coefficients of year of education are the largest in each equation, which shows in each group, the year of education have greatly affected the income distribution but male is larger(0.704) than female(.330).Model 12 and model 13 compared the difference brought about by gender. The unstandardized coefficient of education in model 12 is 11.5% and in model 13 is 5.9%, which shows that Jewish's return to education is higher than Arab's. As for the standardized coefficient, excluding the counteracting function of experience and experience square(one is positive and the other is negative), it is 0.636 in model 12 and 0.666 in the model13. Both of them are the largest coefficient which shows that both of the groups, the variable of educational year is very important to the income distribution.

The data analysis in the table 6 and table 8 are got by the continuous variable , the "years of education" to examine the relationship between education and income. This line of analysis of the relationship between education and

income is basically assumed to be linear one , that is, on average, additional year of education will increase how much of the natural log annual income. From the above analysis, the results of these models reflect the general relationship between the trend, that is, the more years of education, the higher the income. However, the true relationship between education and annual income is not a smooth straight line. The reality is that the different stages of education obtain the different returns to education, or, to a different level of education, income growth rate will be different. In table 9 the regression model will use five levels of education (primary, lower secondary, upper secondary, graduate and postgraduate education) to replace the years of education as factors to estimate the coefficients. Thus different levels of education were estimated to improve how the role of improving the individual's income. Model 14 is a general analysis of different educational level to affect the individual income (on behalf of the whole situation). Models 15-18 use gender, religion, educational level as variables to analyze the role of improving their income. In the following analysis, we just observe the four key dummy variables in the regression coefficients of education, regarding the other independent variables in the model as control variables only, where the analysis does not focus on these control variables in the regression coefficient of variation. In these Models, the non-standardized regression coefficients reflect the degree of differences between the average income of different educational level groups, while the standardized regression coefficient reflects the role of the respective educational level to the income gap or the increased income within a group(model). As like the above, we use equation (2) and get the estimation results in table 10.

From the equations, we draw the following conclusions: Firstly, in all of the models, that is in all the groups, different people with different education level have different returns to education. The unstandardized coefficients in each model become much as the rising of the education level, such as in the overall model, the coefficients of education level in lower secondary, upper secondary, graduate and post-graduate are 0.343, 0.713, 1.48, 2.16. The other models have the same tendency which shows the higher level of education, the much more

annual incomes. In the standardized coefficients of education level also show the same situation. Secondly, compared to male group, the female group has much higher returns to all the different levels of education because we can see the unstandardized coefficients between them. From lower secondary to postgraduate, the male's are .332, 0.657, 1.39, 2.01 while female's are .410, .900, 1.77, 2.69, which means that female's effect of educational level on annual income is much higher than male. From the standardized coefficients, we can see the coefficient of postgraduate is the largest one in the each model which means that the return to educational level is the biggest in each groups. As to Jewish and Arab, the situation shows that Jewish has much higher returns to educational level in each stage. Thirdly, experience and experience square have significantly affected the income distribution nearly all the models. And in overall model and female model, there exists the interaction of education* gender.

The samples of the former statistic analysis are only the employees who have the job. The results show that how the year of education and the educational level affect the annual income and what is the extent. If only from the analysis to examine the impact of education on income or the estimated economic rates of return to education, it would be incomplete. From the empirical observation, we know that the impacts of the educational level on people's annual income not only the level of their income, but also the situation of whether they have income or whether they have work in fact. In the survey data (excluding students and those who are unwilling to work) , there are some individuals who accounted for 15% of all the samples have no income. Unemployment members, housewives and other people who do not work, their monthly income on this variable is 0. If we put these samples in the previous model analysis, parameter estimation will lead to inaccurate (bias), it is possible to bring about the economic rate of return on education too high or too low. Clearly, the previous data analysis excluded unemployed samples. However, when studying on the relationship between education and income, we cannot but consider the level of education in this part of the people. Then we introduce the logistic regression model to analyze it. In table 11, the data were analyzed using logistic regression models to

compare the different probabilities of happening to be no income or unemployment in different qualifications of educational level, which can be from the other side to reflect the impact of education on personal income. Table 11 lists the five logistic regression models in which the first equation represent the overall situation in Israel, the second and the third ones compared gender differences, the fourth and fifth equations compare differences in religious beliefs. The dependent variable in these modles is binary variables - whether the individuals have incomes or job. The independent variables are the different levels of education, that is primary, lower secondary, upper secondary and graduate education. The reference group is post graduate education. According to formula (4)and (5) and through the using of SPSS, we gain the estimate results in table12.

Table 12 list the coefficients and the odds ratio in each model. Model 19 lists the overall situation in Israel, Model 20 and Model 21 compare the difference between male and female groups, Model 22 and Model 23 make a comparison between Jewish and Arab. From table 12 we can draw a conclusion as follows: from the overall point of view, the incidence of unemployment and no income of the group under the level of graduate(higher education) is 1~2 times higher than the samples with higher education qualifications. Model 19 manifests that there exists significant difference of incidence of unemployment among the different groups. There is much differences between employees with higher education qualification and without higher qualification but there is less differences between the groups under the level of higher education. For example, the incidence of unemployment of people with primary qualification is 2.76 times higher than postgraduates. Lower secondary is 1.576 times, upper secondary is 1.782 times, while graduate is only 0.487 times. Model 20 and Model 21 list the difference between male and female. From the outcome, we can see that the incidence of unemployment of female is much higher than male which means that it is more important for female than for male to raise their income. Take the primary group as an example, the incidence for male is 2.483 time higher than postgraduate while female is 3.250 times. Model 22 and Model 23 list the difference between

Jewish and Arab. From the outcome, we can see the similar situation that education level has more effect than Arab on the incomes. We take upper secondary group as an example, for Jewish, the incidence of unemployment is 1.705 time higher than postgraduate while Arab is 0.669 times.

5.Summary and conclusion

The paper provides a comprehensive update return to education and analyze the unemployment incidence with different education qualification in Israel. From the paper, we conclude: Firstly, The rate of return to education patterns established in earlier reviews are upheld, namely, the return to education keeps rising steadily. Secondly, there exist sex and ethnicity difference as to the return to education, investment in women's education is in general more profitable than that for men and Jewish people also have the advantage over the Arabs. Thirdly, There exist a great relationship between education level and unemployment risks incidence significantly, although it is not absolute. The above findings are discussed in the context of controversies in the field, concluding that investment in education continues to be a very attractive investment opportunity in Israel today – just like the other countries. From the change of the return to education and the risks of the unemployment incidence, we think the supply of more educated persons will contribute to the narrowing of earnings differentials and hence to a more equitable distribution of income in the future.

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Tables and Figures

Table 1 Variable Definitions and Summary Statistics

variable	Male(59%)		Female(41%)		Jewish(74.5%)		Arab(25.5%)	
	mean	Std.dev	Mean	Std.dev	Mean	Std.dev	Mean	Std.dev
Dependent Variables								
Annual Earnings	168685.5318	1.6340 1E5	89111.3890	1.0586 4E5	157412.3355	1.6316 4E5	73584.6515	78798.16336
Educational Variables								
Primary	0.115	0.319	0.06	0.237	0.044	0.204	0.233	0.423
Lower Secondary	0.105	0.306	0.112	0.316	0.115	0.317	0.087	0.282
Upper Secondary	0.28	0.450	0.301	0.459	0.269	0.448	0.347	0.476
Undergraduate	0.26	0.438	0.298	0.458	0.296	0.455	0.213	0.410
Postgraduate	0.24	0.428	0.229	0.420	0.276	0.446	0.119	0.314
Other Variables								
Potential Experience	20.2384	12.5858	18.0632	12.0535	20.4983	12.4817	15.9788	11.5948
Number of Observations	2343	1630	2960	1013				

Note: The definition of the variables is as follows: annual earnings mean the gross annual earnings in 2008(Shekels);If the highest qualification is primary, dummy=1;if the highest qualification is upper secondary, dummy=1;if the highest qualification is undergraduate, dummy=1; if the highest qualification is postgraduate, dummy=1;Potential experience means the maximum time in paid work in years.

Table 2 Multiple Comparisons of Annual Earnings (ANOVA)

					95% Confidennce Interval	
(I)Level education	(J)Level education	Mean Difference (I-J)	Std. Error	sig	Lower Bound	Upper Bound
Primary School	lower secondary	-12485.32603	6688.0899	.474	-31261.84	6291.1915
	upper secondary	-14373.78119		.063	-29170.84	
	undergraduate	-8.49939E4*	5266.8899	.000	-101304.4	423.2825
	post-graduate	-1.69786E5*		.000	-192320.3	-68683.32
Lower Secondary	primary school	12485.32603	5810.9465	. 474	-6291.191	-147250.7
	upper secondary	-1888.45516	8035.4514	1.000	-17538.25	31261.843
	undergraduate	-7.25085E4*		0	-89596.71	
	post-graduate	-1.57300E5*		.000	-180403.3	13761.341
Upper Secondary	primary school	14373.78119	6688.0899	.000	-423.2825	-55420.37
	lower secondary	1888.45516		.063	-13761.34	-134197.1
	undergraduate	-7.06201E4*	5572.1031	1.000	-83180.64	
	post-graduate	-1.55412E5*	6088.9492	.000	-175418.5	29170.844
Under -graduate	primary school	8.49939E4*	8238.7307	.000	68683.325	17538.251
	lower secondary	7.25085E4*		.000	55420.37	-58059.53
	upper secondary	7.06201E4*				

	post-graduate	-8.47917E4*	5266.889	.000	3	-135405.0
			9	.000	58059.53	
Post-	primary school	1.69786E5*	5572.103		6	101304.4
graduate	lower secondary	1.57300E5*	1	.000	-105944.1	1
	upper secondary	1.55412E5*	4481.616	.000		89596.71
	undergraduate	8.47917E4*	3	.000	147250.7	7
			7133.461	.000	7	83180.64
			0		134197.1	4
					8	-63639.21
			5810.946		135405.0	
			5		0	192320.3
			6088.949		63639.21	7
			2		9	180403.3
			4481.616			1
			3			175418.5
			7544.086			8
			1			105944.1
						8
			8035.451			
			4			
			8238.730			
			7			
			7133.461			
			0			
			7544.086			
			1			

*. The mean difference is significant at the 0.05 level.

Table 3 The descriptive statistics of Annual incomes (Univariate Variance)

gender	Ethnicity	Level Education	Mean	Std. Deviation	N
Male	Jewish	Primary school	95518.4810	1.06421E5	79
		lower	112913.6907	1.34613E5	194
		secondary	119282.0458	1.28043E5	393
		upper	206513.0416	1.32276E5	481
		secondary	319454.4000	1.97458E5	500
		undergraduate	203636.3285	1.75487E5	1647
		post-graduate			
		Total			
	Arab	primary school	65785.5158	78484.05339	190
		lower	59948.0000	18890.06926	51
		secondary	65164.0602	47281.83844	266
		upper	146330.3040	93487.65605	125
		secondary	135306.9375	1.47591E5	64
		undergraduate	85978.6897	85400.81632	696
		post-graduate			
		Total			
	Total	primary school	74517.5019	88454.93591	269
		lower	101888.1796	1.21945E5	245
		secondary	97437.7602	1.06648E5	659
		upper	194099.1106	1.27543E5	606
		secondary	298558.2340	2.01028E5	564
		undergraduate	168685.5318	1.63401E5	2343
		post-graduate			
		Total			

Female	Jewish	primary school	62645.8824	1.06976E5	51
		lower secondary	60060.4110	51929.38452	146
		upper secondary	64734.1485	56340.39535	404
		undergraduate	107392.6481	88447.44194	395
		post-graduate	157776.1136	1.72967E5	317
		Total	99429.9162	1.12701E5	1313
	Arab	primary school	28586.0870	17420.47353	46
		lower secondary	8838.1622	14474.79095	37
		upper secondary	37655.0233	27042.38475	86
		undergraduate	66284.9670	33659.22521	91
		post-graduate	66453.4737	99602.71219	57
		Total	46372.5047	52565.94346	317
	Total	primary school	46493.8144	79968.20491	97
		lower secondary	49704.0000	51141.28407	183
		upper secondary	59981.4857	53380.07507	490
		undergraduate	99695.5309	82601.88220	486
		post-graduate	143857.9572	1.67079E5	374
		Total	89111.3890	1.05864E5	1630
Total	Jewish	primary school	82622.3077	1.07439E5	130
		lower secondary	90217.8706	1.10256E5	340
		upper secondary	91631.6688	1.02106E5	797
		undergraduate	161818.3436	1.24725E5	876
		post-graduate	256722.4333	2.04067E5	817
		Total	157412.3355	1.59510E5	2960
	Arab	primary school	58534.7797	72320.08670	236
		lower secondary	38458.6364	30587.85216	88
		upper secondary	58443.1023	44777.58606	352
		undergraduate	112607.5000	84168.62500	216
		post-graduate	102871.8347	1.31365E5	121
		Total	73584.6515	78798.16336	1013
	Total	primary school	67090.4590	87064.85411	366
		lower secondary	79575.7850	1.01392E5	428
		upper secondary	81464.2402	89868.08248	1149
		undergraduate	152084.3306	1.19403E5	1092
		post-graduate	236876.0341	2.02825E5	938
		Total	136038.7025	1.47891E5	3973

Table 4 Tests of Between-Subjects Effects

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	2.846E13a	19	1.498E12	101.37	.000	.328
Intercept	1.971E13	1	1.971E13	1333.8	.000	.252
gender	2.214E12	1	2.214E12	149.81	.000	.037
ethnicity	1.957E12	1	1.957E12	132.41	.000	.032
Education level	4.107E12	4	1.027E12	69.480	.000	.066
gender * ethnicity	9.285E10	1	9.285E10	6.284	.012	.002
gender * education	5.456E11	4	1.364E11	9.230	.000	.009
ethnicity * education	7.768E11	4	1.942E11	13.142	.000	.013
gender*ethnicity*education	1.420E11	4	3.549E10	2.402	.048	.002
Error	5.841E13	3953	1.478E10		.000	
Total	1.604E14	3973				
Corrected Total	8.687E13	3972				

a. R Squared = .328 (Adjusted R Squared = .324)

Table 5 Estimation Procedure for Model 1~9

Models	Specification
Model 1	Estimate by OLS with White(1980) heteroscedasticity consistent errors and correction for year of education.
Model 2	Estimate by OLS using the variables including year of education and experience
Model 3	Estimate by OLS using all the variables in model 3, plus experience^2
Model 4	Estimate by OLS using all the variables in Model 4, plus gender
Model 5	Estimate by OLS using all the variables in Model 5,plus ethnic identity
Model 6	Estimate by OLS using all the variables in Model 5, plus the interaction of education and ethnic identity
Model 7	Estimate by OLS using all the variables in Model 6, plus the interaction of education and experience
Model 8	Estimate by OLS using all the variables in Model 7, plus the interaction of education and gender
Model 9	Estimate by OLS using all the variable in Model 8, plus the interaction of education , experience and gender

Table 6
Effect of year of Education on the Employee(Unstandardized Coefficients , N=3973)

variables	Mod1	Mod2	Mod3	Mod4	Mod5	Mod6	Mod7	Mod8	Mod9
Year of education	.062*** (.003)	0.070*** (.003)	0.069*** (.003)	.071*** (.003)	0.064*** (.003)	.073*** (.009)	.067*** (.005)	.104*** (.008)	.128*** (.013)
experience	--	.016*** (.001)	.039*** (.004)	.037*** (.004)	.036*** (.004)	.036*** (.004)	.040*** (.006)	.035*** (.004)	.039*** (.006)
Experience Square	--	--	.000*** (.000)	.000*** (.000)	.000*** (.000)	.000*** (.000)	.000*** (.000)	.000*** (.000)	.000*** (.000)
gender	--	--	--	-.621***	-.652***	-.649***	-.653***	-.264***	-.236***

				(.027)	(.027)	(.027)	(.027)	(.075)	(.077)
Ethnic Identity	--	--	--	--	-.394***	-.312***	-.395***	-.349***	-.201***
					(.045)	(.085)	(.045)	(.045)	(.086)
Education* Ethnic Identity	--	--	--	--	--	-.008 (.007)	--	--	-.015** (.007)
Education* Experience	--	--	--	--	--	--	.000 (.000)	--	.000 (.000)
Education* Gender	--	--	--	--	--	--	--	-.029***	-.031***
								(.005)	(.005)
Constant	10.740***	10.308***	10.161***	11.055***	11.657***	11.556***	11.605***	11.084***	10.792***
	(.040)	(.051)	(.057)	(.065)	(.093)	(.129)	(.115)	(.140)	(.190)
Adjusted R Square	.137	.183	.192	.313	.330	.331	.330	.337	.338

Notes: The dependent variable is the natural log of the individual gross annual income. Standard errors are in the parentheses, Significant at 10%*, significant at 5% **, significant at 1% ***.

Table 7 Estimation Procedure for model 10~13

Models	Specification
Model 10	Estimate by OLS using the variables including year of education, experience, and ethnicity of males
Model 11	Estimate by OLS using the variables including year of education, experience, and ethnicity of females
Model 12	Estimate by OLS using the variables including year of education, experience, and gender of Jewish people
Model 13	Estimate by OLS using the variables including year of education, experience, and gender of Arabs

Table 8 Effect of year of Education on the Employee in different groups

variables	Gender				Ethnic Identity			
	Mod10 (Male, N=2343)		Mod11 (Female, N=1630		Mod12 (Jewish, N=2960)		Mod13 (Arab, N=1013)	
	Unstand-ardized	Standardized	Unstand-ardized	Standard-ized	Unstand-ardized	Standard-ized	Unstand-ardized	Standard-ized
Year of education	.116*** (.013)	.704	.048** (.016)	.330	.115*** (.011)	.636	.059*** (.016)	.666
experience	.058*** (.008)	.805	.013 (.009)	.211	.040*** (.007)	.563	.021* (.011)	.451
Experience Square	.000*** (.000)	-.528	.000 (.000)	-.195	.000*** (.000)	-.369	.000 (.000)	-.280
gender	--	--	--	--	-.258*** (.085)	-.145	-.108 (.136)	-.086
Ethnic identity	-.178* (.100)	-.070	-.027 (.192)	-.009	--	--	--	--
Education*Ethnic Identity	-.024* (.009)	-.167	-.013 (.013)	-.113	--	--	--	--
Education*	.000 (.000)	-.133	.000 (.000)	.114	.000 (.000)	-.063	.001 (.001)	.151

experience								
Education*Gender	--	--	--	--	-.031*** (.006)	-.346	-.016 (.010)	-.331
Constant	10.28*** (.177)	--	10.55*** (.246)	--	10.61*** (.162)	--	10.49*** (.205)	--
Adjusted R Square	.328	--	.097	--	.312	--	.244	--

Notes: The dependent variable is the natural log of the individual gross annual income. Standard errors are in the parentheses, Significant at 10%*, significant at 5% **, significant at 1% ***.

Table 9 Estimation Procedure for Model 14~18

Models	Specification
Model 14	Overall Estimate by OLS using the variables including level of education(introducing the dummy variables), gender ,experience, ethnicity and their interaction
Model 15	Male Estimate by OLS using the variables including level of education(introducing the dummy variables), experience, ethnicity and their interaction
Model 16	Female Estimate by OLS using the variables including level of education(introducing the dummy variables), experience, ethnicity and their interaction
Model 17	Jewish Estimate by OLS using the variables including level of education(introducing the dummy variables), experience, gender and their interaction
Model 18	Arab Estimate by OLS using the variables including level of education(introducing the dummy variables), experience, gender and their interaction

Table 10
Effect of Level of Education on the Employees' income in different groups

Variables	Mod14 (Overall, N=3973)		Mod15 (Male, N=2343)		Mod16 (Female, N=1630)		Mod17 (Jewish, N=2960)		Model18 (Arab, N=1013)	
	Unstan-dardized	Stand-ardized	Unstand-ardized	Stand ar-dized	Unstand-ardized	Stand ar-dized	Unstand-ardized	Stand ar-dized	Unstand-ardized	Stand ar-dized
Lower secondary	.343*** (.071)	.129	.332*** (.086)	.126	.410*** (.129)	.183	.316*** (.085)	.115	.340*** (.118)	.242
Upper secondary	.713*** (.085)	.351	.657*** (.104)	.306	.900*** (.155)	.567	.712*** (.098)	.349	.575*** (.177)	.424
Graduate	1.48*** (.102)	.769	1.39*** (.127)	.702	1.77*** (.188)	1.157	1.47*** (.116)	.770	1.41*** (.254)	.947
Post-graduate	2.16*** (.126)	1.096	2.01*** (.157)	1.026	2.69*** (.245)	1.622	2.18*** (.143)	1.113	1.84*** (.377)	1.208
exp	.032*** (.006)	.455	.050*** (.007)	.693	.004 (.009)	.071	.033*** (.007)	.459	.012 (.011)	.252
Exp Square	.000*** (.000)	-.286	.000*** (.000)	-.424	.000 (.000)	-.143	.000*** (.000)	-.294	.000 (.000)	-.128
gender	-.153* (.061)	-.086	--	--	--	--	-.187 (.080)	-.105	-.184 (.132)	-.146

Ethnic identity	-.242*** (.070)	-.086	-.230 (.108)	-.090	-.246 (.186)	-.083	--	--	--	--
Edu *Ethnic Identity	-.013 (.006)	-.095	-.019 (.010)	-.133	-.003 (.013)	-.025	-.018 (.012)	-.102	-.026** (.013)	-.589
Edu *Exp	.000 (.000)	-.054	.000 (.000)	-.143	.001 (.000)	.167	.000 (.000)	-.056	.001 (.001)	.175
Edu* Gender	-.003*** (.004)	-.390	-.010 (.015)	-.061	-.065*** (.010)	-.899	-.032*** (.005)	-.356	-.015 (.010)	-.297
Constant	11.289*** (.121)	--	10.845*** (.219)	--	11.599*** (.303)	--	11.138*** (.172)	--	11.02*** (.209)	--
Adjusted R Square	.426	--	.415	--	.228	--	.404	--	.341	--

Notes: The dependent variable is the natural log of the individual gross annual income. Standard errors are in the parentheses, Significant at 10%*, significant at 5% **, significant at 1% ***.

Table 11 Estimation Procedure for Model 19~23

Models	Specification
Model 19	Overall Estimate by Logistic Model using the variables including level of education(introducing the dummy variables), gender ,experience, ethnicity.
Model 20	Male Estimate by Logistic Model using the variables including level of education(introducing the dummy variables), experience, ethnicity.
Model 21	Female Estimate by Logistic Model using the variables including level of education(introducing the dummy variables), experience, ethnicity.
Model 22	Jewish Estimate by Logistic Model using the variables including level of education(introducing the dummy variables), experience, gender.
Model 23	Arab Estimate by Logistic Model using the variables including level of education(introducing the dummy variables), experience, gender.

Table 12
Effect of year of Education on Unemployment Risk Incidence
(Unstandardized Coefficients , N=4448)

variables	Mod19 (Overall,N=4448)	Mod20 (Male,N=2559)	Mod21 (Female,N=1889)	Mod22 (Jewish,N=3076)	Mod23 (Arab, N=1102)
Primary	2.726***	2.483***	3.250***	2.866***	1.201**
	(15.278)	(11.973)	(25.788)	(17.564)	(3.323)
Lower Secondary	1.576***	1.399***	1.745***	1.469***	.518
	(4.833)	(4,049)	(5.725)	(4.345)	(1.687)
Upper Secondary	1.782***	1.710***	1.780***	1.705***	.669
	(5.941)	(5.528)	(5.931)	(5.500)	(1.952)
Graduate	0.487**	.102*	.701**	0.415*	-.604
	(1.628)	(1.108)	(2.016)	(1.514)	(.547)
Constant	-3.207***	-3.340***	-3.019***	-3.147***	-1.922***
-2Log Likelihood	2477.663	1217.363	1214.880	2079.025	425.545
Chi-square	301.5***	149.828	168.035	246.571	20.964

Notes: The dependent variable is the binary variable of whether has income or not. Odds ratio are in the parentheses, Significant at 10%*, significant at 5% **, significant at 1% ***.