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Gender gap in returns to schooling in Palestine

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Abstract

This study provides estimates of the private returns to schooling in Palestine utilizing eight quarterly labor force surveys for 1999 and 2001. This period was chosen to investigate the differential impact of the Israeli closure policy on Palestinian male and female workers. Although gross enrollment ratios for males and females reveal little to no difference in the primary, middle and tertiary levels of schooling, returns to schooling are significantly different. On average, females earned 14–15% less than males in 1999. The gender gap is narrowed during 2001 due to rising male unemployment in the Palestinian areas. Performing the regression for males and females separately, it is found that returns to schooling are larger for women (at least at the margin). The gap in returns to schooling was reduced in 2001; however, female returns to schooling as estimated by OLS suffer from selectivity bias which worsened during 2001. The work in Israel premium increased for women and decreased for men. Finally, Palestinian public sector employment parallels periods of restricted access to Israeli labor markets; its average wages are lower and years of schooling are higher relative to private sector employment.
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1. Introduction

Primary, secondary, and tertiary are the three stages of schooling in Palestine. Gross enrollment rates for Palestinians[1] in the three educational stages are nearly equal for males and females[2] for the year 2000.

Although the ratios drop to nearly one-fifth for the tertiary level, the combined average (for the three stages) is 73.7%. This has been partly the result of a concerted effort by the Palestinian National Authority (PNA) to encourage education. The proportion of government spending on education for 2001 was about 15%,[3] but since its establishment in 1994–1995 the PNA devoted fewer additional resources to the ministries of education and higher education compared to security and police. On per capita bases, educational spending increased from US \$49.6 in 1996 to \$ 59.8 in 2001. The economic and political conditions that Palestinians live under the Israeli occupation has made human capital investment

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[1] Residents of the West Bank and Gaza are the target population of this paper. Neuman and Ziderman (2001) study the effect of vocational education on the wages of minority groups including Palestinians living under Israel (areas taken in 1948).

[2] The Human Development Report—Palestine 2002, shows the ratios are 98% and 95.8% for primary, 61.5 and 53.7 for secondary, and 22.4 and 23.7 for higher education for females and males, respectively.

[3] Average figures (1995–1997) for Jordan, Turkey, and Israel are 19.8, 14.7, and 12.3%, respectively. See the World Bank, Human Development Report 2001.

less risky than physical capital investment since it is less likely to be confiscated or demolished.

Shortly after Israel occupied the West Bank (WB) and Gaza Strip (GS) in 1967, many Palestinians dropped out of school to work in Israel. Employment in Israel pays higher wages and requires little to no education compared to domestic employment. The vast majority of Palestinians employed in Israel are males. They work in agriculture, construction and services. The Palestinian labor markets witnessed four major shocks in the last two decades, each of which had important implications for returns to schooling. The first was an increase in the number of colleges and universities in the late 1970s and early 1980s. This led to an increase in the supply of university graduates. The first uprising (Intifada), which broke out in late 1987, resulted in a reduction in the supply of Palestinian workers to the Israeli labor market. The Oslo peace treaty (1993) resulted in the establishment of the PNA, which in turn increased the demand for educated Palestinians. Finally, the start of the second Intifada in September 2000 lead to a large drop in income coupled with a sharp increase in unemployment. In 1999, about 20–25% of the labor force were employed in Israel and the settlements. This figure dropped to 9% by the end of 2001.

Angrist (1995) uses a supply shock argument to show that private returns to education for Palestinian males witnessed a large decrease in the mid to late 1980s due to an increased supply of university graduates. In a subsequent paper, Angrist (1996) estimates the wage premium for men working in Israel to fluctuate between 0–18% for 1981–1987 and 25–35% for the 1988–1991 period, the latter period being of restricted access to the Israeli labor markets. This led the researcher to conclude that Palestinians may have monopoly power if the Israeli demand for Palestinian workers is inelastic. As for returns to schooling, it dropped from 23% to nearly 0% during the first period and rose to 4% in the second period for the group with 13–15 years of schooling. The trend is similar for the 16+ age group, although the premium is higher. In a third paper, Angrist (1997) provides a followup on Palestinian labor markets up to 1995. He found that Israeli employers have substituted Palestinians with guest workers, either due to structural changes in the Israeli economy or as a consequence of the first Intifada.[4] He also found that returns to

schooling stood at 11.3% in the GS for the group with 12–13 years of schooling in 1994, but was −4.4% in the WB for the same group.

Although these findings provide very useful insights into the dynamics of the Palestinian labor market, they suffer from a few drawbacks. The studies utilized a data set provided by the Israeli Central Bureau of Statistics (CBS) covering *males* aged 18–64 years. This excludes an important segment, namely females, whose employment is almost entirely domestic. In addition, previous studies did not focus on the Palestinian domestic labor market during periods of restricted access to Israel. An omitted variable test on a set of occupation and industry dummies was significant at very high levels, indicating that returns to schooling estimates are very sensitive to the inclusion of such variables and may have suffered from such biases.[5]

It is, therefore, important to re-estimate private returns to education in Palestine, keeping in mind that Israeli closure policies reinforce the importance of investment in education for most Palestinians. When Palestinian workers have open access to the Israeli labor market, workers with little education can earn wages that are higher than the wages of individuals with many years of schooling. During periods of political unrest, the government of Israel closes off its borders to Palestinians, and severely restricts movement between Palestinian populated areas. Therefore, it is also important to analyze the ramifications of such policies on the different participants in the local labor market. Worker profiles such as gender, refugee status, locality of residence and private–public sector employment are investigated. Daoud (2002) shows that changes in public employment seem to rise during closure periods, which seems to widen the returns to schooling gap for the two periods (open and restricted access to Israel). It must be noted, however, that the time span between the two periods is short enough to preclude major changes that are not uprising related. There are other effects, although less direct, such as out migration of many educated Palestinian returnees who chose to leave because of the unrest, a noticeable drop in construction activities, and a reduction in capital inflows from Palestinians working abroad.

The uprising is expected to affect male wages mainly through the increased labor supply in the domestic market resulting in a reduction in their wages. Female wages are affected through many avenues: first, internal closures make it difficult for domestically produced goods to reach other districts within the WB and GS, as

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[4]The term Intifada means uprising. The first uprising started in the third quarter of 1987 and continued for 3 years; it resulted in a peace treaty that did not deliver peace. As a result, the second Intifada started in September 2000 after the Israeli head of the right wing Likud party (Sharon) visited the Muslim holy Al-Qsa mosque and the Dome of the Rock; it is still continuing. All of the Palestinian cities and towns were reoccupied and Palestinians have very restricted movement between their cities not to mention to the Israeli labor markets.

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[5]Psacharopoulos and Patrinos (2002) and Becker (1964) raise this issue as adding a redundant variable instead of an omitted variable. Since higher schooling is correlated with occupation, adding the latter to the regression results in a smaller return to education.

Table 1
Sample information

Year/quarter	No. of observations	No. of households	Average household size	
			Age $\geqslant$ 15	All ages
1999/1	22,638	6719	3.37	7.43
1999/2	23,816	6990	3.4	7.49
1999/3	23,667	6970	3.4	7.55
1999/4	23,198	6843	3.39	7.58
2001/1	22,875	6561	3.48	7.66
2001/2	22,763	6576	3.46	7.58
2001/3	21,241	6130	3.46	7.62
2001/4	21,869	6313	3.46	7.61

a result many establishments had to lay off workers or reduce their wages during peak closure periods. It was much easier to find Israeli-produced goods in the Palestinian market compared to Palestinian goods. Second, many employed Palestinians had to take up residence in the locality of their workplace. This is a more difficult option for women than it is for men. And finally, the overall loss of family income may motivate some women to seek wage employment to supplement family income. Although the demand factor is expected to be stronger, the supply factor also contributes to lower female wages.

Section 2 presents the data and descriptive statistics. Section 3 discusses the theoretical framework followed by Section 4 which presents the model and estimation results. Concluding remarks are presented in Section 5.

2. Data and descriptive statistics

The Palestine Central Bureau of Statistics (PCBS) initiated its Labor Force Survey (LFS) in November 1995, and hence has produced four quarterly surveys each year.[6] Starting with the first quarter of 1999, the sampling frame is the 1997 census. The WB and GS were divided into 481 cells, which remain fixed overtime. Each cell contained 16 households. The sample is a two-stage cluster random sample, which provides short panels to monitor trends. Each round households in 50% of the enumeration areas were replaced. The same household is interviewed four times. The first and last two interviews are consecutive, but the second and third are separated by a two-quarter period. After the fourth interview, the household is permanently dropped from the sample.[7] This implies that each subsequent round contains 50%

of the first round within a year and a 50% overlap for the fourth quarter in a given year and the first quarter 1 year later. The wage data constitutes 90% of the original raw data set.[8] The first and last 5 percentile figures were left blank for wages, while the rest of the variables were preserved.

The sample at hand contains information about household members ages 15 and over. It covers two non-consecutive years; the first is 1999, which was a year of relative calm, and 2001, a year during the second Intifada. The sample statistics are provided in Tables 1 and 2. The average household size for individuals over 15 years of age is a little over 3, while it is over 7 for all ages. The average couple is in their mid-thirties.

In 1991, it is reported (Angrist (1995)) that males' average years of schooling was 8.65 years. According to the sample, average years of schooling for males are 9.3 years for 1999 and 9.47 for 2001. The figures for females are 7.68 and 7.92, respectively. The gender statistics reveal that females are only 1.6 and 1.56 years short of their male counterparts in education. Female education is 15–16% lower than male education. Their wages, however, are 24–25% less for 1999 and roughly 15% less for 2001. Fig. 1 shows the narrowing gap in the average daily wages between females and males for the two years.

It is evident from Fig. 1 that wages fell for both sexes in the year 2001, but the decline was much larger for males. Table 2 also shows that the Israeli labor market, where wages are higher, is dominated by males, thus giving rise to the wider gap in 1999. In order to make the analysis more comprehensive, this paper investigates the characteristics of the employed and the unemployed covering both sexes in the two years. The idea is to

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[6]In 1997 only three surveys were implemented, fourth quarter data is therefore not available.

[7]Please refer to www.pcbs.org for further information on sampling and methodology.

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[8]The data can only be obtained from PCBS; communications must be directed to: Palestine Central Bureau of Statistics, Publication and documentation division, Public service department, P. O. Box 1647, Ramallah —Palestine. Or e-mail DIWAN@PCBS.PNA.ORG.

Table 2
Sample labor force characteristics by gender

Variable	Sex	1999/1	1999/2	1999/3	1999/4	2001/1	2001/2	2001/3	2001/4
Labor force	M	8007	8435	8432	8099	7650	7429	6798	7244
	F	1334	1448	1530	1560	1155	1227	1050	1112
Employed	M	6842	7367	7417	7279	5343	5448	4991	5156
	F	1143	1272	1332	1403	1000	1074	904	977
Unemployed	M	1165	1068	1015	820	2307	1975	1807	2088
	F	191	176	198	157	155	153	146	135
Wage employment	M	5472	5860	5897	5719	5341	5042	3060	3082
	F	694	749	783	753	660	690	559	557
Average daily wage(NIS)[a]	M	73.2	73.6	74.8	76.1	70.4	71.3	67.9	68.1
	F	54.8	56	57.2	58.1	59.3	57.9	57.7	57.3
Average years of schooling	M	9.19	9.29	9.4	9.32	9.36	9.46	9.58	9.47
	F	7.59	7.65	7.74	7.75	7.82	7.94	8.06	7.88
Employed in Israel and Settlements	M	1783	1983	1918	1930	831	839	693	742
	F	26	39	28	34	11	18	23	16

[a]Individuals who receive their wages in Jordanian Dinars (JD) or United States Dollar (US $) were converted to New Israeli Shekel (NIS) using the relevant exchange rate.
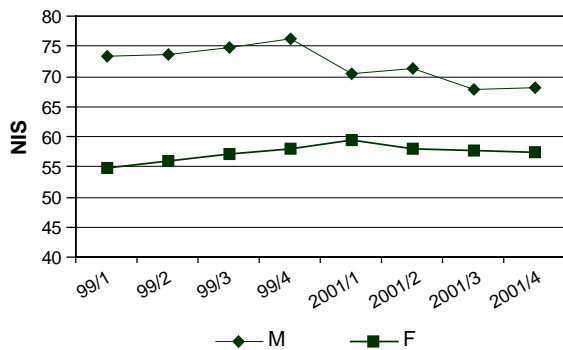

Fig. 1. Average daily wage for males and females, New Israeli Shekel (NIS).

Fig. 2. Unemployment rate by gender.

establish whether wage differences are attributable to real labor market characteristics or a reflection of the severity of self-selection for women which worsened in 2001. Unemployment figures for the two years are shown in Fig. 2.

Unemployed women are younger than employed women, and on average, they have more schooling. For example, in 2001 employed rural females had an average of 5 years of schooling less than their unemployed counterparts.[9] Unemployed men, on the other hand, are younger but they are less educated than

employed men. This is manifested in the ratio of male/female unemployment rate which was 3.5 in 2001, but 1.4 in 1999 for rural areas. Since most of Palestinian who worked in Israel came from villages and had fewer years of education, the wage gap is mostly attributable to mobility restrictions between Israel and the Palestinian labor markets. Female participation rates dropped the most in rural areas (2.8 percentage points between the two years) where the employed/unemployed schooling gap is the largest.

The data in Table 1 shows that the 2001 sample was smaller than the 1999 sample; this applies to manpower which is not expected to decline when applied to the population. The number of individuals who are 15 and over declined by roughly 4.9% for both sexes; the female labor force declined by 23% as opposed to 13% for men. As a result, participation rates experienced a larger drop for women (18.6%) compared to men (7.1%). The decline in the number of employed males (7961 workers) was offset by an increase in the number of unemployed

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[9]The average age difference is 3–4 years for men and 7–9 years for women depending on the type of locality. As for the schooling difference, it is 0–1 years for men and (−2)–(−5) years for women.
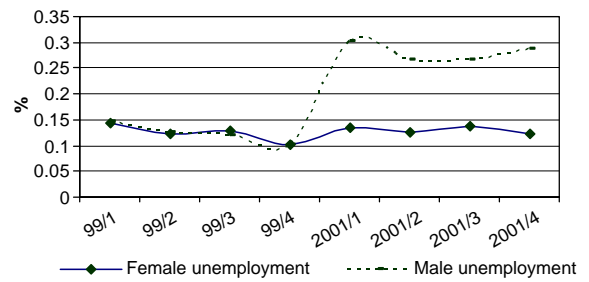
(4109) and discouraged workers (1518). The female population experienced negative change in all three categories (−1195, −133, −909, respectively). This is the reason why female unemployment did not rise so drastically (from 12.3% to 12.96%). The decline in female employment is clouded by the relative stability of their unemployment rate. Table 12 shows that more than half of the lost jobs in 2001 for men occurred in the Israeli labor market; this proportion is a mere 5% for women.

Although female unemployment fluctuated between 10 and 15% throughout, male unemployment soared to levels well over 30% since 2001. Demand shocks of this magnitude are largely responsible for private returns to schooling for Palestinians. While the average daily wage is higher for laborers employed in Israel, Palestinian employment in Israel is restricted to low-skill jobs in agriculture, construction, and manual labor in manufacturing. This has been documented in the 1980s (Kleiman, 1992) and continued to be the case in the 1990s. For the period 1996 to the beginning of the second Intifada (third quarter 2000), it is reported that the share of Palestinian employment in Israel for construction was in the range 54–58%. The share of industry declined from 20% in 1996 down to 11% in 1998 and reached 17% for the fourth quarter of 2000. Commerce, hotels and restaurants experienced a positive growth in the share of employed Palestinians and a negative growth in agriculture.[10] The distribution of Palestinian employment in Israel by schooling group (years of schooling) is provided in Fig. 3.

The proportion of each schooling category employed in Israel declined; the decline is largest (roughly 10 percentage points) for low-level education workers. The figure also shows that individuals with higher levels of education are least likely to be employed in Israel.

Returning to wage employment, it was stable around 75% in 1999. But it was remarkably volatile in 2001, initially increasing to over 91% in the first quarter, then declining to less than 60% in the forth quarter. In contrast, Angrist (1995) reports that wage earners constitute two-thirds of the labor force with participation rates ranging from 72% to 82%. The current sample shows that male Labor Force Participation Rates (LFPR) fluctuate between 64% and 70%, and is lower for the latter year. Female LFPR is much lower, ranging from 10% to 12%.

2.1. Occupation and industry distribution

Tables 3 and 4 are provided to show the effect of changes in employment distribution by industry and occupation. Employment shares of agriculture, manu-
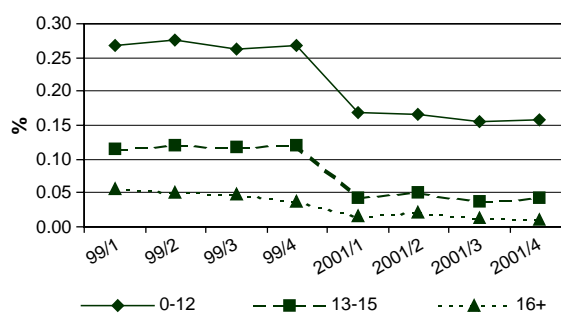

Fig. 3. Proportion of schooling group employed in Israel.

facturing and construction declined, with the biggest decline in construction between 1999 and 2001 (eight percentage points). On the other hand, services increased by seven percentage points. Wage changes were −4% to −1% except for agriculture, which fell by 8.5%. The sharp decline in agricultural wages is likely to be due to large declines in agricultural employment in Israel.[11] Employment distribution by occupation remained stable between the two years; the relative wages, however, were stable on the most part except for two categories: The first is skilled, agricultural and fishery workers whose average wage fell by 13%. The second group is the laborers in elementary occupations whose wages fell by 7% between 1999 and 2001.

2.2. Schooling, wages, and the gender gap

The schooling–wage relationship is first considered using regression with a gender dummy. The results are given in Table 5; it can be seen that that the slope coefficient is much higher for females (4.22%) than for males (0.5%). It is also evident that gender differences are statistically significant. Furthermore, when the regressions were run for males and females separately, it was found that schooling explains wages better for females. Although schooling coefficients are significant for both sexes, the standard errors of the schooling coefficient for males are much smaller; but that might be due the sample size.

Although female average years of schooling is only marginally lower than that of males, recent studies have found that expanding education for women is particularly beneficial in terms of their labor force participation. Tansel (1994) finds that a university degree increases female participation by 50% compared to 37% for males, despite the fact that returns to schooling

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[10]See Palestine Economic Policy Research Institute (MAS) (2001) for details.

[11]In 1999, the distribution of agricultural employment was 15.8% in Israel and the settlements and 84.2% domestic (Palestine), while the figures for 2001 were 13.8% and 86.2%. The share of agricultural employment fell in 2001 relative to other industries. This implies that proportionate changes in domestic agricultural employment were less than that in Israel.

Table 3
Employment and wage distribution by industry

Industry	1999		2001	
	Employment (%)	Average daily wage (NIS)	Employment (%)	Average daily wage (NIS)
Agriculture	15.48	61.84	14.94	56.70
Manufacturing	14.48	67.10	13.00	66.46
Construction	22.82	93.08	14.71	89.53
Commerce, hotels and restaurants	15.23	71.43	17.51	69.56
Transport, storage and communication	4.43	64.62	5.29	63.11
Services	27.56	61.47	34.56	61.01
Group total	100.00	72.50	100.00	67.17

Table 4
The distribution of employment and wages by occupation

Occupation	1999		2001	
	Employment (%)	Average daily wage (NIS)	Employment (%)	Average daily wage (NIS)
Legislators, senior officials and managers	4.22	90.20	3.82	90.53
Professional, technical, associates and clerks	57.66	65.56	60.14	66.03
Service, shop, and market workers	19.86	54.24	18.26	51.70
Skilled, agricultural and fishery workers	0.32	61.40	0.44	53.59
Craft and related trade workers	2.41	85.84	2.46	78.14
Plant and machine operators and assemblers	2.80	69.61	2.52	66.40
Elementary occupations	12.74	74.04	12.36	69.27
Group total	100.00	72.50	100.00	67.17

Table 5
OLS regression results, dependent variable log daily wage

Variable	1999		2001	
	Coefficient	S_e	Coefficient	S_e
Constant	4.199	0.0093	4.208	0.0111
Schooling	0.005	0.0008	0.0008	0.0009
Sex dummy (male = 0)	−0.756	0.040	−0.396	0.0414
Sex–schooling interaction	0.037	0.0028	0.0186	0.0030
R^2	0.0348[a]		0.008	
N	20,469		13,631	

Estimates were weighted by PCBS sampling weights.

[a] The weighted $R^2 = 0.95$.

were found to be smaller for women. Schultz (2002) offers three reasons why governments should invest more in the education of girls: broadening the tax base, increased health and schooling of children, and higher marginal returns to education.

A comprehensive review of returns to schooling trends (social and private) can be found in Psacharopoulos and Patrinos (2002). Europe, the Middle East and North Africa (MENA) are reported to have the lowest returns to education. Meanwhile, the average years of schooling for this region is above the world average.[12] Evidence on female returns to education from developing countries is
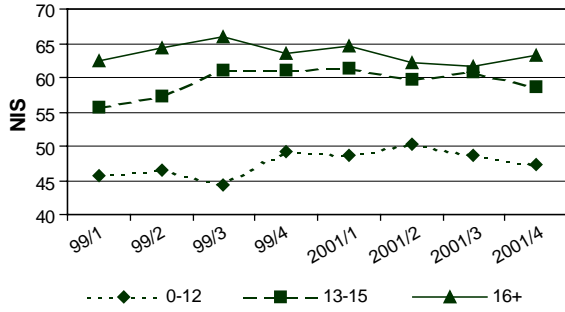
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[12] Psacharopoulos and Patrinos (2002), Table 4, p. 14.
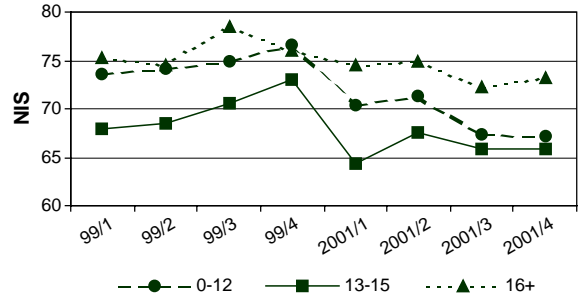
Fig. 4. Female average daily wage by schooling category.

Fig. 5. Male average daily wage by schooling category.

Fig. 6. Ratio of average daily wage for workers with 13–15 years and 0–12 years, by place of work and period.

varied. Nielsen and Westergard-Nielsen (2001) provide mixed evidence from Zambia. The return to urban females' primary education is not significant, but that of males is 2.6%. On the other hand, the return to secondary education is higher for females. In rural areas the return is higher for primary school and insignificant for secondary school. Cameron, Malcolm, Dowling, and Worswick (2001) focus on the increased probability of female labor force participation due to education, showing mixed evidence for five Asian countries. For the Palestinian labor market, Daoud (1999) found that schooling is not significant in increasing participation, but returns to education are around 6% and are significant in the wage equation.

Fig. 4 shows average daily wage for females by schooling category. Wages for females with 0–12 years of schooling (a maximum of high school diploma) are the lowest among the three groups. On average, female college graduates earn 30–35% more than high school graduates.

The least educated male group shows high volatility for average daily wage. Their wages start off nearly equal to college graduates (when the Israeli labor market was open), and they end up closer to the group with 13–15 years of schooling (when their access to the Israeli labor market was restricted) (Fig. 5).

Although the daily wage experienced a sharp drop during the year 2001 for the 13–15 years of education, the gap with the 16+ group grew from a mere 4% in the fourth quarter of 1999 to nearly 20% in the fourth quarter of 2001. The supply shock of uneducated labor seems to have adverse effects on semi-skilled workers during 2001. Wages fell on average, but more so for unskilled male workers. Contrary to their male counterparts, female workers with 0–12 years of schooling experienced some growth of their wages during the 1999–2001 period. This indicates that female workers are not as adversely influenced by Israeli closure policies.

Palestinian males with 13–15 years of schooling have a higher relative wage when employed domestically. Fig. 6 shows that the wage ratio is lower for workers in the Israeli labor market.
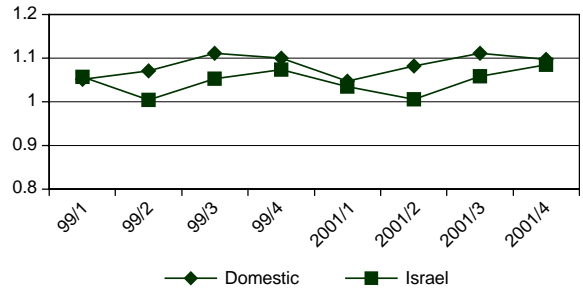
3. Theoretical framework

The model of labor markets with two skilled groups by Altonji and Card (1991) was adopted by Angrist (1996). In this model, he describes the possible supply and demand shocks and their likely impact on wages for Palestinians employed domestically and in Israel. Domestic labor market outcomes (wages and employment) are affected by employment opportunities for Palestinians in Israel in two ways. First, the increased supply of Palestinian migrants in the Israeli labor market tends to lower the wages offered to them. Second, the higher income generated by employment in Israel tends to increase demand for domestic output which increases demand for labor. Based on Angrist's (1996) adaptation of the model, local wages (W_l) and wages paid to Palestinian migrants in Israel (W_m) are functions of labor supply and demand elasticities.

$$d \ln W_l = \left(\frac{1}{\eta_{ll}}\right) d \ln l_l - \left(\frac{\xi}{\eta_{ll}}\right) d \ln E - \left(\frac{\eta_{lx}}{\eta_{ll}}\right) d \ln x_l,$$

(1)

$$d \ln W_m = \left(\frac{1}{\eta_{mm}}\right) d \ln l_m - \left(\frac{\eta_{mx}}{\eta_{mm}}\right) d \ln x_m,$$

(2)

where η_{ij} is the elasticity of labor demand in location i with respect to factor price j; l_i is labor demand in location i $(i = l, m)$, E is per capita earnings $(E = W_1 L_1 + W_m L_m)$ as L_i represents per capita labor supply. Finally, ξ is the income elasticity of demand for locally produced product and x_i is the price of a composite input in market i and represents demand and supply shocks. The theory postulates that a negative supply shock would raise wages of the remaining Palestinians employed in Israel, thus potentially raising earnings if demand is inelastic. As a result, supply in the domestic market of unskilled workers tends to increase and demand may increase (if Israeli labor demand for Palestinian migrants is wage inelastic) or decrease (otherwise). The size of the work in Israel premium depends negatively on the elasticity of the Israeli demand for Palestinian workers.[13] Based on the results obtained by Angrist (1996), the elasticity of Israeli demand for Palestinian labor ranges from -1% to -2%, suggesting a negative impact on earnings. Combining the effects leads to the conclusion that the work in Israel premium may fall.

In regards to the schooling premium, it is noticed that wages for Palestinians employed in Israel is the same for skilled and unskilled workers. In the domestic market, however, wages are higher for skilled workers in comparison to unskilled workers (see Angrist, 1995). If the demand for skilled workers is insensitive to changes in unskilled workers' wages, the Intifada effect would be to increase the proportion of unskilled workers in the domestic market. This would tend to increase the skill wage differential. The income effect tends to dampen the skill wage differential. It is worth noting that the differential impact of the Intifada on men and women results mainly from this point. Unskilled female labor supply shocks resulting from the Intifada are negligible compared to men. The income effect, on the other hand, takes a more important role; thus the skill wage differential may remain constant if skilled and unskilled female labor supply functions have the same elasticity. However, the work in Israel premium is more likely to rise.

4. Estimation results

Variants of the Mincerian (Mincer, 1974) earnings function were estimated for the years 1999 and 2001 separately. Quarterly data were pooled for two reasons: the first was to check for seasonality in the data, and the second was to provide comparability bases with

previous research. The first variant is

$$\ln w_i = \beta_0 + \beta_1 S_i + \beta_2 S_i^2 + \beta_3 T_i + \beta_4 T_i^2 + \beta_5 \mathrm{TS}_i$$
$$+ \sum \delta_j Q_j + \sum \phi_t \mathrm{ID}_t + \sum \vartheta_k \mathrm{OD}_k$$
$$+ \sum \gamma_l \mathrm{SD}_l + \varepsilon_i, \tag{3}$$

where w_i is average daily wage, S_i is years of schooling, T_i is potential experience (which is age minus schooling minus age at the beginning of schooling), TS_i is the interaction term of schooling and experience, Q_j is the quarter effect dummy, ID_t is a set of industry dummies, OD_k is another set of occupation dummies, and SD_i is a set of social, employment and geographic dummies. The second variant replaces the schooling variable with schooling categories. The first category includes all of those with 0–12 years of schooling, inclusive of high school graduates. The second comprises those with 13–15 years of schooling (which covers all of those with education and/or training short of a 4-year college degree). The last category includes college graduates and above.

Eq. (3) was estimated by OLS; although OLS may suffer from heterogeneity, endogeneity, and self-selection biases the literature points to the lack of consensus whether OLS is downward or upward biased.[14] The current study finds little evidence for any biases in OLS estimates using both the household heads' education and family size as instrumental variables.[15] To correct for self-selection biases, Heckman's (1976) two-step procedure was also applied without occupation and industry dummies. The removal of the industry and occupation dummies is expected to reveal the true effect of the Intifada on returns to schooling. One of the important changes between 1999 and 2001 is the change in industrial composition of Palestinian employment resulting from lost access to certain industries.

The quadratic schooling and the interaction terms can be evaluated to show the marginal effects:

$$\frac{\partial \ln w_i}{\partial S_i} = \beta_1 + 2\beta_2 S_i + \beta_5 T_i. \tag{4}$$

The results are provided in Tables 6 and 7. Table 6 provides the estimates of the restricted and unrestricted versions of model 1 without the interaction term (TS) and assuming returns to schooling to be constant.[16] It is

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[13] The analysis excludes the negative impact of the Intifada on Israel's output. Its likely impact is to reduce demand for Palestinian (and Israeli) workers which would put a downward pressure on the work in Israel premium.

[14] See Trostel, Walker and Woolley (2002) and Neumark and Korenman (1994) for a discussion.

[15] Most variants of the model showed little difference between OLS and IV; a notable exception is when the model was estimated using S, S^2, T, T^2, TS and the rest of the regressors. The schooling coefficient became very erratic and generally overshooting the OLS estimate.

[16] The F-statistic of the restrictions implied is 59.9, which is highly significant implying that returns to schooling are not constant and that dropping these variables leads to an upward bias in OLS estimates.

Table 6
OLS estimates of the human capital model

	1999				2001			
	Coeff.	S_e	Coeff.	S_e	Coeff	S_e	Coeff.	S_e
Constant	3.7062	0.0258	3.7225	0.0319	3.7807	0.0332	3.9000	0.0417
Years of schooling	0.0275	0.0008	0.0110	0.0036	0.0257	0.0010	−0.0040	0.0044
Quadratic schooling			0.0011	0.0001			0.0014	0.0002
Potential experience	0.0206	0.0006	0.0250	0.0012	0.0149	0.0007	0.0142	0.0015
Experience square	−0.0003	0.0000	−0.0003	0.0000	−0.0002	0.0000	−0.0002	0.0000
Sch.–exper. Interaction			−0.0003	0.0001			0.0001	0.0001
Female	−0.1408	0.0077	−0.1408	0.0077	−0.1327	0.0079	−0.1305	0.0079
Professional, tech…,	−0.2666	0.0163	−0.2691	0.0164	−0.2451	0.0197	−0.2372	0.0198
Service, shop & market	−0.3728	0.0179	−0.3545	0.0183	−0.4246	0.0212	−0.3977	0.0216
Skilled, agric. & fishery	−0.4115	0.0295	−0.3913	0.0297	−0.4474	0.0396	−0.4253	0.0396
Craft & trade	−0.3316	0.0179	−0.3170	0.0182	−0.3292	0.0220	−0.3051	0.0222
Plant and machine oper.	−0.2971	0.0189	−0.2811	0.0192	−0.3184	0.0231	−0.2931	0.0233
Elementary occupations	−0.4498	0.0176	−0.4354	0.0179	−0.3879	0.0217	−0.3656	0.0219
Urban Dwellers	0.0127	0.0045	0.0137	0.0045	−0.0309	0.0055	−0.0289	0.0055
Work in Israel	0.4985	0.0053	0.5009	0.0054	0.4824	0.0071	0.4839	0.0071
Manufacturing	0.1395	0.0148	0.1475	0.0148	0.2377	0.0203	0.2425	0.0202
Construction	0.3516	0.0138	0.3566	0.0137	0.4388	0.0195	0.4431	0.0195
Commerce, hotels..	0.2128	0.0145	0.2194	0.0145	0.3196	0.0203	0.3231	0.0203
Transport, storage & com	0.1484	0.0193	0.1530	0.0193	0.1894	0.0248	0.1968	0.0248
Services	0.2254	0.0148	0.2287	0.0148	0.3005	0.0202	0.3036	0.0201
Refugees	−0.0339	0.0045	−0.0325	0.0044	−0.0403	0.0052	−0.0389	0.0052
Public sector employment	−0.2055	0.0075	−0.2069	0.0074	−0.2229	0.0080	−0.2244	0.0080
Quarter 2	−0.0035	0.0060	−0.0049	0.0060	0.0105	0.0071	0.0110	0.0071
Quarter 3	0.0304	0.0060	0.0294	0.0060	−0.0362	0.0073	−0.0353	0.0073
Quarter 4	0.0587	0.0060	0.0568	0.0060	−0.0129	0.0071	−0.0130	0.0071
Number of observations	20,469		20,469		13,631		13,631	
Adj (R^2)	0.5190		0.523		0.4680		0.4720	
AIC	0.6973		0.6916		0.6107		0.6058	

Estimates are weighted by PCBS sampling weights. Omitted categories are SD1 = 0 for male. Occupation (OD = 0) for legislators, senior officials and managers. Locality dummy (LD = 0) for residents of urban centers. Place of work dummy (PD = 0) for employment in domestic labor market. Industry dummy (ID = 0) for agriculture. Refugee status (RD = 0) for non-refugees. Government dummy (GD = 0) for private sector employment. Quarter 1 is the reference category for quarter effects. Occupation and industry categories are report in Tables 3 and 4 in the same order.

found that returns to schooling are lower than what is reported in the literature (Trostel, Walker and Woolley, 2002) for many countries. A 1-year increase in schooling increases average daily wage by 2.75% for 1999 and 2.57% for 2001. These figures are a little higher than the ones reported by Angrist (1995) for the year 1991(which was 1.7%).[17] The quadratic potential experience is negative as expected, but the coefficient estimate seems to be rather small.

The female intercept dummy shows that, on average, women earn 13–15% less than their male counterparts. It is found that industry and occupation dummies are significantly jointly different from zero, and their omission leads to increased private returns to schooling.

Occupation seems to significantly affect average earnings and lie below the reference group, which is legislators, senior officials and managers.[18] Village and camp dwellers seem to have been effected negatively by the present intifada. The locality dummy changed signs from positive to negative in 2001, suggesting that a larger proportion of village and camp workers depended on the Israeli labor market where wages are higher. This is indicated by the place of work dummy (PD) showing a 50% premium for work in Israel. Refugees earn 3–4% less than non-refugees. Angrist (1997) reports a

[17]See Angrist (1995), Table 5.

[18]The remaining occupations are professionals, technical associates and clerks; service, shop and market workers, skilled agriculture and fishery workers; craft and related trade workers; plant and machine-shop workers; and elementary occupations.

Table 7
OLS estimates of another variant of the human capital model

	1999				2001			
	Coeff.	S_e	Coeff.	S_e	Coeff	S_e	Coeff.	S_e
Constant	3.3716	0.0310	3.9636	0.0235	3.5726	0.0403	4.0111	0.0303
13–15 years of schooling			0.1060	0.0078			0.1001	0.0089
16 or more years			0.2516	0.0087			0.2091	0.0093
Potential experience			0.0201	0.0006			0.0156	0.0007
Experience square			−0.0003	0.0000			−0.0002	0.0000
Years of schooling	0.0164	0.0007			0.0168	0.0009		
Age	0.0335	0.0012			0.0215	0.0015		
Age square	−0.0003	0.0000			−0.0002	0.0000		
Female	−0.1475	0.0077	−0.1407	0.0078	−0.1358	0.0079	−0.1380	0.0080
Professional, tech…,	−0.2881	0.0163	−0.2807	0.0164	−0.2556	0.0197	−0.2413	0.0198
Service, shop & market	−0.3961	0.0179	−0.3718	0.0183	−0.4351	0.0213	−0.4132	0.0217
Skilled, agric. & fishery	−0.4297	0.0295	−0.4265	0.0298	−0.4539	0.0397	−0.4708	0.0399
Craft & trade	−0.3527	0.0179	−0.3497	0.0181	−0.3377	0.0220	−0.3381	0.0223
Plant and machine oper.	−0.3204	0.0189	−0.3068	0.0192	−0.3279	0.0231	−0.3233	0.0234
Elementary occupations	−0.4705	0.0176	−0.4770	0.0178	−0.3977	0.0217	−0.4057	0.0219
Urban Dwellers	0.0101	0.0045	0.0205	0.0045	−0.0318	0.0055	−0.0269	0.0055
Work in Israel	0.4964	0.0054	0.5067	0.0054	0.4834	0.0071	0.4803	0.0071
Manufacturing	0.1444	0.0148	0.1505	0.0149	0.2396	0.0203	0.2432	0.0204
Construction	0.3525	0.0138	0.3650	0.0139	0.4411	0.0195	0.4474	0.0196
Commerce, hotels..	0.2128	0.0145	0.2317	0.0146	0.3224	0.0203	0.3205	0.0204
Transport, storage & com	0.1432	0.0193	0.1712	0.0195	0.1887	0.0248	0.2111	0.0250
Services	0.2241	0.0148	0.2453	0.0150	0.3003	0.0202	0.3119	0.0203
Refugees	−0.0330	0.0044	−0.0295	0.0045	−0.0403	0.0053	−0.0369	0.0053
Public sector employment	−0.2055	0.0075	−0.2058	0.0075	−0.2220	0.0080	−0.2259	0.0080
Quarter 2	−0.0045	0.0060	−0.0057	0.0061	0.0105	0.0071	0.0127	0.0072
Quarter 3	0.0298	0.0060	0.0288	0.0061	−0.0355	0.0073	−0.0343	0.0074
Quarter 4	0.0580	0.0060	0.0547	0.0060	−0.0125	0.0071	−0.0100	0.0071
Number of observations	20,469		20,469		13,631		13,631	
Adj (R^2)	0.519		0.514		0.466		0.465	
AIC	0.6966		0.7139		0.6125		0.6227	

Estimates are weighted by PCBS sampling weights. Omitted categories are SD1 = 0 for male. Occupation (OD = 0) for legislators, senior officials and managers. Locality dummy (LD = 0) for residents of urban centers. Place of work dummy (PD = 0) for employment in domestic labor market. Industry dummy (ID = 0) for agriculture. Refugee status (RD = 0) for non—refugees. Government dummy (GD = 0) for private sector employment. Quarter 1 is the reference category for quarter effects. Finally the reference group for education is 0–12 years.

premium as little as −1.4% in GS and 10.7% in the WB for 1993. The trend over the 1991–1995 period was that of a shrinking refugee/non-refugee gap as reported by Angrist (1997). Government workers have a larger gap with private sector employees. In 1999, the average public sector employee earned roughly 21% less than the private sector employee; this gap widened to 22% in 2001. The model explains roughly half the variability of log wages as indicated by the adjusted R^2 measure.

Relaxing the assumption of a fixed rate of returns to schooling (adding S^2 and TS) to the regression resulted into two important findings (see Table 6). The first is that it lowered the schooling coefficient to 1.1% for 1999

and −0.4% for 2001. The standard error of the schooling coefficient was also increased substantially. The second is that the marginal effect for an additional year of schooling increases with S, which is contrary to the prevailing belief that the coefficient on S^2 is typically negative. Returns to schooling were estimated using the unrestricted model (Table 6) and evaluating the marginal effects at average years of schooling and experience as shown in Eq. (4). The results are 2.92% and 2.895% for 1999 and 2001, respectively. Once again, government employees earn 20–22% less than the rest of wage employees.

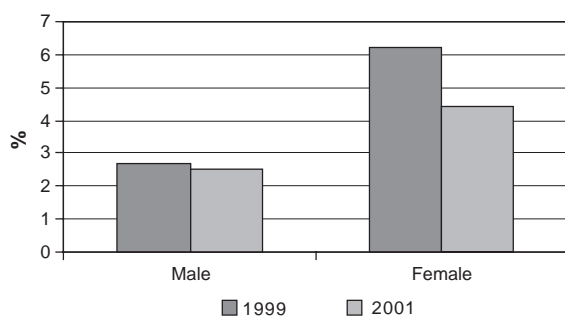Joint F-tests of linear restrictions were applied to test for the equality of schooling and potential experience

Fig. 7. Marginal returns to schooling for males and females.

coefficients.[19] The hypothesis was rejected even at the 1% level; the quadratic schooling and experience were also subjected to the same test and similar results were found. The results confirm the finding in Fig. 7 that marginal returns are higher for female workers. A t-test was also carried out for a female dummy–schooling interaction; the value for the coefficient was 0.026 for 1999 and 0.01 in 2001 with standard errors of 0.002 for both years. This leads to the conclusion that male/female differences reported in Table 8 are significant.

Table 7 provides estimates for schooling categories 13–15 years and 16 + years. In 1999, workers with 13–15 years of schooling earned 10.6% more than the basic group (0–12 years of schooling); this figure dropped to 10% in 2001. The premium is much higher for the 16 + group, which was 25% and dropped to 20% in 2001. Since lower schooling and higher wages characterize employment in Israel, one would expect that the schooling premium would fall by a bigger amount in 2001 for the 13–15 group than it would for the 16 + group. This would suggest that the schooling premium would increase during periods of restricted access to Israeli labor markets. However, a closer look at the wage employment distribution between private and public employment could explain the decline in the premium (see Table 10).

It is evident that public sector employment share increased, where the wages are lower and years of schooling are higher in relation to private sector employment. Since wages are higher in the private sector for lower average years of schooling, it would tend to reduce the schooling premium.

Tables 6 and 7 show that the gender effect dummy indicates female wages are lower than their male counterparts by 14%, and the gap narrowed to 13% during 2001. It is of interest to perform the regression

on males and females separately to compare returns to schooling for men and women. The results show that returns to schooling are higher for women (5.7% in 1999) than for men (2.57% in 1999) and the schooling premium dropped to 3.6% and 2.4% for females and males, respectively, in 2001 (these results are not reported). Table 8 reports the results of the unrestricted version (Eq. (3)) in which returns to schooling are not assumed constant and the interactive term with experience is present. Although the schooling coefficient (see Table 8) for males is larger than that of females for both years, the marginal effects show the opposite.

The marginal effects evaluated at average years of schooling and experience are provided in Fig. 7.

Although marginal returns decreased in 2001 for both sexes, female returns are higher for both years. The male/female gap has narrowed in 2001 mainly due to the larger decline in male wages. As seen in Table 8, the interaction term is also smaller for men, which would tend to increase the schooling premium for women if potential experience is included. If in fact market or private returns to schooling are higher for women, then it is socially desirable to increase family allocations for girls schooling.[20] Rosenzweig and Schultz (1982) discuss the factors affecting demand for schooling for girls and boys as a function of labor market returns, although there may be instances in which girls education could be under funded, relative to boys (see Schultz (1995) for a review). Tansel (1994) found that parent's education and permanent income have a bigger effect on girls' schooling than on boys' schooling in Turkey.

In Palestine, women's schooling is similar to men's, and they enjoy a higher return to schooling (at least at the margin), yet LFPR is significantly lower. The reason could be the social perception that men are the breadwinners, or that women place a higher value on their time at home.

Refugee status affects men more negatively than women; the results in Table 8 show that male refugees earn 22—24% less than the reference group. The figures for females are 17% less, although Table 9 shows that females with refugee status earned 3.5% more than the reference group in 1999 and 2.2% less in 2001, however insignificant. That does not necessarily imply that refugee females are more integrated in the labor market. It could merely reflect the homogeneity of female occupations which in the most part is subject to the

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[19]The tests were applied to the unrestricted version of the model in Table 6. The value of the F-statistic was in the range of 22–100 although the critical value ($F_{1,\infty} = 6.6$) is much lower.

[20]It may be argued that increasing family allocations to females' schooling is compromised by the fact that labor force participation is lower for women and their wages are lower as well. This may be the case if schooling does not increase participation, but evidence from the probit equation points that it does increase both participation and wages, thus leading to reducing the gap on both counts.

Table 8
Returns to schooling and gender differences

	1999				2001			
	Male		Female		Male		Female	
	Coeff.	S_e	Coeff.	S_e	Coeff	S_e	Coeff.	S_e
Constant	3.7207	0.0337	3.6246	0.1404	3.8883	0.0438	4.0500	0.1784
Years of schooling	0.0137	0.0038	0.0063	0.0156	0.0027	0.0046	−0.0676	0.0189
Schooling square	0.0009	0.0002	0.0019	0.0005	0.0011	0.0002	0.0035	0.0006
Potential experience	0.0262	0.0012	0.0112	0.0051	0.0177	0.0015	−0.0089	0.0055
Experience square	−0.0003	0.0000	−0.0002	0.0001	−0.0002	0.0000	0.0000	0.0001
Sch.–exper. interaction	−0.0003	0.0001	0.0004	0.0003	0.0000	0.0001	0.0012	0.0003
Professional, tech…,	−0.2848	0.0190	−0.1848	0.0319	−0.2695	0.0230	−0.1474	0.0377
Service, shop & market	−0.3638	0.0206	−0.1389	0.0508	−0.4167	0.0245	−0.3635	0.0516
Skilled, agric. & fishery	−0.4025	0.0312	−0.3481	0.1887	−0.4639	0.0411	−0.0710	0.5786
Craft & trade	−0.3262	0.0204	−0.2042	0.0591	−0.3498	0.0251	−0.0624	0.0623
Plant and machine oper.	−0.3017	0.0213	−0.1525	0.0912	−0.3361	0.0261	−0.1604	0.0818
Elementary occupations	−0.4500	0.0202	−0.2209	0.0472	−0.4025	0.0249	−0.2084	0.0530
Urban Dwellers	0.0239	0.0047	−0.0432	0.0149	−0.0202	0.0058	−0.0583	0.0160
Work in Israel	0.4956	0.0054	0.3598	0.0380	0.4694	0.0072	0.5404	0.0367
Manufacturing	0.1620	0.0150	−0.1331	0.0764	0.2544	0.0207	0.0836	0.0947
Construction	0.3566	0.0140	0.1573	0.0846	0.4402	0.0198	0.3245	0.1023
Commerce, hotels..	0.2217	0.0148	−0.0077	0.0752	0.2983	0.0208	0.5143	0.0919
Transport, storage & com	0.1571	0.0198	−0.0346	0.0841	0.1810	0.0251	0.5526	0.1315
Services	0.2371	0.0153	0.0105	0.0683	0.2976	0.0207	0.4411	0.0893
Refugees	−0.0408	0.0047	0.0370	0.0133	−0.0406	0.0056	−0.0224	0.0140
Public sector employment	−0.2207	0.0086	−0.1699	0.0146	−0.2470	0.0095	−0.1760	0.0150
Quarter 2	−0.0029	0.0063	−0.0304	0.0180	0.0184	0.0076	−0.0275	0.0186
Quarter 3	0.0304	0.0063	0.0152	0.0185	−0.0412	0.0078	−0.0207	0.0196
Quarter 4	0.0554	0.0063	0.0569	0.0181	−0.0121	0.0076	−0.0115	0.0190
Number of observations	18,366		2103		11,689		1942	
Adj (R^2)	0.529		0.348		0.488		0.316	
AIC	0.689		0.601		0.586		0.599	

Estimates are weighted by PCBS sampling weights. Omitted categories are SD1 = 0 for male. Occupation (OD = 0) for legislators, senior officials and managers. Locality dummy (LD = 0) for residents urban centers. Place of work dummy (PD = 0) for employment in domestic labor market. Industry dummy (ID = 0) for agriculture. Refugee status (RD = 0) for non-refugees. Government dummy (GD = 0) for private sector employment. Finally, quarter 1 is the reference category for quarter effects.

same pay scale. The public sector employment gap is also higher for men. On average, men in the public sector earn 22—24% less than men employed in the private sector (Table 10). Public sector employment reduces female wages by 17%. On the other hand, industry dummies are not individually significant for women.[21] The place of work dummy (PD) is of particular interest. The premium for men declined from 49.5% in 1999 to 46.9% in 2001. In contrast, female work in Israel premium increased from 35.9% to 54% in 2001.

To see the dynamics, Table 12 shows average daily wage by place of work and gender; the number

[21]This is rather an anomalous result; women tend to be concentrated in the service industry (ID6 in the table) working mostly in education, health, and financial services.

employed is also provided. A few trends can be identified. First, there has been negative employment growth in both the domestic and Israeli labor markets for both sexes. Male employment in Israel dropped 59%, the figure for females is 46.4%. Second, the relative wage of Palestinian workers employed in Israel and the settlements is greater than one for all schooling categories, but this ratio has experienced negative growth between 1999 and 2001. This implies that the gap between domestic wages and the wages paid to Palestinians employed in Israel shrunk during the Intifada. The increased supply of male labor in the domestic market would tend to lower their wages. If the closure policy (which restricts the flow of Palestinian workers to Israel) is viewed as a supply shock, then wages would tend to rise and hence the work in Israel premium would rise. To the contrary,

Table 9
Returns to schooling and the gender gap, other variants

	1999				2001			
	Male		Female		Male		Female	
	Coeff.	S_e	Coeff.	S_e	Coeff	S_e	Coeff.	S_e
Constant	3.9742	0.0256	3.7745	0.0780	4.0517	0.0332	3.5378	0.0977
13–15 years of schooling	0.0744	0.0085	0.2589	0.0215	0.0884	0.0097	0.1312	0.0229
16 or more years	0.2374	0.0096	0.3994	0.0234	0.2028	0.0103	0.2313	0.0236
Potential experience	0.0204	0.0006	0.0201	0.0016	0.0164	0.0008	0.0137	0.0020
Experience square	−0.0003	0.0000	−0.0003	0.0000	−0.0002	0.0000	−0.0002	0.0001
Professional, tech…,	−0.2943	0.0191	−0.2219	0.0313	−0.2706	0.0231	−0.1649	0.0378
Service, shop & market	−0.3803	0.0206	−0.1747	0.0507	−0.4314	0.0248	−0.3738	0.0527
Skilled, agric. & fishery	−0.4372	0.0315	−0.3819	0.1892	−0.5091	0.0415	−0.1482	0.5822
Craft & trade	−0.3558	0.0205	−0.2826	0.0585	−0.3785	0.0253	−0.0977	0.0604
Plant and machine oper.	−0.3251	0.0214	−0.1909	0.0914	−0.3622	0.0262	−0.2064	0.0814
Elementary occupations	−0.4890	0.0202	−0.3326	0.0449	−0.4404	0.0250	−0.2702	0.0519
Urban Dwellers	0.0322	0.0047	−0.0502	0.0150	−0.0167	0.0059	−0.0677	0.0161
Work in Israel	0.5022	0.0055	0.3475	0.0381	0.4669	0.0073	0.5737	0.0361
Manufacturing	0.1636	0.0152	−0.0390	0.0752	0.2529	0.0209	0.1993	0.0913
Construction	0.3630	0.0141	0.3107	0.0824	0.4418	0.0200	0.4565	0.0979
Commerce, hotels..	0.2322	0.0149	0.1059	0.0732	0.2939	0.0210	0.6548	0.0864
Transport, storage & com	0.1744	0.0200	0.0760	0.0826	0.1954	0.0254	0.6713	0.1285
Services	0.2516	0.0154	0.1180	0.0664	0.3043	0.0210	0.5593	0.0844
Refugees	−0.0377	0.0047	0.0350	0.0134	−0.0384	0.0057	−0.0226	0.0142
Public sector employment	−0.2157	0.0087	−0.1781	0.0147	−0.2466	0.0096	−0.1748	0.0152
Quarter 2	−0.0036	0.0064	−0.0311	0.0181	0.0202	0.0077	−0.0274	0.0187
Quarter 3	0.0301	0.0064	0.0170	0.0185	−0.0389	0.0079	−0.0252	0.0197
Quarter 4	0.0541	0.0064	0.0476	0.0181	−0.0090	0.0076	−0.0115	0.0191
Number of observations	18,366		2103		11,689		1942	
Adj (R^2)	0.52		0.342		0.48		0.294	
AIC	0.713		0.607		0.606		0.614	

Estimates are weighted by PCBS sampling weights. Omitted categories are SD1 = 0 for male. Occupation (OD = 0) for legislators, senior officials and managers. Locality dummy (LD = 0) for residents of urban centers. Place of work dummy (PD = 0) for employment in domestic labor market. Industry dummy (ID = 0) for agriculture. Refugee status (RD = 0) for non—refugees. Government dummy (GD = 0) for private sector employment. quarter 1 is the reference category for quarter effect, and the reference group for education is 0–12 years.

domestic male wages experienced little changes and wages in Israel declined; thus Israel's policy of substituting guest workers for Palestinians contributed to the reduction of work in Israel premium. On the other hand, growth in the female relative wage experienced negative growth at lower schooling levels and large positive growth at higher levels of education, thus leading to increased premium for employment in Israel.

The results in Table 9 show that the schooling premium for workers with 13–15 years of schooling is 7.5% for men and 25.9% for women in 1999 and 8.8% and 13.1% for men and women in 2001, respectively. The gender gap has narrowed in 2001 for this group. The same applied to the 16+ group. This indicates that the schooling premium declined much faster for women (see Figs. 4 and 5).

Finally, joint maximum likelihood estimates were obtained for the wage and participation equations to correct for self-selection problem. Heckman (1976) assumed that observation i is observed if,

$$H_i = z_i\gamma + u_{1i} > 0. \tag{5}$$

Simultaneously, the market wage equation is

$$w_{mi} = x_i\beta + \sigma u_{2i}. \tag{6}$$

The vector z_i is a set of variables affecting a female's decision to work, and x_i is a subset of z_i that determines whether H_i is observed or not. u_{1i} and u_{2i} are potentially correlated with correlation coefficient $\rho \neq 0$. σ is the standard error of the residual in the wage equation; it is used to estimate $\lambda = \sigma\rho$, the self-selection term. The results are presented in Table 11.

The estimated coefficients of Eqs. (5) and (6) indicate that the number of children less than six and household size reduce the probability of participation. Household total wage income, on the other hand, increases the probability of work for women. This result may seem counter-intuitive because if a woman has a spouse that is working, one would expect that there is a lesser need for her to work. It is also possible that females with employed spouses and potentially older sons or daughters are more likely to work because of lower appreciation for time spent at home. The effect of being a widow or divorced on the participation decision is a positive one, the probability of participation increases for those females (more so in 2001) because of the greater need to support the family, a situation which worsened during 2001. The schooling dummy coefficient is positive and significant, implying that schooling does increase participation.[22] The urban dwellers' dummy is also positive but highly insignificant. The results show that the *z-test* of $\hat{\rho} = 0$ is highly significant justifying the use of Heckman's two-stage procedure, and the self-selection term is also highly significant.

The predicted average log (daily wage) obtained from OLS (W_o) is compared to that obtained by the Heckman procedure (W_h) for both years. It is found that the values are $W_h = 3.93$ for 1999 and 3.93 for 2001.While $W_o = 3.76$ and 3.82 in the same order. This translates to an underestimate of 11–18% of average daily wage. Table 11 shows that individuals

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[22]The schooling coefficient turned out to be negative and significant when years of schooling were used instead of schooling dummies. Further investigation revealed that average years of schooling $(\bar{S})$ and participation for women were as follows:

	Schooling category						Total
	0–12		13–15		16 or over		
	$\bar{S}$	N	$\bar{S}$	N	$\bar{S}$	N	
1999							
In the labor force	6	3515	14	1333	16	1024	5872
Outside the labor force	7	37,400	14	2242	16	431	40,073
Participation rate	0.086		0.373		0.704		0.128
2001							
In the labor force	6	2441	14	984	16	1119	4544
Outside the labor force	7	36,367	14	2338	16	459	39,164
Participation rate	0.063		0.296		0.709		0.104

with 13–15 years of schooling earn 29.5% more than the basic group, the comparable figure for 1999 is 35.7% if not adjusted for self-selection. For the year 2001, the figures are 28.16% and 32.1%. This leads to the conclusion that OLS overestimates the schooling return.

5. Conclusions

This paper has analyzed the private returns to schooling for Palestinian wage earners aged 15 and over using quarterly data that was merged for two years. The choice of years was based on accessibility to the Israeli labor market. The first year, 1999, was relatively calm and a little over one-fifth of the Palestinian labor force were employed in Israel. The second year, 2001, started a few months after the second Palestinian uprising had begun. During this year the majority of one hundred and twenty thousands who were employed in Israel were barred from entering the Israeli labor market. Guest workers were brought from Korea, Turkey and Romania after the first Intifada in response to the interruption of Palestinian labor flows.

The work in Israel dummy indicated that the premium for both sexes was 50% in 1999 and declined to 48% during 2001 as shown in Tables 6 and 7; it was higher for men in 1999 (49.5% versus 35.6%), but lower in 2001 (47% versus 54%). The big increase in the work in Israel premium for women did not reverse the overall premium because female employment is very small relative to total employment in Israel (l.7% for 2001). It is noticeable that men's education does not matter to their wages when employed in Israel and the settlements. Table 12 shows that the variance of average daily wage of men across education categories is very small compared to women's. Although in 1999 average daily wage is higher for men than for women at every schooling category, it is higher for women in 2001 for both the 13–15 years of schooling and 16 or more years of schooling categories.

Returns to schooling vary depending on specification; a non-linear specification yields better fit. The marginal effect of an additional year of schooling is 2.75% and 2.57% for 1999 and 2001, respectively, if assumed constant. In the non-linear case, the marginal effects evaluated at average years of schooling and experience are 2.92% and 2.89% for both sexes in 1999 and 2001 in that order. If taken separately, females' marginal return is almost twice as large as male marginal return. Table 7 shows that schooling premium for 13–15 years of schooling is 10.6% and for the 16 or more years of schooling it is 25% for 1999. The Intifada affected the schooling premium negatively for both groups, but more so for the group with 16 or more years of schooling.

Table 10
Changes in wage employment

	Proportion of wage employment (%)[b]		Average daily wage (NIS)		Average years of schooling	
	1999	2001	1999	2001	1999	2001
Public sector	23.6	31.2	56.5	56.8	13	13
UNRWA[a]	1.3	1.1	89.9	102.7	11	12
Private—regular[c]	64.4	54.8	78	74.5	9	10
Private—irregular[c]	6.7	7.6	83.4	70.6	9	9

[a]UNRWA is United Nations Relief and Works Agency.

[b]Figures do not add up to 100% because of excluded categories.

[c]A regularly employed person is one whose employer is identifiable (has been in the same job). Irregular employment refers to employment on daily bases with different employers.

Table 11
Joint maximum likelihood estimates of the wage and participation equations for Palestinian women

	1999		2001	
	Ln(w)	Probit	Ln(w)	Probit
Constant	3.7521	−2.2136	3.7624	−2.1800
	(0.0417)	(0.0624)	(0.0361)	(0.0748)
Children less than six		−0.1599		−0.1814
		(0.0151)		(0.0177)
Household total wages		0.0038		0.0045
		(0.0002)		(0.0003)
Household size		−0.0682		−0.0953
		(0.0064)		(0.0075)
Divorced or widowed		0.4922		0.6091
		(0.078)		(0.0851)
13–15 years of schooling[a]	0.2948	1.2071	0.2816	1.1327
	(0.0214)	(0.0414)	(0.0197)	(0.0477)
16 years or more[a]	0.4324	1.4320	0.3757	1.5769
	(0.0241)	(0.0583)	(0.022)	(0.0606)
Potential experience	0.0138	0.0682	0.0147	0.0919
	(0.0019)	(0.004)	(0.0019)	(0.005)
Experience square	−0.0001	−0.0016	−0.0002	−0.0021
	(.00004)	(.0001)	(.00005)	(0.0001)
Urban dwellers	−0.0821	0.0029	−0.0645	0.0505
	(0.0136)	(0.0333)	(0.0129)	(0.0379)
Work in Israel	0.2712	2.5642	0.2649	2.3936
	(0.0417)	(0.141)	(0.0474)	(0.173)
Public employment	−0.2039	2.6198	−0.1868	2.8752
	(0.0238)	(0.0783)	(0.0202)	(0.0992)
λ	−0.0789		−0.0563	
	(0.0152)		(0.0128)	

Numbers in parenthesis are standard errors. λ is the self-selection coefficient.

[a]The corresponding least-square estimates and are 0.357 for the 13–15 years category and 0.5 for the 16+; the standard errors are .018 and 0.02 for 1999. For the year 2001, the figures are 0.32 and 0.42 with standard errors .017 and .019, respectively.

Finally, joint maximum likelihood estimates indicate that average predicted wage by OLS is smaller than the ML estimate by 11–18%. Female returns to schooling are inflated by 4–6 percentage points as a result of using OLS in comparison to Heckman procedure estimates depending on the year and the schooling category.

Table 12
Wage employment distribution by place of work, sex, and years of schooling

Years	Male							Female					
	Place of work				Group total			Place of work				Group total	
	Domestic		Israel and settlements					Domestic		Israel and settlements				
	N	NIS	N	NIS	N	NIS		N	NIS	N	NIS	N	NIS
1999													
0–3	1112	55.0	282	96.4	1394	73.1		968	37.4	23	69.2	991	49.0
4–6	3456	55.6	1515	97.3	4971	74.2		696	39.3	24	60.8	720	42.5
7–9	5173	58.5	2636	97.3	7809	76.0		705	39.7	17	69.5	722	42.3
10–12	6416	57.7	2583	99.9	8999	74.1		863	46.6	36	79.4	899	49.5
13–15	2279	62.6	427	103.6	2706	70.1		1016	58.8	13	54.2	1029	58.7
16 +	2855	74.0	171	107.1	3026	76.1		775	63.6	14	95.5	789	64.0
Total	21,291	60.9	7614	98.7	28,905	74.4		5023	55.8	127	71.7	5150	56.6
2001													
0–3	722	54.3	118	92.5	840	68.8		650	47.3	21	50.9	671	48.6
4–6	2660	58.0	558	94.6	3218	68.4		479	45.1	11	66.1	490	46.7
7–9	4274	60.3	1181	96.7	5455	72.2		500	44.3	15	79.9	515	46.4
10–12	5509	57.8	1068	99.1	6577	67.0		618	48.8	16	89.8	634	50.8
13–15	2002	63.7	126	100.5	2128	65.9		814	60.1	2	105.8	816	60.2
16 +	2672	73.2	54	111.1	2726	73.8		826	62.9	3	115.4	829	62.9
Total	17,839	62.3	3105	97.3	20,944	69.5		3887	57.7	68	72.6	3955	58.1

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