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Migrant Workers' Patterns of Self-Selection: The Case of Palestinian Workers in Israel*

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1 Introduction

The presence of migrant workers has become widespread in many developed economies, often constituting 6%-8% of the population in major Western economies. A prevalent case, though not the only one, is the case of workers from less developed economies. These typically enter low-wage/low-skill occupations, which are at the bottom of the social status ladder. Sometimes, but not always, these workers become immigrants and stay in the host country. As the gap between rich and poor economies persists and in certain cases widens, as mobility becomes easier and cheaper, and as distaste for low-skill occupations in rich economies grows, this phenomenon is likely to continue and even increase.

This paper explores the self-selection processes that take place when workers of this type choose to work in a foreign economy. It does so using data on Palestinian workers who worked in Israel and those who worked in the local economy (the West Bank of the Jordan river and the Gaza Strip). These data are taken from a quarterly Labor Force Survey, conducted by the Israeli Central Bureau of Statistics (CBS). About 30%-40% of male Palestinian workers were employed in the Israeli economy (including East Jerusalem) in the 1980s and early 1990s. Their employment bears similarity, in terms of occupation and position in the wage distribution, to the employment of Hispanic workers in the U.S. and North African workers in Western Europe.[1] The data, typically unavailable for migrant workers, are a rich source for studying key questions, such as:

(i) What determines self-selection of migrant workers? The data-set covers workers that

[1] When Palestinian work in Israel declined in the 1990s – an issue discussed below – they were replaced in the same jobs by non-Palestinian foreign workers, coming from different continents. Though many Palestinians were commuting, not migrating, to work in Israel, this substitution serves to demonstrate that they were indeed fulfilling the role of migrant workers.

remained in the home economy as well as workers that became migrant workers in Israel. Thus it offers a rare opportunity to examine observed skills, their wage return profiles and the resulting choice of work in the local or foreign economies.

(ii) What kind of selection processes take place? The econometric framework used allows for the derivation of the type of selection that takes place also in terms of unobservable skills. The paper characterizes the types of sorting that take place when workers self-select in terms of comparative and absolute advantage. This sorting affects the mean and dispersion of wages in the home and host economies.

The paper examines these issues by estimating wage equations derived from the Roy (1951) self-selection model. The Roy model is particularly well suited for this examination as it is an assignment model highlighting worker heterogeneity and individual worker optimal employment decisions. The basic idea is as follows: workers select where to work according to the principle of maximizing income. Income depends on the return to the individual's skills (both observed skills, like education or experience, and unobserved skills) and on market prices for a suitably defined labor supply aggregate. Thus individuals sort themselves into locations and therefore the data are conditioned on their selection decisions. Estimation is done using Heckman's (1979) two-step methodology to correct for sample selection bias, which is inherent in the model.

These wage regressions—for workers employed locally and in Israel–yield the following main findings: the market appears segmented. Substantially different return profiles for experience and education existed in the local economy and in the Israeli economy. While in the former they assumed a standard shape, in the latter they were low, flat and in some range even declining. This led to the self-selection of younger, less educated workers to the Israeli economy.

The paper makes several contributions:

First, it identifies the self-selection patterns of migrant workers. This identification has implications with respect to studies of low-skill immigration. The results show how self-selection affects estimates of return to experience and education, which is a major issue in these studies [see for example Borjas (1987)]. There are also policy implications, as many Western governments,

imposing selection criteria on immigration, face a self-selected labor supply.

Second, the results show the implications of self-selection for the analysis of wage inequality. In particular, there is a significant reduction in inequality due to selection.

Third, it characterizes wage determination in a developing economy, including the earnings of its migrant workers. It studies return profiles for education and experience and the ensuing sectorial selection. The paper shows that using aggregate rather than sectorial data gives a misleading characterization of skill returns. The empirical work also sheds light on the influence of unobservable skills or abilities in this context.

The paper proceeds as follows: Section 2 presents the background: stylized facts of the Palestinian economy, Palestinian workers as migrant workers, and results from previous studies. Section 3 delineates the model, including the types of self-selection processes involved. Section 4 discusses the data and the econometric methodology. Section 5 first discusses specification issues and then reports the results. Section 6 discusses the implications of the results for selection patterns and wage inequality. Section 7 concludes.

2 Background

This section provides the background for the analysis. It presents key facts about the Palestinian economy and its labor market (2.1). It then discusses the stylized facts about migrant workers in the Western world and shows how to define the work of Palestinians in Israel in this context (2.2). Finally, it reports results from previous literature pertinent to the current paper (2.3).

2.1 The Palestinian Economy and Its Labor Market

The West Bank and the Gaza Strip–the constituents of the Palestinian economy–are occupied by Israel since June 1967. In 1968 Palestinian workers started to flow to employment in Israel and the labor market turned out to be the major link between the two economies. The links between the labor markets of the two economies, and in particular the flow of migrant workers, reached

their height in the 1980s. These links underwent significant changes, and in particular a substantial decline in the flow of workers, beginning in December 1987 when a popular uprising ('intifada') broke out against the occupation. The uprising led to strikes, curfews and new security regulations such as occasional closures of the territories. In 1993, following peace negotiations, the Oslo accords were signed, offering the Palestinians autonomous control over parts of the West Bank and the Gaza Strip. In September 2000 a second uprising broke out with even greater ensuing turbulence.

In this paper we focus on data from the period of highest Palestinian labor market involvement.[2] Table 1 documents two key macroeconomic indicators of the Palestinian and Israeli economies in this period.

Table 1

The table shows that the Palestinian economy was roughly a fifth of the Israeli economy in terms of production per capita and slightly more in terms of consumption per capita, with the West Bank numbers somewhat higher than those of Gaza.

Turning to the Palestinian labor market itself, the following are its key features:

(i) Men constitute the bulk of the labor force. Participation rates for men aged 14 and above have increased from around 63% in the early 1980s to over 70% by the mid - 1990s. All the while women have had low participation rates – around 10% for women in the West Bank and around 3% for women in Gaza.

(ii) Figure 1 depicts the employment share in Israel, separately for Gaza and for the West Bank. The period covered is from 1970, soon after the Israeli and Palestinian labor markets began integrating, till the Oslo accords in 1993.

Figure 1

[2] See Arnon et al (1997) and the papers in the special feature issue of the Economic Journal (2001) for more detailed discussion.

Employment in Israel was substantial: 37% of employment for Gaza residents and 30% for West Bank residents on average in the period 1970-1993. Israeli employment peaked at 46% in 1985-1988 for Gaza residents and at 36% in 1989 for West Bank residents. In terms of absolute numbers CBS data indicate that the highest number was recorded in 1992 with almost 116,000 Palestinians working in Israel, 9% of private sector employment in Israel.

(iii) Real wages were on an upward trend from 1985 to 1988 (perhaps reflecting the rise in Israeli wages in that period) and again from 1990 to 1993, with small declines at other times. Till the end of the 1980s wages in the different locations tended to move together; in the 1990s wages in Israel increased at a much more rapid rate. Comparing average real wages across locations the following picture emerges (Zakay 1988): Palestinian workers in Israel earned roughly 40% of the average wage of Israeli salaried workers, with lows of about 34% and highs of 49% in the period 1972-1986. Compared to workers employed locally in the West Bank and Gaza there was usually a positive premium for work in Israel. The premium however declined through time since the 1968 integration, falling from over 50% in the early 1970s to about 20% in 1980 and to negative numbers (5%-10%) by 1985. Since 1986 the premium was positive again.

2.2 Palestinians as Migrant Workers

When coming to consider migrant workers in the developed economies, one sees that there are various dimensions of classification: employment by skills, legal status, planned and actual length of stay in the host economy, motivation for migration etc. The data often lump together all these categories or miss out on entire categories (such as illegal or undocumented low-skill workers). However the data do point to some clear facts and trends:

(i) The share of foreign residents in developed economies has increased in the post-war period and is significant: Stalker (1994, Table 12.1) reports that foreign resident population as a share of total population in 18 European economies has increased from 1.3% in 1950 to 4.5% in 1990. More specifically, in Germany it has increased from 1.1% to 8.2% and in France from 4.1%

to 6.4%. Borjas (1988) reports 6.2% in the U.S. in 1980-81.

(ii) Migration into the developed economies has seen a big increase in the share of migrants from developing economies: Stalker (1994, pp.171-172) reports that this share in the U.S. has increased from 12% in the period 1951-1960 to 88% in 1981-1990.

That Palestinian workers are a clear case of migrant workers in Israel is amply demonstrated by the changes that took place in the 1990s: Aggregate data show that the total share of foreign workers in private sector employment was in the range of 9%-12% throughout the decade; while in 1990 about 0.1% of this share were non-Palestinians, by 1998 they were over 8% of this share [Bank of Israel (1999)]. This substitution is evident also at the micro level: in 1992 at the peak of Palestinian employment in Israel, the Palestinians constituted 43% of employment in construction with no other migrant workers; by 1996 the Palestinian share was 12% and the non-Palestinian 26% [Amir (1999)].

2.3 Results from Previous Literature

Some findings from previous literature are pertinent to the issues examined here:

Kleiman (1992) suggested that it is mostly unskilled and inexperienced labor that tended to flow to work in Israel. A certain part of it came to specialize in work in Israel, as evidenced by relatively long employment spells. The key demographic characteristic of the workers in Israel was the young age, consistent with the idea, that it would take more mobile and less attached workers to work in more distant locations. There was also a somewhat higher proportion of singles, which fits the afore-cited idea too. Angrist (1992) estimated a multinomial logit model for the probability of working in the West Bank, Gaza, Jerusalem and Israel. His findings corroborate some of these hypotheses: highly educated (13 years and more) and older (35 years and more) are less likely to work in Israel, though the schooling effect is declining over the sample years (1981-1990).

Angrist (1996) estimated a short-run Israeli demand function for Palestinian labor, finding it relatively inelastic. Till 1990 movements along this curve can explain the fall in the daily wage

premium for working in Israel from 18% in 1981 to zero in 1984 and its subsequent rise to as high as 39% in 1989. These changes paralleled supply changes - Palestinian absences from work due to the uprising and events associated with it. In the 1990s the wage premium for working in Israel increased even further and reached levels as high as 50% - 60%. As these changes were roughly proportional to changes in days worked they were probably not the results of supply shocks.

Semyonov and Lewin-Epstein (1987) proposed the view that Palestinian workers entered occupations in Israel that were low in social status and remained there. Having low ability to negotiate employment conditions and few alternatives, they were given less desirable jobs enabling other ethnic groups to move up the occupational ladder in Israel.

3 The Model

The model used is based on the seminal work of Roy (1951) which was developed to explain occupational choice and its implications for earnings when workers differ in occupation-specific skills. The model has been formalized and applied to other labor market issues by Rosen (1978) and Willis and Rosen (1979); for a recent theoretical survey see Sattinger (1993), and for empirical implications see Heckman and Honore (1990). Extensive applications to the U.S. economy, as well as theoretical extensions, are presented in Heckman and Sedlacek (1985, 1990) whose notation is followed here. In sub-section 3.1 the model is briefly presented [for more extensive presentations see the afore-cited references]. Sub-section 3.2 examines alternative possible outcomes of the self-selection process. The next section parameterizes the model and describes the econometric methodology.

3.1 Self-Selection

There are two market sectors $i(= 1, 2)$ in which workers can work. Agents are free to enter the sector that gives them the highest income but are limited to work in only one sector at a time. Each sector requires a unique sector-specific task t_i. Each worker is endowed with a vector of skills (S) which enable him to perform sector-specific tasks. The vector S is continuously distributed with

density $g(S \mid \Theta)$ where Θ is a vector of parameters. $t_i(S)$ is a non-negative function that expresses the amount of task a worker with the given skill endowment S can perform and is continuously differentiable in S. Note that there is a distinction here between tasks, which are the object of firms' demand, and skills, which reflect the endowments of workers. Packages of skills cannot be unbundled, and different skills are used in different tasks but some skills could be equally productive in all tasks.

Aggregating the micro supply of task to sector i yields:

$$T_i = \int_{\mathsf{Z}} t_i(S) g(S \mid \Theta) dS \tag{1}$$

The output of sector i is given by:

$$Y_i = F^i(T_i, \mathsf{A}_i) \tag{2}$$

where A is a vector of non-labor inputs. The production function F is assumed to be twice continuously differentiable and strictly concave in all its arguments. For a given output price P_i, the equilibrium price of task i equals the value of the marginal product of a unit of the task in sector i. This task price will be denoted by π_i and is assumed independent of the skill distribution:

$$\pi_i = P_i \frac{\partial F^i}{\partial T_i} \tag{3}$$

An income-maximizing individual will choose the sector i that will satisfy:

$$\pi_i t_i(S) > \pi_j t_j(S) \quad i \neq j; i, j = 1, 2 \tag{4}$$

Wages in this set-up are given by:

$$\ln w_i(S) = \ln \pi_i + \ln t_i(S) \tag{5}$$

Further analysis requires the adoption of specific functional forms for the density of skills g and the function mapping skills to tasks t. Roy (1951) assumed that these are such that the

tasks are log-normal i.e. $(\ln t_1, \ln t_2)$ have a mean (μ_1, μ_2) and co-variance matrix Σ (with elements denoted by σ_{ij}) . Denoting a zero-mean, normal vector by (u_1, u_2) the workers choose between two wages:

$$\begin{aligned} \ln w_1 &= \ln \pi_1 + \mu_1 + u_1 \\ \ln w_2 &= \ln \pi_2 + \mu_2 + u_2 \end{aligned} \tag{6}$$

If for the worker $\ln w_1 > \ln w_2$ he enters sector 1. If the converse is true he enters sector 2.

With these functional specifications the proportion of workers in sector i is given by:[3]

$$\begin{aligned} pr(i) &= P(\ln w_i > \ln w_j) = \Phi(c_i) \\ i &\neq j; i, j = 1, 2 \end{aligned} \tag{7}$$

where $\Phi(\cdot)$ is the cdf of a standard normal variable and

$$\begin{aligned} c_i &= \frac{\ln \frac{\pi_i}{\pi_j} + \mu_i - \mu_j}{\sigma^*}, \; i \neq j \\ \sigma^* &= \sqrt{var(u_1 - u_2)} \end{aligned} \tag{8}$$

The proportion of workers in sector i will increase as the task price π_i in that sector gets relatively higher or as the mean of the task μ_i gets relatively bigger. In addition it depends on the variance co-variance terms in Σ via σ^*.

3.2 Patterns of Self-Selection

Post-selection the conditional mean and variance of the sectorial wage distribution can be characterized; note that these will also characterize the observed distribution if the model holds true:

[3] The following equations are based on the properties of incidentally truncated bivariate normal distributions.

$$E(\ln w_i \quad | \quad \ln w_i > \ln w_j) = \ln \pi_i + \mu_i + \frac{\sigma_{ii} - \sigma_{ij}}{\sigma^*}\lambda(c_i) \tag{9}$$

$$var(\ln w_i \quad | \quad \ln w_i > \ln w_j) = \sigma_{ii}\left[\rho_i^2[1 - c_i\lambda(c_i) - \lambda^2(c_i)] + (1 - \rho_i^2)\right] \tag{10}$$

$$i \neq j; i, j = 1, 2$$

where:

$$\begin{aligned} \rho_i &= correl(u_i, u_i - u_j),\ i \neq j; i, j = 1, 2 \\ \lambda(c_i) &= \frac{\phi(c_i)}{\Phi(c_i)} \end{aligned}$$

with $\phi(\cdot)$ denoting the density of a standard normal variable. The term $\lambda(c)$, denoted the inverse of "Mill's ratio" or the hazard rate in reliability theory, has the following properties, with sub-scripts denoting partial derivatives:

$$\begin{aligned} \lambda(c) &\geq 0 \\ \lambda_c &< 0 \quad \lambda_{cc} > 0 \\ \lim_{c\to\infty} \lambda(c) &= 0 \quad \lim_{c\to-\infty} \lambda(c) = \infty \end{aligned}$$

This set-up provides for a rich set of outcomes. The focus here is on issues that will be relevant to the empirical work below. The discussion which follows refers to equations (9)-(10) i.e. to the two moments of the log-normal wage distribution.

3.2.1 Mean Wages

Equation (9) shows that the post-selection mean wage differs from the unconditional mean by the term $\frac{\sigma_{ii}-\sigma_{ij}}{\sigma^*}\lambda(c_i)$. This term has two elements: (i) Selectivity as expressed by $\lambda(c_i)$. As task prices and task means change, and as σ^* changes, the proportion of workers choosing the sector changes

according to equation (7). Note that if all workers choose sector i, then $\lambda(c_i) = 0$ and so the task mean becomes $\ln \pi_i + \mu_i$. (ii) The relation between the variance of the sectorial distribution and the co-variance with the other sector, which is reflected in the term $\frac{\sigma_{ii}-\sigma_{ij}}{\sigma^*}$.

As mean skills in one sector μ_i rise relative to the other μ_j or as task prices in one sector π_i rise relative to task prices in the other sector π_j the proportion of workers in sector i rises (see equation 7). What is the change in quality of workers in sector i? This is given by the change in the difference between the conditional and unconditional mean:

$$E(\ln w_i \mid \ln w_i > \ln w_j) - E(\ln w_i) = \frac{\sigma_{ii} - \sigma_{ij}}{\sigma^*}\lambda(c_i) \tag{11}$$

As c rises λ falls. If $\sigma_{ii} - \sigma_{ij} > 0$ then this difference falls; quality, which is higher than in the case of random assignment, declines; if $\sigma_{ii} - \sigma_{ij} < 0$ quality, which is lower than in the random assignment case, increases.

The selection bias in estimation is related to these outcomes; we return to this issue below.

3.2.2 Wage Variance and Sorting Patterns

Regarding the variance, note from equation (10), that the sectorial variance observed is smaller than the population variance of the relevant log task, as the term $[1 - c_i\lambda(c_i) - \lambda^2(c_i)]$ is less than or equal to 1. Generally, sectorial variances decrease with increased selection. Suppose for example that $\rho_i \neq 0$ for each sector and $\frac{\pi_1}{\pi_2}$ increases, so people move from sector 2 to 1. Thus selection increases in Sector 2 and declines in Section 1. In this case c_1 increases and c_2 declines; with $\lambda(c_i)$ being a convex, decreasing function of c_i the term $[1 - c_i\lambda(c_i) - \lambda^2(c_i)]$ increases for $i = 1$ and declines for $i = 2$. Thus the conditional variance increases in 1 and declines in 2. Only when $\rho_i = 0$ (which requires $\sigma_{ii} = \sigma_{ij}$) will the variance of log task i actually employed in sector i (variance of the post-selection distribution) be identical to the variance of log task i in the population.

It is possible to classify the selection outcomes in terms of the relations between the elements

of Σ: σ_{11}, σ_{22} and σ_{12} or alternatively between $\frac{\sqrt{\sigma_{22}}}{\sqrt{\sigma_{11}}}$ and $\rho_{12} = \frac{\sigma_{12}}{\sqrt{\sigma_{11}}\sqrt{\sigma_{22}}}$.[4] Assuming, without loss of generality, that $\sigma_{22} \geq \sigma_{11}$,the different outcomes depend on the relation between the ratio of the variance in each sector $\frac{\sqrt{\sigma_{22}}}{\sqrt{\sigma_{11}}}$ and the correlation between the two sectorial distributions ρ_{12}.

Three cases are possible (remarking that ρ_{12} is bounded from above by $1 \leq \frac{\sqrt{\sigma_{22}}}{\sqrt{\sigma_{11}}}$) :

(i) The correlation between the sectors is positive and relatively high, i.e. $\rho_{12} \geq \frac{\sqrt{\sigma_{11}}}{\sqrt{\sigma_{22}}}$. In this case the term $\frac{\sigma_{ii}-\sigma_{ij}}{\sigma^*}$ in equation (9) is positive for sector 2 and negative for sector 1. Thus the conditional mean in sector 2 (sector 1) is higher (lower) than the unconditional mean, $\ln \pi_i + \mu_i$ (note that $\lambda(c_i)$ is positive). Selection is positive in sector 2 and negative in sector 1. Note that the Roy model cannot have negative selection in the two sectors (as $\sigma_{11} + \sigma_{22} - 2\sigma_{12} \geq 0$). Because of the high correlation, this is a "comparative advantage" case rather than "absolute advantage:" workers who do well in a certain sector may still select the other one and workers may select a sector that they do badly in.

(ii) The correlation between the sectors is negative, i.e. $\rho_{12} < 0$. In this case the term $\frac{\sigma_{ii}-\sigma_{ij}}{\sigma^*}$ in equation (9) is positive for each sector so the conditional mean in each sector is higher than the unconditional mean. This is a case of positive selection in the two sectors or of "absolute advantage" – each sector tends to be filled with the workers that perform best in the sector.

(iii) The correlation between the sectors is positive but relatively low, i.e. $0 \leq \rho_{12} < \frac{\sqrt{\sigma_{11}}}{\sqrt{\sigma_{22}}}$. In this case too the term $\frac{\sigma_{ii}-\sigma_{ij}}{\sigma^*}$ in equation (9) is positive for both sectors, and in each sector there is positive selection, though it is once more comparative and not absolute advantage which dictates selection. Note that this case includes $\rho_{12} = 0$, i.e. the endowment of tasks are uncorrelated.

Case (i) would be more likely to occur than the other two the lower is the variance in sector

[4] Note the following definitions which will appear below:

$$\begin{aligned} \rho_1 &= \frac{\sigma_{11} - \sigma_{12}}{\sqrt{\sigma_{11}}\sigma^*} \\ \rho_2 &= \frac{\sigma_{22} - \sigma_{12}}{\sqrt{\sigma_{22}}\sigma^*} \\ \rho_{12} &= \frac{\sigma_{12}}{\sqrt{\sigma_{11}}\sqrt{\sigma_{22}}} \end{aligned}$$

1 (σ_{11}) or the higher is the co-variance between the sectors (σ_{12}).

Willis and Rosen (1979) and Willis (1986) discuss the nature of the correlation ρ_{12}. They point out that there is a difference between a one-dimensional approach, whereby skills reflect one factor such as IQ, and a multi-dimensional approach, whereby there are different abilities that have differential importance in different tasks. Examples would be strength, agility, dexterity, creativity, intelligence, visual acuity, etc. They define case (i) above as "hierarchical sorting" – those in the high-wage sector are drawn from the upper portion of the potential earnings distribution while those in the low-wage sector are drawn from the lower portion of the potential earnings distribution- and cases (ii) and (iii) as "non-hierarchical sorting."

Borjas (1987) offered a classification of these outcomes in terms of immigration selection patterns:

(i) Positive selection of immigrants – when the host economy has greater wage inequality (i.e. the higher σ_{ii}) and the inter-sector correlation (ρ_{12}) is relatively high, then the "best" persons leave the home economy and perform well in the host economy (i.e. negative selection at home and positive selection in the host economy).

(ii) Negative selection of immigrants – when the home economy has the greater wage inequality and ρ_{12} is relatively high then the immigrants come from the lower tail of the home distribution and these immigrants do not perform well in the host economy.

Both these cases correspond to the one classified as (i) above, each case defining sector 1 and sector 2 differently. The key point here is that it matters which economy has the bigger wage inequality.

(iii) Refugee sorting – the correlation is relatively low so the host economy draws below average immigrants but they do well in the (host) economy. These are cases (ii) and (iii) above with positive selection in each sector.

4 Data and Methodology

4.1 The Data

The data are taken from the Territories Labor Force Survey (TLFS) conducted by the Israeli Central Bureau of Statistics [see CBS quarterly serial on the TLFS; here the source is the 1995 issue published in early 1996 (CBS (1996))]. The TLFS was conducted regularly from August 1968, after the occupation of the West Bank and Gaza by Israel in June 1967. Following the 1993 autonomy (Oslo) accords with the Palestinian Authority, the Survey was last conducted in Gaza and Jericho in the first quarter of 1994 and in the West Bank in the third quarter of 1995. Its principles are similar to the Israeli Labor Force Survey done by the CBS, which is akin to other such surveys in the world, such as the U.S. Current Population Survey. The Survey used a 1967 CBS-conducted Census as the sampling frame, with a major update in 1987. It was conducted quarterly, using rotation groups (households were randomly divided into four groups; each group was interviewed for two consecutive quarters, excluded for two consecutive quarters and interviewed again for two consecutive quarters). Beginning mid-1974 the Survey included 6,500 households, surveyed by local Palestinian enumerators employed by the Israeli Civil Administration in the Territories. The Palestinian uprising ('intifada') caused disruptions in data collection and probably diminished data accuracy. The TLFS contains questions on demographics, schooling and labor market experience.

In this paper we use observations on men aged 18-64 from the TLFS in the years 1981 and 1987. We chose these two years for several reasons: in the 1970s when Palestinian workers started working in Israel, a large number of workers also worked in the Gulf countries which prospered with the oil price hikes of 1974 and 1979; thus the choice of foreign location included the latter countries. By the 1980s this situation had radically changed. The year 1987 was the last one before the uprising and the ensuing new security procedures affected employment patterns and disrupted data collection. Finally, between 1981 and 1987 significant changes occurred in schooling levels and in the occupational mix so as to make the data set rich enough in terms of intertemporal variation. Table 2 shows the sample sizes and descriptive statistics for key variables used in the empirical

work below.

Table 2

Several changes took place between the two cross sections: there was a rise in mean school years; a drop in the mean age, which may explain the rise in the share of single men; and a rise in rural residence (inferred from the drop in urban and refugee camp residence).

Table 3 reports the percentages of salaried workers with positive labor income (all of them men aged 18-64) working in the different sectors examined in the empirical work below: the proportions of workers in the different locations - Israel, East Jerusalem, West Bank and Gaza and the proportions of workers in the different occupation categories.

Table 3

The table shows that the fraction of Palestinians working in Israel is sizeable: 70% for Gaza residents and over 50% (counting East Jerusalem too) for West Bank residents. The Gaza numbers were stable between 1981 and 1987 while the West Bank share of employment in Israel has increased by 5 percentage points. These percentages are higher than those reported in Figure 1 as here they pertain to salaried employees with positive income only while in the figure they pertain to total employment. The table also shows that around 80% of all workers are concentrated in three occupations: about half of them are in construction and the rest are almost evenly divided between manufacturing and government. The remainder work in agriculture, commerce, or in different services (each constituting around 8%).

4.2 Econometric Methodology

The estimation of equations (6) for different sectorial divisions of the Palestinian labor market will yield estimates of all the key elements of the model, i.e. $\ln \pi_i, \mu_i$ and the elements of Σ. To do that the following procedure is used:

(i) Posit that $\ln t_i = c_i S$ where S is decomposed into measured and unmeasured variables S_o and S_u, and c_i their associated coefficients, are c_{io} and c_{iu}, respectively. Thus equations (6) become:

$$\ln w_i = \ln \pi_i + \beta_i X + u_i, \quad i = 1, 2 \tag{12}$$

where $\beta_i = c_{io}, X = S_o$ and $c_{iu} S_u = u_{i.}$

(ii) When estimating (12) correct for sample selection bias – which is inherent in the model – using the methodology proposed by Heckman (1979). In what follows we briefly present this methodology, referring the reader to the above reference for full details.

Define the variable z^* :

$$\begin{aligned} z^* &= \ln w_1 - \ln w_2 \\ &= \ln \pi_1 - \ln \pi_2 + \beta_1 X - \beta_2 X + u_1 - u_2 \end{aligned} \tag{13}$$

and the indicator variable z :

$$\begin{aligned} z &= 1 \; if \; z^* > 0 \\ z &= 0 \text{ otherwise} \end{aligned} \tag{14}$$

According to the model we shall observe $\ln w_1$ only if $z^* > 0$ i.e. when $z = 1$. Paralleling (7) we have:

$$\begin{aligned} \Pr(z &= 1) = \Phi(\ln \frac{\pi_1}{\pi_2} + \beta_1 X - \beta_2 X + u_1 - u_2) \\ \Pr(z &= 0) = 1 - \Phi(\ln \frac{\pi_1}{\pi_2} + \beta_1 X - \beta_2 X + u_1 - u_2) \end{aligned} \tag{15}$$

Based on equations (9) - (10) we know that the observed $\ln w_1$ is thus given by:

$$\ln w_1 \mid (z=1) = \ln \pi_1 + \beta_1 X + \left[\frac{\sigma_{11} - \sigma_{12}}{\sigma^*}\right] \lambda(c_1) + u_1 \tag{16}$$

This may also be written as follows:

$$\ln w_1 \mid (z=1) = \ln \pi_1 + \beta_1 X + \rho_1 \sqrt{\sigma_{11}} \lambda(c_1) + u_1 \tag{17}$$

The Heckman methodology consists of two stages: in the first stage, Probit analysis is used to estimate (15). Then an estimator for λ for each observation can be computed. In the second stage least squares is used to estimate (17) replacing λ by its estimator from the previous stage. It is also possible to obtain separate estimates for $\sqrt{\sigma_{11}}$ and ρ_1. Evidently, a similar procedure may be undertaken for sector 2.

Following Heckman (1979) one can interpret the selection bias here as an omitted variable bias. If $\lambda(c_i)$ is not included in the regression, the estimates of the vector of coefficients β_i may be biased. The intuition is as follows: not including $\lambda(c_i)$ as a regressor ignores the influence of all the variables in question on the dependent variable – which is the conditional wage – through the self-selection process. This influence comes in addition to the direct effect expressed by β_i. Thus the uncorrected OLS estimate does not take into account the co-variation between the variable x_k in question (education, for example) and the selectivity variable λ. The sign of the bias depends on the effect of x_k on selection and on the effect of selectivity on the dependent variable, i.e. on wages in this case. The following equation expresses this bias formally. For any variable x_k in X:

$$\frac{\partial E(\ln w_i \mid (z=1))}{\partial x_k} = \beta_{ik} + \left[\frac{\sigma_{ii} - \sigma_{ij}}{\sigma^*}\right] \frac{\partial \lambda}{\partial c_i} \frac{\partial c_i}{\partial x_k} \tag{18}$$

There are three components to the selectivity bias term (the second term on the RHS):

(i) $\left[\frac{\sigma_{ii}-\sigma_{ij}}{\sigma^*}\right]$ – this is the term determining the type of selection taking place (based on unobservables) as discussed above. Note that it can be negative (case i above) or positive (cases ii and iii). This term expresses the effect of selectivity on wages.

(ii) $\frac{\partial \lambda}{\partial c_i} < 0$ - this negative term expresses the relation between the selectivity regressor λ and the proportion c_i of the workers in the sector or the probability that an observation be included in the sample; as this proportion (or probability) increases, the bias diminishes.

(iii) $\frac{\partial c_i}{\partial x_k}$ – this term expresses the influence of the variable in question on selection. Note that $\Pr(z = 1) = \Phi(\sigma^* c_i)$. Thus the sign of this component is determined in the Probit analysis.

The sign of the bias depends on the type of selection process (point i) and on the direction of influence of the relevant variable on the sectorial selection (point iii). The magnitude depends on these factors as well as on the $\frac{\partial \lambda}{\partial c_i}$ term. Evidently, this magnitude will be different for different x_k depending on the third term.

5 Specification Issues and Results

In this section we use the Roy model to examine the self-selection of migrant workers. We look at two cases:

(i) West Bank residents working in Israel and East Jerusalem as one sector and working locally as the other sector.

(ii) Gaza residents working in Israel as one sector and local workers in Gaza as the other sector.

When we tried modelling all the workers in Israel as one sector and workers in all other locations combined as the other sector, the model was not supported by the data.

In what follows we discuss specification issues (5.1) and report the results for the location choice (5.2). This section presents the econometric results, leaving the analysis and interpretation to the following sections.

5.1 Specification Issues

In each case we look only at wage earners (i.e. excluding the self-employed). For the task function variables we consider TLFS variables that are likely to be indicative of skills: education, age or

experience, marital status, and residence in urban areas and in refugee camps. Education, age and experience have been often used in this context and appear to be "natural" candidates to proxy for skills. In addition, because about half the population resides in rural areas, other types of residence may also offer some indication of skills, hence the use of urban residence status (over 30% of each sample) and refugee camps residence (around 20%). Finally, marital status may affect work performance due to factors such as the availability of other sources of family income, the need to support household members, etc. We look at two specifications: in one we use dummy variables for age and education categories (reported in panel (a) of the tables below with the base group having no education and aged 18-24); in the other we use education, experience[5] and experience squared all measured in years (reported in panel (b) of the tables). The other variables are dummy variables for singles (base group is married) and residents of urban areas and refugee camps (base group is residents of rural areas). In addition we use dummy variables for the quarters, which we do not report. For the location choice we take into account the costs of commuting to Israel, i.e. the wage in Israel is $w(1-\tau)$ where τ expresses any relevant costs, assumed equal across workers. This term then becomes part of the constant of the equation. The estimated equations are thus the following specific forms of equation (16):

$$\ln w_i \quad | \quad \text{sector } i = \ln \pi_0 - \ln(1-\tau) + \beta_0 + \sum_{k=1}^{5} \beta_{1k} school_k + \sum_{l=1}^{4} \beta_{2l} age_l + \beta_3 single + \beta_4 urban + \beta_5 refugee + \sum_{m=2}^{4} \gamma_m Q_m + \left(\frac{\sigma_{ii} - \sigma_{ij}}{\sigma^*} \right) \lambda(c_i) + u_i \tag{19}$$

where i, j denote sectors, k, l denote the categories for schooling and age respectively and m denotes the quarter number. All variables are dummy variables.

[5] Experience being defined as age minus education minus 5.

$$\ln w_i \quad | \quad \text{sector } i = \ln \pi_0 - \ln(1-\tau) + \beta_0 + \beta_1 school + \beta_{21} exp + \beta_{22} exp^2 + \beta_3 single + \beta_4 urban + \beta_5 refugee + \sum_{m=2} \gamma_m Q_m + \left(\frac{\sigma_{ii} - \sigma_{ij}}{\sigma^*} \right) \lambda(c_i) + u_i \tag{20}$$

Here all the previous definitions hold true except for school and experience which are measured in years.

Some discussion of the dependent variable is warranted. We use the log of real hourly wages, defined as the nominal monthly wage divided by hours worked and deflated by the CPI.[6] The use of hourly wages is designed to avoid confounding the location choice with the choice of work time (hours or days). We find – as did Heckman and Sedlacek (1985) – that the model is rejected unless very low-wage observations are deleted. We delete observations of nominal wages which constitute the lower 1%-3% of the wage distribution in the different locations. For these observations monthly wages are so low that they are either measured with error or reflect few hours of monthly work.

5.2 Results

Tables 4 and 5 report the results of the alternative specifications, separately for the two regions. Each stage of the regression is reported – the Probit estimates and the second-stage, corrected, least squares estimates. In each table panel (a) reports the results for equation (19) and panel (b) for equation (20).

Tables 4 and 5

In general the results are similar across the two specifications and a consistent picture emerges, particularly for West Bank workers (Table 4).

[6] Real, rather than nominal, wages are used so as to compare values intertemporally. Inflation in the 1980s was particularly high, running at triple digit annual figures till mid 1985 (101.5% in 1981) and at double digit rates for the remainder of the decade (16.1% in 1987).

(iii) Single men suffer a similar negative premium in both locations.

(iv) Urban residence has a positive premium locally. In Israel it has a small negative effect or is insignificant. Note that the positive local residence premium is greater than the schooling premium in Israel.

(v) Refugee status carries a negative premium in Israel. Locally the results are mixed across specifications.

(vi) The equation's intercept - reflecting the task price, the commuting cost and the constant in the task function - is substantially higher in Israel. This reflects the afore-cited Israel premium.

The results of the Probit analysis demonstrate that all independent variables have a positive effect on the probability of local employment - education,[7] age or experience, single status, urban residence and refugee camp residence all increase the probability of choosing local employment. In other words it is the younger, less educated and less experienced workers, living in rural areas, that are more likely to be found working as foreign workers in Israel. Married men are also more likely to be doing so, perhaps because the need to support families creates the relevant incentive.

The difference in the intercept of the wage equations for Gaza and West Bank workers employed in Israel should reflect the higher commuting costs (captured by τ in equation (19)) for the former workers. This is so because distance from the Gaza strip to employment locations in Israel is greater for most workers than the distance from the West Bank. In 1981 the difference was 0.08 and in 1987 it was 0.06. Note that these costs are not absolute ones but rather the difference in commuting costs and that they are in the order of - and often greater than - the schooling or age premia.

[7] In specification (19) in 1981 for Gaza, schooling coefficients are negative rather than positive. This is so because the benchmark group is no longer zero education but rather high education - see the discussion in sub-section 4.2 above. Thus the effect of schooling on the probability of local employment is still positive.

6 Implications: Selection Patterns and Wage Inequality

In this section we examine the implications of the results reported in Tables 4 and 5. We first look at the return profiles pertaining to education and experience (6.1). We then look at the estimates of the elements of P and discuss the implications with respect to selection patterns and wage inequality (6.2).

6.1 Return Profiles

Tables 4 and 5 yield a consistent picture of the choice between local employment and employment in Israel and the schooling and age return profiles. Figure 2 illustrates this graphically by plotting the coefficients reported in the tables. The figure also includes the relevant profiles emerging from the same regressions using 1981 data.

Figure 2

While there are certain differences across equation specification [equations (19) and (20)], regions (West Bank and Gaza) and time (1981 and 1987) the following are the essential points:

(i) Locally, schooling premia rise with years of education, especially with higher education. In Israel they are much lower and essentially flat.[8] Education has higher returns in Gaza than in the West Bank.

(ii) While the age profile of earnings in Israel is initially flat and then declining, that of local workers lies above it and has the familiar humped shape.

The emerging picture is one of segmentation: while local premia for schooling and age (experience) behave "normally," employment in Israel offers low, constant - if not declining - rewards for these attributes. However, for given skills Israel offered higher wages. Less educated and less

[8] In the case of Gaza workers in 1987 they are even negative. This can be interpreted as follows: post-secondary education was negatively rewarded in Israel as it may have been taken to indicative of low levels of relevant skills in construction, agriculture and manufacturing that were the main occupations in that sector.

experienced workers therefore chose to work in Israel; those with better skills chose to work locally and were compensated for the wage differential by the local returns given to their skills.

This sorting is evident in the actual, observed locational distributions by education and age. The following table describes the distribution of work locations by education and age for the 1987 cross-section.

Table 6

The table confirms that it is indeed the less educated and younger workers who worked relatively more in Israel. Panel (a) shows the education distribution by schooling groups; panel (b) reports key moments of the education distribution. The emerging picture is that the level of education is higher in local employment: the mean and median schooling years are higher (and so is the standard deviation). Particularly striking are the results for the two extreme groups: in the higher education group (school 5) local employment is over-represented (70% local employment compared to only 30% in Israeli employment) while in the zero education group Israeli employment is over-represented (almost 70%). These numbers contrast markedly with the 40% local employment and 60% Israeli employment in total. It is true, though, that in schooling groups 3 and 4 Israeli employment is higher than average, so the above conclusion is driven by the two extreme groups. Panels (c) and (d) repeat the same exercise for age. The age of workers is higher in local employment with both panels offering a consistent picture of this difference.

The sorting that occurs here due to self-selection resembles the mechanism that has been used to explain interindustry wage differentials by Kim (1998). In his model, high-skilled workers sort themselves into the industries offering more jobs that are better matched to them, and those industries pay higher wages. Here workers with higher skills self-select into the sector that rewards these skills more.

There are several implications to these phenomena of segmentation and selection:

First, the returns to the same skills are different in different sectors. The local sector rewards education and experience more. This phenomenon can be explained by looking more closely at the

types of jobs in each sector. Table 7 shows the distribution of employment across industries and occupations, and the distribution of schooling levels for the years in question.

Table 7

Local employment has more industries that presumably require the performance of more complex tasks. In particular, government and financial services are about a third of employment in the West bank and over a half of employment in Gaza. Hence it is not surprising that these sectors offer higher rewards for education and experience. The higher returns to education in Gaza relative to the West Bank may be explained by the significantly higher share of employment in government.

Second, aggregation in these circumstances produces a misleading picture. Running regular OLS regressions for the entire Palestinian economy or for the West Bank or Gaza economies, yields a return to education in specification (20) of 1.9% in the aggregate economy, 1.8% in Gaza and 2.0% in the West Bank (in 1987). According to the selectivity corrected estimates these were 6.6% in Gaza and 4% in the West Bank locally and about zero in Israel. The return to experience is 1.2% overall, 1.2% in Gaza and 1.3% in the West Bank in the simple OLS regressions. In the corrected sectorial regressions they were 3% in Gaza and 2.7% in the West Bank locally and again about zero in the Israel sector. Though the simple OLS regressions yield similar estimates across specifications they obscure the diversity of returns. The corrected sectorial regressions yields estimates that are much higher for the local sector (with differences across regions) and much lower for the Israel sector.

6.2 Unobservables

Table 8 reports estimates that allow for the analysis of the self-selection process: the coefficient $\rho_i\sqrt{\sigma_{ii}}$ of the selectivity regressor ($\lambda(c_i)$) and estimates of the latent moments (σ_{ii}, ρ_{ij}) are reported as well as the actual standard deviation ($s.d.$)

Table 8

As discussed in sub-section 3.2. above, a key issue is the relationship between the correlation of the unobserved distributions in the two sectors (ρ_{12}) and relative wage inequality $\frac{\sqrt{\sigma_{11}}}{\sqrt{\sigma_{22}}}$. The results show that for the most part the correlation is positive but not too high (in one case it is even moderately negative) i.e. it is smaller than $\frac{\sqrt{\sigma_{11}}}{\sqrt{\sigma_{22}}}$. The relatively low correlation may be due to the fact that government employment was predominant locally and required very different skills than those needed for the occupations that dominated employment in Israel – construction, manufacturing and agriculture. Thus selection was positive in each sector.[9]

There are two implications to these results: the first pertains to the type of skills that are unobserved. The results reject a one factor model (such as IQ-ability) as the distributions are not highly correlated across sectors. As a result there is positive selection in both the local and host economies. Second, while it is not always the case that the home sector - the less developed economy – is the one with more inequality, this is the prevalent case here.

Selection induces a reduction in wage inequality as measured by the standard deviation (see the column $\frac{s.d.}{\sqrt{\sigma_{ii}}}$ in the tables). In the case of West Bank workers this reduction reaches a peak of a 12% decline relative to the latent standard deviation in the more unequal sector; in Gaza in 1987 the decline is as high as 22%.

How important is the selection bias? Figure 3 reports the schooling (panel a) and age (panel b) coefficients for the wage regressions using OLS not corrected for sample selection bias as well as the coefficients of the corrected regressions reported in Tables 4 and 5.

Figure 3

The figure reveals a substantial and systematic downward bias for the local sector and an upward bias for the Israeli sector. This is consistent with the afore-cited selection patterns. In

[9] The one exception is the estimate of the Israeli sector of Gaza workers in 1987 according to (20). This specification has a high ρ_{12} and therefore negative selection; as discussed above it stands in marked contrast to the estimate of specification (19).

terms of (18) the term $\frac{\partial c_i}{\partial x_k}$ is positive locally, negative in Israel. Thus age and education premia are overstated in the Israel sector and understated in the local sector if one does not control for selection bias. As a result the difference between the two sectors is understated in the uncorrected regressions. This is akin to the understatement of the college premium when the two sectors are college graduates and high-school graduates and when selection is positive in each sector (see Willis and Rosen (1979)).

7 Conclusions

The results indicate that the self-selection model is able to explain key location decisions in the Palestinian labor market whether to work locally or in Israel. The main results may be summarized as follows: the market shows aspects of segmentation. Local employment exhibits standard education and experience return profiles, while for employment in Israel these profiles are flat, sometimes negative, and low. Israel offered Palestinian workers low-skill jobs – mostly in construction, manufacturing and agriculture – where education and experience were almost not rewarded, but offered higher wages for given skills. Less educated and less experienced workers chose to work in Israel; those with better skills chose to work locally and were compensated for the wage differential by the local returns given to their skills. In terms of the unobserved skill distribution there was positive selection in each sector and so a reduction in observed inequality.

The broader implications of these results are as follows:

Different complexity of jobs across locations or industries leads to differential return profiles for education and experience. These may create market segmentation which dictates selection patterns. This includes the choice of workers who became migrant workers. In such a case, looking at the aggregate economy gives a misleading picture.

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Table 1

Macroeconomic Indicators

GNP per capita, 1984-5

	current dollars	% of Israeli figure
West Bank	1,215	24%
Gaza	855	17%
Israel	5,005	100%

Consumption per capita, 1986-87

	current dollars	% of Israeli figure
West Bank	1,480	32%
Gaza	1,022	22%
Israel	4,654	100%

Notes:

1. GNP per capita figures from Zakay (1988,Table 2b).

2. Consumption per capita figures from Arnon and Goetlieb (1995, Table1).

Table 2

Sample Statistics

1987

variable	
sample size	39,222
employed (out of total sample)	79%
salaried employees out of employment	64%
mean schooling years	8.3
mean age	31.7
percent single	32%
percent urban residence	31%
percent refugee camps residence	16%
Gaza employment	7%
West Bank employment	31%
Israel + East Jerusalem employment	59%

Note:

All variables - except for the first two rows - refer to salaried employees.

Table 3

Salaried Employees

a. Employment Locations

		local	**Israel**	**East Jerusalem**
West Bank residents	**1981**	47%	32%	19%
	1987	42%	38%	18%
Gaza residents	**1981**	30%	69%	0%
	1987	29%	70%	0%

b. Occupations

	1981	**1987**
construction	40%	38%
manufacturing	19%	21%
government	20%	17%
agriculture	8%	9%
commerce	5%	7%
personal services	3%	4%
transportation	4%	3%
financial services	0.4%	1%

Table 4

West Bank Workers

(a) Equation (19)

First-stage Probit

constant	-0.98 (0.06)
schooling 1	0.19 (0.06)
schooling 2	0.27 (0.05)
schooling 3	0.26 (0.06)
schooling 4	0.27 (0.05)
schooling 5	0.82 (0.06)
age 2	0.18 (0.03)
age 3	0.34 (0.04)
age 4	0.43 (0.05)
age 5	0.42 (0.06)
single	0.04 (0.03)
urban	1.09 (0.03)
refugee	0.22 (0.04)

Second-stage regression

	Local	Israel
constant	-3.47	-2.89
	(0.03)	(0.02)
schooling 1	0.12	0.01
	(0.03)	(0.02)
schooling 2	0.16	-0.01
	(0.02)	(0.02)
schooling 3	0.17	0.03
	(0.03)	(0.02)
schooling 4	0.20	0.03
	(0.02)	(0.02)
schooling 5	0.48	-0.03
	(0.03)	(0.02)
age 2	0.09	0.00
	(0.02)	(0.01)
age 3	0.20	-0.01
	(0.02)	(0.01)
age 4	0.26	-0.05
	(0.02)	(0.02)
age 5	0.19	-0.07
	(0.03)	(0.02)
single	-0.11	-0.13
	(0.02)	(0.01)
urban	0.24	-0.15
	(0.01)	(0.02)
refugee	0.02	-0.13
	(0.02)	(0.01)
n	5629	7959

(b) Equation (20)

First-stage Probit

constant	-1.58 (0.07)
schooling	0.07 (0.004)
experience	0.04 (0.004)
experience^2/100	-0.04 (0.007)
single	0.09 (0.03)
urban	1.07 (0.03)
refugee	0.23 (0.04)

Second-stage regression

	Local	Israel
constant	-3.84 (0.04)	-2.86 (0.03)
schooling	0.040 (0.001)	-0.002 (0.002)
experience	0.027 (0.002)	0.0004 (0.001)
experience^2/100	-0.034 (0.003)	-0.005 (0.002)
single	-0.06 (0.01)	-0.13 (0.01)
urban	0.23 (0.01)	-0.15 (0.02)
refugee	0.02 (0.02)	-0.13 (0.01)
n	5629	7959

Notes:

1. Sample includes all wage earners except the bottom 3.3% (wages below 0.8 NIS a month in 1981 and 200 NIS a month in 1987).

2. Israel sector refers to West Bank residents. n is the number of observations in the regression.

3. Standard errors are in parentheses.

4. Schooling groups are 1- 4 years (school 1), 5-6 years (school 2), 7-8 years (school 3), 9-12 years (school 4) and 13 and more (school 5). Base group is no schooling. Age groups are 25-34 (age 2), 35-44 (age 3), 45-54 (age 4) and 55-64 (age 5). Base group is 18-24. The regressions included dummy variables for quarters, which are not reported.

5. Probit estimates refer to the probability of choosing the local sector.

6. s.d. is actual, observed standard deviation of log hourly wages.

Table 5
Gaza Workers

(a) Equation (19)

First-stage Probit

constant	-1.67 (0.12)
schooling 1	0.57 (0.10)
schooling 2	0.39 (0.09)
schooling 3	0.39 (0.10)
schooling 4	0.40 (0.09)
schooling 5	1.49 (0.10)
age 2	0.11 (0.06)
age 3	0.46 (0.07)
age 4	0.76 (0.09)
age 5	0.97 (0.11)
single	0.15 (0.06)
urban	0.44 (0.07)
refugee	0.11 (0.07)

Second-stage regression

	Local	Israel
constant	-3.90	-2.83
	(0.08)	(0.03)
schooling 1	0.31	0.06
	(0.05)	(0.03)
schooling 2	0.28	0.08
	(0.05)	(0.03)
schooling 3	0.29	0.10
	(0.06)	(0.03)
schooling 4	0.37	0.08
	(0.05)	(0.03)
schooling 5	0.93	-0.11
	(0.05)	(0.04)
age 2	0.08	0.05
	(0.04)	(0.02)
age 3	0.24	0.01
	(0.04)	(0.02)
age 4	0.48	-0.09
	(0.05)	(0.03)
age 5	0.43	-0.12
	(0.06)	(0.04)
single	-0.07	-0.08
	(0.03)	(0.02)
urban	0.15	-0.04
	(0.04)	(0.02)
refugee	0.06	-0.10
	(0.04)	(0.02)
n	1333	3207

(b) Equation (20)

First-stage Probit

constant	-2.48 (0.13)
schooling	0.10 (0.01)
experience	0.04 (0.01)
experience^2/100	-0.02 (0.01)
single	0.26 (0.06)
urban	0.46 (0.07)
refugee	0.12 (0.07)

Second-stage regression

	Local	Israel
constant	-4.42 (0.09)	-2.80 (0.04)
schooling	0.066 (0.003)	0.007 (0.002)
experience	0.030 (0.003)	0.009 (0.002)
experience^2/100	-0.026 (0.006)	-0.017 (0.003)
single	0.01 (0.03)	-0.07 (0.02)
urban	0.18 (0.04)	0.02 (0.02)
refugee	0.09 (0.04)	-0.06 (0.02)
n	1333	3207

Notes:

1. Sample includes all wage earners excluding the bottom 1% (wages below 0.4 NIS a month in 1981 and 200 NIS a month in 1987).

2. Israel sector refers to Gaza residents. n is the number of observations in the regression.

3. Notes 3-6 from table 4 apply here, except that the base group in the Probit regression in 1981 also includes schooling 4 and schooling 5.

Table 6
Education and Age Distributions by Work Locations (1987)

a. Schooling Groups

	School 0	School 1	School 2	School 3	School 4	School 5	Total
Israel+E. Jerusalem	68%	60%	63%	65%	65%	30%	60%
West Bank and Gaza	32%	40%	37%	35%	35%	70%	40%
Total	7.8%	8.7%	20.5%	15.2%	35.0%	12.7%	19201

b. Education - Key Moments (in years)

	Israel+E.Jerusalem	West Bank and Gaza	Total
Mean	7.74	9.09	8.29
Median	8	9	8
Standard Deviation	3.88	4.60	4.24

c. Age Groups

	Age 1	Age 2	Age 3	Age 4	Age 5	Total
Israel+E.Jerusalem	67%	60%	52%	51%	57%	60%
West Bank and Gaza	33%	40%	48%	49%	43%	40%
Total	35.2%	32.7%	17.2%	9.7%	5.3%	19201

d. Age-Key Moments (in years)

	Israel+E.Jerusalem	West Bank and Gaza	Total
Mean	30.9	33.2	31.8
Median	27	31	29
Standard Deviation	11.0	11.3	11.2

Notes:

1. Sample include wage earners with wages above 200 NIS a month, with 19,201 observations.

2. In panels (a) and (c) the percentages in rows 1 and 2 refer to the number of workers within the schooling or age group. The percentages in row 3 refer to the share of the group in the total sample.

3. Schooling groups are: no schooling (school 0), 1- 4 years (school 1), 5-6 years (school 2), 7-8 years (school 3), 9-12 years (school 4) and 13 and more (school 5).

4. Age groups are 18-24 (age1), 25-34 (age 2), 35-44 (age 3), 45-54 (age 4) and 55-64 (age 5).

Table 7
Schooling, Industry and Occupation Distributions: 1981 and 1987

a. the West Bank (local)

Schooling (%)

	1981	**1987**	**change**
school 0	10.0	5.7	-4.3
school 1	13.9	8.6	-5.3
school 2	21.6	19.6	-2.0
school 3	13.1	14.9	1.8
school 4	24.0	30.3	6.3
school 5	17.4	21.0	3.6

Industries (%)

	1981	**1987**	**change**
agriculture	4.9	3.7	-1.2
manufacturing	21.5	24.4	2.9
construction	21.7	23.7	2.0
commerce	4.9	6.1	1.2
government	34.8	30.1	-4.7
transportation	8.3	6.1	-2.2
personal	3.1	4.0	0.9
finance	0.8	1.1	0.3

High-Skill Occupations (%)

	1981	**1987**	**change**
high-skill	29.3	27.5	-1.8

b. Gaza (local)

Schooling (%)

	1981	**1987**	**change**
school 0	20.4	7.7	-12.7
school 1	7.8	8.8	1.0
school 2	17.7	16.1	-1.6
school 3	8.9	7.7	-1.2
school 4	28.8	32.6	3.8
school 5	16.4	27.1	10.7

Industries (%)

	1981	**1987**	**change**
agriculture	10.6	5.9	-4.7
manufacturing	12.6	20.5	7.9
construction	16.0	12.2	-3.8
commerce	2.6	2.6	0
government	48.0	47.8	-0.2
transportation	6.7	4.1	-2.6
personal	3.0	5.9	2.9
finance	0.4	0.9	0.5

High-Skill Occupations (%)

	1981	**1987**	**change**
high-skill	34.9	39.4	4.5

c. Israel Employment:

Schooling (%)

	1981	**1987**	**change**
school 0	15.5	8.9	-6.6
school 1	14.4	8.7	-5.7
school 2	23.8	21.6	-2.2
school 3	16.0	16.5	0.5
school 4	27.4	37.7	10.3
school 5	2.8	6.5	3.7

Industries (%)

	1981	**1987**	**change**
agriculture	9.4	11.8	2.4
manufacturing	19.5	19.3	-0.2
construction	54.8	49.2	-5.6
commerce	6.1	8.8	2.7
government	6.0	6.0	0
transportation	1.6	1.5	-0.1
personal	2.5	3.2	0.7
finance	0.1	0.1	0

High-Skill Occupations (%)

	1981	**1987**	**change**
high-skill	2.0	1.6	-0.4

Notes:

1. Employment data refer to wage earners.

2. Schooling groups are: no schooling (school 0), 1- 4 years (school 1), 5-6 years (school 2), 7-8 years (school 3), 9-12 years (school 4) and 13 and more (school 5).

3. High-skill occupations include scientific, professional, managerial and administrative occupations.

Table 8: Selection estimates

a. **West Bank Workers**

I

	Local	Israel
$\rho_i\sqrt{\sigma_{ii}}$	0.32	0.20
	(0.01)	(0.02)

	$s.d.$	$\sqrt{\sigma_{ii}}$	ρ_i	$\frac{s.d.}{\sqrt{\sigma_{ii}}}$	$\frac{\sqrt{\sigma_{11}}}{\sqrt{\sigma_{22}}}$	ρ_{12}
$1 = Israel$	0.331	0.351	0.58	0.94		
$2 = WestBank$	0.359	0.414	0.78	0.87		
interaction					0.85	0.28

II

	Local	Israel
$\rho_i\sqrt{\sigma_{ii}}$	0.32	0.20
	(0.01)	(0.02)

	$s.d.$	$\sqrt{\sigma_{ii}}$	ρ_i	$\frac{s.d.}{\sqrt{\sigma_{ii}}}$	$\frac{\sqrt{\sigma_{11}}}{\sqrt{\sigma_{22}}}$	ρ_{12}
$1 = Israel$	0.331	0.351	0.58	0.94		
$2 = WestBank$	0.359	0.409	0.77	0.88		
interaction					0.86	0.30

b. Gaza Workers

I

	Local	Israel
$\rho_i\sqrt{\sigma_{ii}}$	0.43 (0.02)	0.27 (0.01)

	$s.d.$	$\sqrt{\sigma_{ii}}$	ρ_i	$\frac{s.d.}{\sqrt{\sigma_{ii}}}$	$\frac{\sqrt{\sigma_{11}}}{\sqrt{\sigma_{22}}}$	ρ_{12}
$1 = Israel$	0.313	0.354	0.76	0.88		
$2 = Gaza$	0.376	0.483	0.90	0.78		
interaction					0.73	-0.31

II

	Local	Israel
$\rho_i\sqrt{\sigma_{ii}}$	0.44 (0.02)	-0.02 (0.04)

	$s.d.$	$\sqrt{\sigma_{ii}}$	ρ_i	$\frac{s.d.}{\sqrt{\sigma_{ii}}}$	$\frac{\sqrt{\sigma_{11}}}{\sqrt{\sigma_{22}}}$	ρ_{12}
$1 = Israel$	0.313	0.301	-0.05	1.04		
$2 = Gaza$	0.376	0.487	0.89	0.77		
interaction					0.62	0.65

Figure 1: Employment Share in Israel

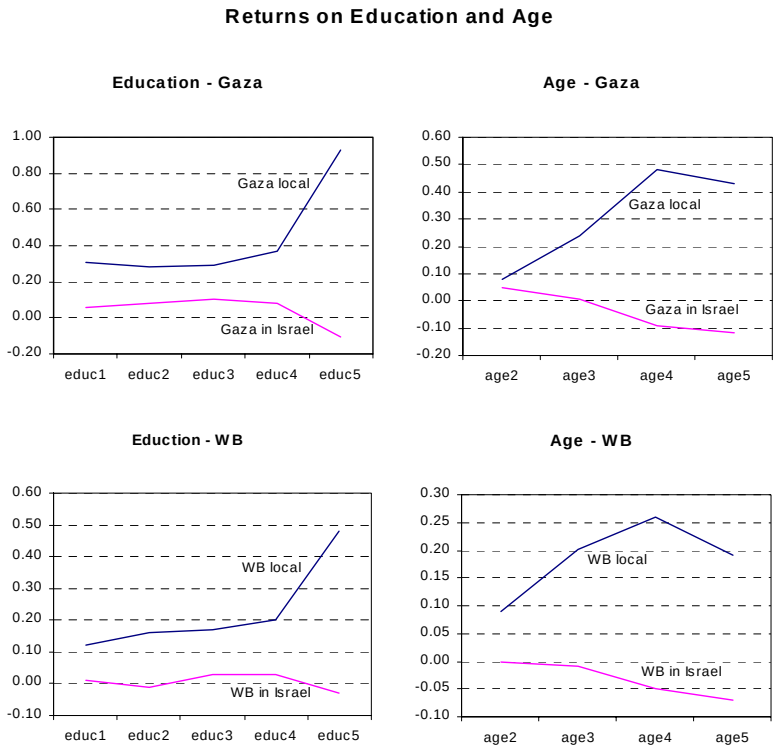

Figure 2: Return Profiles

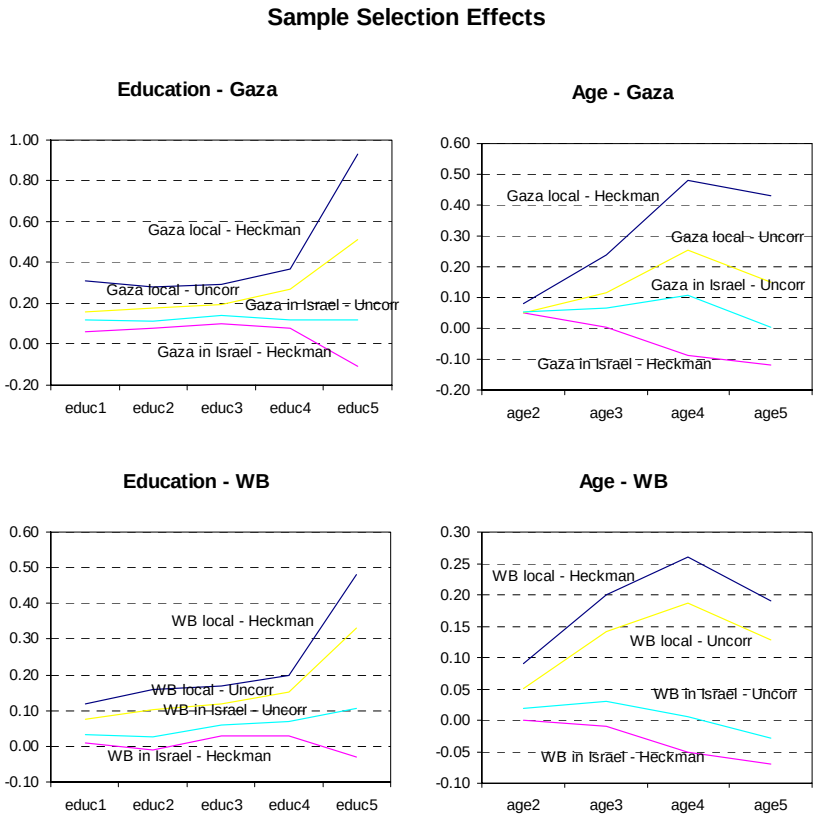

Figure 3: Selection Bias