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The Self Selection of Migrant Workers Revisited

Eran Yashiv

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Abstract
Work of low-skilled migrant workers from developing countries in developed economies is a growing phenomenon and a key political and economic issue. An extensive literature has found (for the most part) that these workers come from the lower part of the skill distribution. This paper revisits the issue, using a self-selection model, a unique data-set on migrant workers as well as on workers that chose not to migrate ('stayers'), and direct estimation of the moments of the latent unobserved skill distributions. The main findings are that there are two dimensions to self-selection: in terms of observed skills, a substantial migration premium lures migrant workers, while very low returns to skills in the foreign economy deter skilled workers, leading to negative self-selection. In terms of unobservable skills, self-selection is found to be positive rather than negative. The latter finding entails substantial increases in mean wages and reduction in wage inequality, relative to random assignment and to the alternative of not migrating. The analysis also demonstrates that estimates of skill premia for migrants — an important issue in the immigration literature — are upward biased if selection is not accounted for. Relevant skills are multi-dimensional, hence assignments in this context are non-hierarchical.

Key words: self-selection, migrant workers, skill premia, migration premium, unobservable skills, non-hierarchical sorting, wage inequality.
JEL classification: J3, J6, F2.

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Eran Yashiv is an associate of the Centre for Economic Performance, and Visiting Reader in the Economics Department, London School of Economics. Contact e-mail: e.yashiv@lse.ac.uk

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The Self Selection of Migrant Workers Revisited

1 Introduction

The flow of low-skilled migrant workers from developing economies to developed ones has become a key political and economic issue. This type of migration is a phenomenon of increasing importance in terms of magnitude[1] and has animated the political debate. A major concern in this discussion is the effect of migrants on the host economy and its workers. In this context, the identity of migrant workers is crucial. It is therefore important to determine what type of workers choose to migrate.

This paper revisits the issue of the self selection of these migrant workers. An impetus for this investigation is provided by the difficulties encountered by the extensive literature on the subject [see Borjas (1999) for a survey]. The major difficulties are, first, that data permitting direct evaluation of self-selection are often unavailable; in some of the better cases, two different data sets (such as census data) have been used to compare migrants and stayers; second, many of the empirical studies have not yielded direct estimates of the moments of the unobserved skills distributions, which are crucial for the determination of the patterns of self-selection; third, many papers do not give sufficient attention to the distinction between the role of observed skills and that of unobservable skills, which is key in interpreting the data; fourth, the differences between developed and developing economies in the jobs offered and in rewarding workers for skills are often not given due consideration. This paper attempts at addressing these difficulties. Doing so it derives new results and re-interprets existing findings. It generates a consistent picture of the (rich) patterns of migrant self-selection. In particular, it shows in what sense migrant workers are negatively selected, as found in many studies, and in what sense they are, concurrently, positively selected.

[1] Some evidence is presented below; for detailed reviews see Stalker (2000) and Zlotnik (1998).

The paper uses the Heckman and Sedlacek (1985) formulation of the Roy (1951) self-selection model. The model is particularly well suited for the current context as it highlights worker heterogeneity and individual worker optimal employment decisions. The data are quarterly labor force surveys 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). The employment of these migrant workers bears similarity, in terms of occupations and position in the wage distribution, to the employment of Hispanic workers in the U.S. and North African workers in Western Europe. These data are particularly consistent with the formulations of the theoretical model, which describes workers as choosing among occupational tasks.

The paper examines self-selection by estimating wage equations derived from the model. 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. Individuals sort themselves into the local or host economy and the data are conditioned on their selection decisions. Estimation corrects for sample selection bias, which is inherent in the model.

These wage equations – for workers employed locally and in Israel – demonstrate that self-selection needs to be understood along two dimensions. Both of these pertain to the fact that migrants come from a relatively poor economy and are offered work in specific occupational tasks in the relatively rich economy. In terms of *observables*, 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 and flat. Israel, however, lured workers by offering a migration premium. This led to the self-selection of younger, less educated workers to the Israeli economy. Hence migrants were negatively selected on education and experience. The estimates with respect to *unobservables* lead to another conclusion. They uncover moments of the latent skill distributions in the local and host economies, conditional on the afore-mentioned observed skills, that are very reasonable: unobserved skills across the two economies are negatively correlated and the home distribution is more dispersed. This structure is to be expected given that migrant work in the host economy is concentrated in low-skill occupational tasks, while in the local economy occupations are more varied and include relatively high-skilled tasks. Therefore, for reasons to be elaborated below, in terms of these conditional unobservables, migrant workers are positively selected. Quantitatively, the positive selection effects are substantial.

The paper makes a number of contributions:

First, it identifies the self-selection patterns of migrant workers. As discussed, it differentiates between selection on observables and on unobservables. The availability of relevant data on migrants and stayers and the use of selection bias correction place this analysis on more solid footing relative to the existing literature on the self-selection of migrants.

Second, the results show how self-selection affects estimates of return to experience and education, which is a major issue in studies of migration. In particular, it finds that estimates uncorrected for selection are biased. More specifically, estimates of migrant skill premia are shown to be upward biased without the selection correction.

Third, the results show the implications of sorting via self-selection for mean wages and wage inequality. In particular, we find selection to be positive and to generate a significant wage premium and a reduction in wage inequality. These results stand in contrast to prevalent claims in the immigration literature, which has emphasized negative self-selection. We are able to reinterpret findings from other studies, claiming that the empirical findings are in fact similar. This new interpretation is due to the fact that we directly estimate the relevant second moments of the latent skill distribution, which are crucial for determining self selection patterns.

Fourth, the paper lends support to the approach of Willis and Rosen (1979) whereby skills are multi-dimensional and hence lead to non-hierarchical selection of occupations. While their study pertained to college vs. high school graduates, it will be shown below that the current context bears similarity to theirs.

Fifth, it quantifies wage determination in a developing economy, including the earnings of its migrant workers. The paper uncovers an aggregation bias: using aggregate, rather than sectorial data, gives a misleading characterization of skill returns. This point may have implications for the issue of job outsourcing to other economies, which has recently aroused much interest.

The paper proceeds as follows: Section 2 presents the model and discusses the types of self-selection processes involved. In particular, it defines the role of observable skill premia and the role of the unobservable skills distributions in dictating self-selection. Section 3 presents the essential background for the empirical work – key facts on the Palestinian labor market, Palestinian workers as migrant workers, and some results from previous studies. Section 4 discusses the data, the econometric methodology, and alternative specifications. It then reports the results. The essential contributions are provided in the subsequent sections: Section 5 discusses the implications of the results for selection patterns both in terms of observables and in terms of unobservables. These include issues such as the migration premium, lack of return to observed skills, the non-hierarchical patterns of selection on unobservable skills, and wage inequality. Section 6 decomposes the wage differential between local employment and employment in Israel, highlighting the offsetting effects of the migration premium and skill premia. Section 7 concludes.

2 The Model

The model used is based on the seminal work of Roy (1951) on self-selection. The model has been formalized and applied to various labor market issues by Rosen (1978) and Willis and Rosen (1979). 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 the context of immigration, Chiswick (1999) offers a discussion of this approach within the class of the human capital models.

In sub-section 2.1 the basic model is briefly presented [for more extensive presentations see the afore-cited references]. In sub-section 2.2, alternative possible outcomes of the self-selection process are examined.

2.1 Self-Selection

There are two market sectors $i(= 1, 2)$ in which workers can work. In the current context these are the host (Israel) and source (Palestinian) economies. 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 or her 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 , though some skills could be equally productive in all tasks.

Aggregating the micro supply of task to sector i yields:

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

The output of sector i is given by:

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

where $\mathbf{A}$ 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:

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

Wages in this set-up are given by:

$$\ln w_i(S) = \ln \pi_i + \ln t_i(S) \tag{4}$$

Additionally, we postulate (to make the model consistent with the data) that the individual has travel costs to work that depend on a vector of location variables (L) and are assumed proportional to wages (representing the time price of travel):

$$\text{travel costs} = k_i(L)w_i$$

An income-maximizing individual chooses the sector i that satisfies:

$$w_i(1 - k_i(L)) > w_j(1 - k_j(L)) \tag{5}$$

Hence:

$$[\pi_i t_i(S)]\,[1-k_i(L)] > [\pi_j t_j(S)]\,[1-k_j(L)] \quad i \neq j; i,j = 1,2 \tag{6}$$

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:

$$\begin{aligned} \ln w_1 &= \ln \pi_1 + \mu_1 + u_1 \\ \ln w_2 &= \ln \pi_2 + \mu_2 + u_2 \end{aligned} \tag{7}$$

If for the worker $\ln w_1 + \ln[1-k_1(L)] > \ln w_2 + \ln[1-k_2(L)]$ he or she enters sector 1. If the converse is true he or she enters sector 2.

With these functional specifications the proportion of workers in sector i is given by:[2]

$$\begin{aligned} pr(i) &= P\left(\ln w_i + \ln[1-k_i(L)] > \ln w_j + \ln[1-k_j(L)]\right) = \Phi(c_i) \\ i &\neq j; i,j = 1,2 \end{aligned} \tag{8}$$

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

$$\begin{aligned} c_i &= \frac{\ln \frac{\pi_i}{\pi_j} + \ln \frac{[1-k_i(L)]}{[1-k_j(L)]} + \mu_i - \mu_j}{\sigma^*},\ i \neq j \\ \sigma^* &= \sqrt{var(u_i - u_j)} \end{aligned} \tag{9}$$

The proportion of workers in sector i will increase as the task price π_i in that sector gets relatively higher, as relative travel costs for the sector $k_i(L)$ decline, or as the mean of the task μ_i gets relatively bigger. In addition it depends on the variance and co-variance terms in Σ via σ^*.

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

2.2 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:

$$\begin{aligned} E\left(\ln w_i \mid \ln w_i + \ln\left[1-k_i(L)\right] > \ln w_j + \ln\left[1-k_j(L)\right]\right) &= \ln \pi_i + \mu_i + \frac{\sigma_{ii}-\sigma_{ij}}{\sigma^*}\lambda(c_i) & (10) \\ var\left(\ln w_i \mid \ln w_i + \ln\left[1-k_i(L)\right] > \ln w_j + \ln\left[1-k_j(L)\right]\right) &= \sigma_{ii}\left\{ \begin{array}{c} \rho_i^2[1-c_i\lambda(c_i)-\lambda^2(c_i)] \\ +(1-\rho_i^2) \end{array} \right\} & (11) \\ i &\neq j; i,j=1,2 \end{aligned}$$

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 (10)-(11) i.e. to the two moments of the conditional log-normal wage distribution.

2.2.1 Mean and Variance of Log Wages

Equation (10) shows that the post-selection *mean* wage differs from the unconditional mean, which obtains under random assignment. The difference is given by the term $\frac{\sigma_{ii}-\sigma_{ij}}{\sigma^*}\lambda(c_i)$. This term has two elements: (i) Selectivity as expressed by $\lambda(c_i)$. 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 σ_{ii} and the co-variance with the other sector σ_{ij}, which is reflected in the term $\frac{\sigma_{ii}-\sigma_{ij}}{\sigma^*}$.

Regarding the *variance*, note from equation (11), 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.

2.2.2 The Wage Distribution and Sorting Patterns

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 $\rho_{12} = \frac{\sigma_{12}}{\sqrt{\sigma_{11}}\sqrt{\sigma_{22}}}$.[3] Assuming, without loss of generality, that $\sigma_{22} \geq \sigma_{11}$,the different outcomes depend on the relation between the ratio of the standard deviation in each sector $\frac{\sqrt{\sigma_{11}}}{\sqrt{\sigma_{22}}}$ 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

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

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

this case the term $\frac{\sigma_{ii}-\sigma_{ij}}{\sigma^*}$ in equation (10) 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, i.e. 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 (10) 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 (10) 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.

One can interpret this set-up as follows: when the correlation ρ_{12} is negative, workers self-select in terms of absolute advantage, i.e. they go to the sector suited for their skills. When the correlation is positive, then comparative advantage applies. The latter case breaks down into two sub-cases: when the correlation is moderate, self-selection induces positive selection effects in the two sectors via worker sorting by comparative advantage. When the correlation is sufficiently high, some workers will work in a sector which is not well suited for them; hence there will be a negative selection effect for those workers.

Case (i) would be more likely to occur than the other two, the lower is the variance in sector 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." These terms relate to Roy's (1951) notion of a hierarchy of occupations that is affected by the ability variances.

Note that task prices and mean abilities operate through c and $\lambda(c)$. They do not determine the afore cited selection patterns but they do affect the magnitude of selection.

2.2.3 Sorting Patterns in Immigration

Borjas (1987) offered a classification of the afore-cited outcomes in terms of immigration selection patterns:

a. Positive selection of immigrants – when the host economy has greater wage inequality (i.e. the higher σ_{ii}) and the correlation between economies (ρ_{12}) is relatively high, then the "best" workers leave the home economy and perform well in the host economy (i.e. negative selection at home and positive selection of migrants going to the host economy).

b. 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 (i.e. positive selection at home and negative selection of migrants going to 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.

c. '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.

Borjas (1999, p. 1715) cites empirical evidence, mostly related to the U.S., in support of the negative selection case outlined above. We return to re-examine this literature after reporting and analyzing the results.

3 Background for the Empirical Analysis

This section provides a brief background for the empirical analysis which follows. It presents key facts on the Palestinian economy and its labor market (3.1), discusses the stylized facts on migrant workers in the Western world, defining the work of Palestinians in Israel in this context (3.2), and reports pertinent results from the literature (3.3).

3.1 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. There is a substantial difference in the degree of development between the economies: in the sample period, GDP per capita in the Palestinian economy was 16% of the Israeli figure. 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 share of salaried employees employed in Israel started off at 22% in 1970, climbed to around 50% three years later, and then fluctuated between 49% and 61%, till starting to fall off in the late 1980s. In the period 1970-1993 it averaged 52%.

Beginning in December 1987 these labor links underwent a series of severe shocks: at the latter date a popular uprising (the first 'intifada') broke out against the occupation, leading to strikes, curfews and new security regulations, such as occasional closures of the territories. In 1993, following peace negotiations, the Oslo accords were signed, giving 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. Consequently Palestinian employment in Israel since the end of 1987 was much more volatile and, generally, on a declining trend.

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 – 7% on average, with little variation.

In this paper we use data on male workers from 1987, a period of high Palestinian labor market involvement pre-dating the events cited above. We elaborate more on the sample period choice below.

3.2 Palestinians as Migrant Workers

In order to place the Palestinian migrant workers in broader context, it is useful to note three key facts on migrant workers in developed economies:

(i) *The share of foreign residents in developed economies has generally increased in the post-war period and in particular in the 1990s.* Zlotnik (1998, Table 1) reports that foreign-born population as a share of total population in developed countries has increased from 3.1% in 1965 to 4.5% in 1990. In Western Europe the rise in that period was from 3.6% to 6.1%; in Northern America from 6.0% to 8.6%. From 1988 to 1998 the share of foreign or foreign born population in 20 OECD economies (OECD (2001, Table 2)) has further risen from 5.7% to 6.9%.

(ii) *Migration into developed economies has seen a big increase in the share of migrants from developing economies.* Zlotnik (1998, Tables 3 and 4) reports that the share of migrants from developing economies in the total migration annual flow, going from the 1960s to the 1990s, has risen from 42% to 80% in the U.S.,[4] from 12% to 78% in Canada, from 25% to 31% in Germany, and from 46% to 79% in the Netherlands.

(iii) *The share of low-skill migrant workers in developed economies is substantial.* OECD (2003, page 45) reports that the percentage of the population with lower secondary education is typically higher among foreigners than among natives; thus, for example, it is 30.1% among foreigners in the U.S. as compared to 9.3% among natives (in 2000-2001); the numbers for France are 66.7% vs 34.9%, for Germany 48.5% vs 15.1%, and for the U.K. 30.1% vs. 18.8%.

Palestinian employment in Israel can be seen as a case of phenomena (ii) and (iii): low skill migrant workers (as shown below) from a developing economy working in a developed one. This classification is further evidenced by the substitution that took place in the course of the 1990s: in 1990, Palestinian workers constituted 8.8% of business sector employment in Israel, while only 0.1% were non-Palestinians. Since then – due to the political turbulence – the Palestinian share has fallen, reaching 1.5% in 2002; concurrently the share of non-Palestinian migrant workers, coming from Eastern Europe, East Asia and West Africa, rose, reaching 12.6% in 2002 [Bank of Israel (2003, page 141)]. The non-Palestinian workers – all of them low-skilled – entered the same

[4] Specifically in the U.S. almost 48% of immigrants came from Hispanic countries in the period 1991-1999 compared to less than 25% in 1951-1960 [see INS (1999, Table 2)].

industries in which the Palestinians had previously worked. This substitution is evident also at the micro level: in the construction sector, which a major industry for migrant workers in Israel, Palestinians constituted 43% of employment in 1992 with no other migrant workers; by 1996 the Palestinian share fell to 12% while the non-Palestinian share stood at 26% employed at the same occupations within the industry [Amir (1999)].[5]

3.3 Results from the Literature on the Palestinian Labor Market

Three findings from previous literature on the Palestinian labor market are pertinent to the issues examined here:

In a descriptive analysis, 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 these workers was the young age.

Angrist (1996) estimated a short-run Israeli demand function for Palestinian labor, finding it relatively inelastic. Till 1990 movements along this demand 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. Note that, taken together with the data on the substitution of Palestinians by non-Palestinians in the 1990s, this implies that there was inelastic demand in Israel for migrant workers in certain industries.

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 little 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.

[5] Fo r further discussion and analysis of this substitution see Friedberg and Sauer (2004). For an extensive account of migration to Israel see Cohen and Eckstein (2004).

4 Data, Methodology and Results

In this section we estimate the wage equations, corrected for self-selection, for Palestinians working in Israel and East Jerusalem as one sector and working locally (in the West Bank and Gaza) as the other sector. In what follows we discuss the data (4.1), the econometric methodology (4.2), and alternative specifications (4.3). We then report the results (4.4). The analysis and interpretation are left to the subsequent sections.

4.1 The Data

The data are taken from the Territories Labor Force Survey (TLFS) conducted by the Israeli Central Bureau of Statistics from 1968 to 1993 [see for example CBS (1996)]. Its principles are similar to the Israeli Labor Force Survey done by the CBS, which is akin to other such surveys, 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). The survey included 6,500 households in the West Bank and 2,000 in Gaza, surveyed by local Palestinian enumerators employed by the Israeli Civil Administration in the Territories. The TLFS contained questions on demographics, schooling and labor market experience.

In this paper we use observations on Palestinian men[6] aged 18-64 from the TLFS in the year 1987. This year represents the time of highest data quality (following the sample frame revision) and, as mentioned, a high share of Palestinian employment in Israel. It was the last one before the uprising and the ensuing turbulence.

Table 1 presents sample statistics for the variables used in the empirical analysis.

[6] A s mentioned, women had very low participation rates, and when working in the market economy, did so locally, not in Israel.

4.2 Econometric Methodology

Estimation of equations (7) for workers employed locally and employed in Israel 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 observed and unobserved variables S_o and S_u, and c_i their associated coefficients, are c_{io} and c_{iu}, respectively. Thus equations (7) 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), take into account sample selection – 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^* :

$$\begin{aligned} z^* &= \ln w_1 + \ln(1 - k_1(L)) - \ln w_2 - \ln(1 - k_2(L)) \\ &= \ln \pi_1 - \ln \pi_2 + \ln(1 - k_1(L)) - \ln(1 - k_2(L)) + \beta_1 X - \beta_2 X + u_1 - u_2 \end{aligned} \tag{13}$$

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 (8) we have:

$$\begin{aligned} \Pr(z &= 1) = \Phi(\ln \frac{\pi_1}{\pi_2} + \ln \frac{(1 - k_1(L))}{(1 - k_2(L))} + \beta_1 X - \beta_2 X + u_1 - u_2) \\ \Pr(z &= 0) = 1 - \Phi(\ln \frac{\pi_1}{\pi_2} + \ln \frac{(1 - k_1(L))}{(1 - k_2(L))} + \beta_1 X - \beta_2 X + u_1 - u_2) \end{aligned} \tag{15}$$

Based on equations (10) - (11) we know that the observed $\ln w_1$ is thus given by:

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

This may also be written as follows:

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

A similar equation holds true for the other sector.

We estimate the model using either Full Maximum Likelihood or the Heckman two-step procedure. Following Heckman (1979) one can interpret the selection bias in (12) as an omitted variable bias. If $\lambda \left(c_i\right)$ is not included in the equation, the estimates of the vector of coefficients β_i may be biased. The intuition is as follows: not including $\lambda \left(c_i\right)$ 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 (in one sector of case i above) or positive (the other sector of case i and in 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 by estimates of the selection equations (15).

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.

4.3 Specification

For the task function variables X we use education and experience[7] (employing for the latter a linear quadratic formulation). In addition we use indicator variables for the quarters within 1987, which we do not report. For the travel cost function k we postulate a linear function $k_i = \sum_t \theta_t \cdot l_t^i$ where l is the region where the person lives, t is the index of regions, and θ is a coefficient to be estimated in the selection equations (15). Approximating we get:

$$\ln(1 - k_i) = \ln(1 - \sum_t \theta_t \cdot l_t^i) \simeq -\sum_t \theta_t \cdot l_t^i$$

The selection equations are thus:

$$\begin{aligned} \Pr(z &= 1) = \Phi(\ln \frac{\pi_1}{\pi_2} + \sum_t \theta_t \cdot l_t^2 - \sum_t \theta_t \cdot l_t^1 + \beta_1 X - \beta_2 X + u_1 - u_2) \qquad (19) \\ \Pr(z &= 0) = 1 - \Phi(\ln \frac{\pi_1}{\pi_2} + \sum_t \theta_t \cdot l_t^2 - \sum_t \theta_t \cdot l_t^1 + \beta_1 X - \beta_2 X + u_1 - u_2) \end{aligned}$$

The estimated wage equation is the following:

$$\begin{aligned} \ln w_i \quad | \quad & \text{sector } i = \ln \pi_i + \beta_0 + \beta_1 educ + \beta_{21} exp + \beta_{22} exp^2 \\ & + \sum_{m=2}^{4} \gamma_m Q_m + \left[\frac{\sigma_{ii} - \sigma_{ij}}{\sigma^*} \right] \lambda(c_i) + u_i \qquad (20) \end{aligned}$$

where i, j denote sectors, Q is an indicator variable for the quarter, and m denotes the quarter number.

[7] E xperience being defined as age minus education minus 5.

Note that the selection equations (19) contain both the X vector and the location variables, while the wage equations (20) use the X vector alone, i.e. the location variables are excluded from the wage equation.

The dependent variable is the log of real hourly wages, defined as the nominal monthly wage divided by hours worked and deflated by the CPI.[8] The use of hourly wages is designed to avoid confounding the choice of work place with the choice of work time (hours or days).[9] Education and experience are defined in years. For location we use indicator variables for 10 regions of local residence.[10]

To check for robustness, we look at the following alternative specifications of the equation, with the benchmark being the above specification:

(i) Using OLS to test for the effect of selection correction.

(ii) Not using any exclusion restrictions, i.e. omitting the location variables from the selection equations (15); this tests for the importance of the exclusion restrictions for identification.

(iii) Using a different cutoff monthly wage rate for the computation of the dependent variable.

4.4 Results

Tables 2 and 3 report the results, the former reporting the estimates of the selection equation and the latter reporting the estimates of the wage equation. In each case we report the point estimates with standard errors in parentheses; in Table 3 we also report the implied second moments (ρ_i, σ_{ii} and ρ_{12}), and two test statistics: the Wald test and the $\rho_i = 0$ test using $\chi^2(1)$, with P-values in parentheses.

[8] Real, rather than nominal, wages are used as inflation was relatively high (16.1%) in the course of 1987.

[9] We delete observations of nominal monthly wages of less than 320 NIS. For these observations monthly wages are extremely low, indicating that they are either measured with error or that they reflect very few hours of monthly work. A similar procedure was employed by Heckman and Sedlacek (1985). Below, we test for robustness of this cutoff point.

[10] The results of the selection equations (19) demonstrate that these locational variables are indeed significant.

Across all specifications, the following results emerge:

(i) The constant of the equation is substantially higher in Israel.

(ii) While education and experience premia are "normal" in local employment, they are very low in Israel employment. Consistent with this finding are the selection equation results, whereby education and experience decrease the probability of choosing employment in Israel.

(iii) Estimates of the second moments indicate higher variance of the local latent skill distribution and a negative correlation between the unobserved skill distributions.[11]

These results hold true across the columns of the tables. Differences across specifications, while not changing the essential picture, deserve brief mention: first, and most importantly, there is a significant role for selection correction; the uncorrected OLS estimates underestimate the skill premia and overestimate the difference in the constant of the equation when comparing stayers and migrants. We return to examine this selection bias below. Second, the exclusion restrictions or the wage cutoff point hardly matter for the coefficient estimates; they do produce somewhat different estimates for the second moments but do not change the implied selection patterns. Third, more substantial differences are found when comparing the Full Maximum Likelihood and the Heckman two-step estimates; the latter imply higher skill premia (for both stayers and migrants), a higher difference between education premia locally and in Israel, and a lower difference between the constant of each regression.

We turn now to examine the implications of these results. In what follows we use the results of column (1) of Table 3 as the benchmark results.

5 Selection Patterns

In this section we examine the implications of the results reported in Tables 2 and 3. We first look at the premia: the constant of the equation, reflecting the migration premium, and the premia to education and experience (5.1). We then look at the estimates of the elements of the $\sum$ matrix and discuss the implications with respect to selection patterns (5.2). Next we do a graphical analysis

[11]In two specifications – reported in columns 3 and 4 of Table 3 – the estimates of the second moments, while indicating positive selection in both sectors ($\rho_i > 0$) and the same relationship between local and host variances (i.e. $\sigma^{local} > \sigma^{host}$), are inconsistent with $\sigma^* > 0$ and $-1 \leq \rho_{12} \leq 1$.

that combines the estimates of the return premia and of the second moments of unobserved skills; this allows for a fuller account of the self-selection process (5.3). Finally, we draw the implications with respect to the wage premium and wage inequality (5.4). The next section decomposes wage differences across the local and host economies.

5.1 Migration Premium and Returns to Observed Skills

The wage equation's intercept – reflecting the task price π_i and the constant μ_i in the task function – is substantially higher in Israel. Note that this "migration premium" is much higher than the difference in mean wages between Israel and local employment: the difference in the constant of the equation between Israel and local employment is 1.04 while the difference in average wages is 0.03 (both in terms of log real hourly wage). We analyze this difference in more detail below.

The following picture emerges with respect to the skill premia:

(i) Locally, schooling premia rise with years of education. In Israel these premia are close to zero and the premia function is flat.

(ii) Locally the experience premia profile of earnings has the familiar hump-shape while in Israel it is again flat and around zero.

Thus while local premia for education and experience behave "normally," employment in Israel offers low – basically zero – rewards for these attributes. However, for given skills Israel offered higher wages (as reflected in the constant). Less educated and less 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 represents negative selection on observed skills.

This sorting pattern implied by the results of estimation is borne out in the actual, observed locational distributions by education and age. Table 1 has presented key moments for education and experience. Table 4 offers additional evidence by describing the distribution of workers across work locations by education and age:

The table confirms that it is indeed the less educated and younger workers who worked relatively more in Israel. Locally, mean schooling and age are higher. Particularly striking are the results for the high schooling group, where the share of workers is substantially higher in local employment.

There are several implications to these patterns:

First, the returns to the same skills differ markedly for migrant and stayers. The local economy rewards education and experience substantially more. This phenomenon can be explained by looking more closely at the types of jobs in each economy. Table 5 shows the distribution of employment across industries and occupations.

Local employment is characterized by industries and occupations that presumably require the performance of more complex tasks. In particular, government, personal, and financial services are about 40% of local employment. In Israel, employment is highly concentrated (over 80%) in three industries – construction, manufacturing and agriculture. In terms of occupations, 21% of local workers are employed in high-skilled occupations (the top three in the table) vs. 2% in such occupations in Israel. Hence it is not surprising that local employment offers higher rewards for education and experience.

Second, the absence of returns to experience in the Israeli economy is consistent with the findings of Dustmann and Meghir (2003), who studied returns to experience (on several dimensions) for young German workers. They found that much of the return to unskilled workers is due to such workers finding good matches and remaining with them. The case of unskilled Palestinians in Israel is likely to violate both requirements – there is no search process for good matches and the employment relationship is not of long duration.

Third, the results indicate that aggregation in these circumstances produces a misleading picture. Running regular OLS regressions for the entire Palestinian labor market, including both local workers and migrant workers in Israel, yields a return to education of 1.9% in the aggregate economy. According to the selectivity corrected estimates reported in Table 3 these were 4.8% locally and about zero in Israel. The return to experience is 1.2% overall in the simple aggregate

OLS regressions. In the corrected regressions of Table 3 they were 2.9% locally and again about zero in the Israeli economy. Thus simple OLS regressions of the entire economy obscure the diversity of returns. The corrected regressions yields estimates that are much higher for workers employed in the local economy and much lower for workers in the host (Israeli) economy.

5.2 Self-Selection and Unobserved Skills Distributions

Table 3 has reported estimates of the unobserved skills variance-co-variance matrix ($\sum$) produced by estimation. These allow for the analysis of the self-selection process. As discussed in sub-section 2.2. above, a key issue is the relationship between the correlation of the unobserved skill distributions in the two sectors (ρ_{12}) and relative skill variances $\frac{\sqrt{\sigma_{11}}}{\sqrt{\sigma_{22}}}$. The results indicate that:

(i) The correlation ρ_{12} is negative.

(ii) The variance in local employment is higher than that of employment in Israel.

These results are reasonable: the negative correlation is probably due to the fact that local and Israeli occupational tasks differed, as discussed above. In particular, 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. The latter require skills that are less dispersed than those in the more high-skilled occupations of local employment – an "anybody can do it" effect – hence the lower variance in Israel employment.

As a consequence selection was positive in each sector. This corresponds to case (ii) discussed in Section 2.2.2 above, with positive selection due to absolute advantage. It constitutes the "refugee sorting" case in the Borjas (1987) terminology.

These results lend support to the afore-cited approach of Willis and Rosen (1979), who examined the earnings of U.S. college graduates vs. high-school graduates. They found positive selection in both groups, as we do here. They interpret this result as a rejection of the one factor model for skills and of the ability bias findings in previous literature. Instead, they argue that the results point to a multiple factor model and non-hierarchical sorting via self-selection. The similarity of their findings and the results here pertains not only to the finding of positive self-selection in both sectors, but also to the identity of the sectors in terms of the type of jobs offered. One sector –

in their case the college graduate jobs sector, here the local one – offers jobs that require relatively high education. The other sector – high school graduate jobs in their case, employment in Israel here – offers jobs that require relatively low levels of education. Hence, the more educated workers self select in both cases to the former sector and the less educated to the latter sector, implying negative self-selection on observed skills. However, conditional on observed skills, unobserved skills distributions are such that there is positive self-selection.

How important is the selection bias? Figure 1 reports the education and experience coefficients for the wage equations using OLS not corrected for sample selection bias (column 5 of Table 3) as well as the coefficients of the corrected equations (column 1 of Table 3).

The figure reveals a substantial and systematic downward bias for the local economy and an upward bias for the Israeli economy. This is consistent with the afore-cited selection patterns. In terms of equation (18) the term $\frac{\partial c_i}{\partial x_k}$ is positive locally, negative in Israel. Thus experience and education premia are overstated in the Israeli economy and understated in the local economy if one does not control for selection bias. As a result, the difference between migrants and stayers 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)). Note that this bias is important in the context of studying the labor market performance of migrants. While this issue is not at the focus of the current paper, the extent of the bias is noteworthy.

5.3 The Roles of Observables and Unobservables

To see the role of the different elements of the self-selection process, consider the following regression equation:[12]

[12] Derived from multiplying both sides of the equation $\ln t_1 = \mu_1 + u_1$ by $\frac{\sigma_{12}}{\sigma_{11}}$ and subtracting from $\ln t_2$.

$$
\begin{aligned}
\ln t_2 &= \mu_2 + \frac{\sigma_{12}}{\sigma_{11}}(\ln t_1 - \mu_1) + \varepsilon_2 \qquad (21)\\
&= \left(\mu_2 - \frac{\sigma_{12}}{\sigma_{11}}\mu_1\right) + \frac{\sigma_{12}}{\sigma_{11}} \ln t_1 + \varepsilon_2
\end{aligned}
$$

where:

$$
var\ \varepsilon_2 = \sigma_{22}[1 - \frac{\sigma_{12}^2}{\sigma_{11}\sigma_{22}}]
$$

In log task ($\ln t_2 - \ln t_1$) space this regression is shown in Figure 2 (based on the discussion in Heckman and Sedlacek (1985, Figures 1 and 2)):

The figure has the following elements:

(i) For any given worker, the log task value in the local sector is given by a value of $\ln t_{local}$ on the horizontal axis.

(ii) The regression line (the downward-sloping line in the figure) gives the linearly predicted log task value in the Israel sector, i.e. predicted $\ln t_{Israel}$. It has the intercept given by $\mu_{Israel} - \frac{\sigma_{local,Israel}}{\sigma_{local}}\mu_{local}$[13], and the slope is given by $\frac{\sigma_{local,Israel}}{\sigma_{local}}$

(iii) Actual values lie along the normal distribution around the regression line, as shown in two places in the figure; note that the distributions plotted relate to the vertical $\ln t_{Israel}$ values. The data points are distributed – conditional on the $\ln t_{local}$ value – with $var\ \varepsilon_{Israel}$.

(iv) The regression line and the normal distribution are plotted using the point estimates of the parameters reported in Table 3, column 1.[14]

(v) The other line in the figure is the 45 degree line serving as the line of equal income ($w_{local} = w_{Israel}$). It starts from a negative intercept as $\pi_{Israel} > \pi_{local.}$ When the worker has a value below this line he chooses the local sector; above it, he chooses to work in Israel.

[13] We use the point estimates of the coefficients, and the sample means of the X variables, to generate μ_{local} and μ_{Israel}. We adopt the normalization of $\beta_0 = 0$.

[14] Equal income means $\ln w_1 = \ln w_2$ or $\ln \pi_1 + \ln t_1 = \ln \pi_2 + \ln t_2$. Hence it is given by $\ln t_2 = \ln \pi_1 - \ln \pi_2 + \ln t_1$.

Using the actual estimates, the figure shows the positive selection in each sector. In terms of equation (10) this means that in each sector $E(\ln w_i \mid \ln w_i > \ln w_j) > E(\ln w_i)$. Graphically this is seen by noting that when individuals are classified according to their task value, the fraction of people working locally increases as the local task level increases. As one moves up the $\ln t_{local}$ axis, the fraction of workers selecting the local sector rises. To see the positive selection for the Israeli economy consider the alternative regression (not plotted) of $\ln t_{local}$ on $\ln t_{Israel}$ and note that there too the slope is negative as $\sigma_{local,Israel} < 0$.

The figure shows the role of the migration premium through the position of the $w_{local} = w_{Israel}$ line, the role of observable skill premia through the intercept term of the regression line, and the role of unobservable skills through the intercept and slope of the regression line and through the variance of the distribution at each point.

Three major features of the estimates are manifested in the figure: (i) $\mu_{Israel} < \mu_{local}$ so the intercept of the regression line is relatively low; (ii) $\frac{\sigma_{local,Israel}}{\sigma_{local}} < 0$ so the regression slope is negative; and (iii) $\pi_{Israel} > \pi_{local}$ so the line of equal income starts from below 0. All of these features are reasonable: $\mu_{Israel} < \mu_{local}$ as the host (Israeli) economy does not reward skills (education and experience) in the low-skill occupations offered; there is a negative correlation between unobserved skills required in these occupations, as discussed above; and the host economy, being richer and presumably more productive, has a higher task price i.e. $\pi_{Israel} > \pi_{local}$.[15]

It is of interest to consider the effects of possible changes in the parameters that determine selection patterns:

(i) When the migration premium rises, i.e. when $\frac{\pi_{host}}{\pi_{local}}$ rises, the line of equal income shifts downwards. Fewer workers choose the local economy and more migrate.

(ii) When the skill premia in the host economy decline, i.e. μ_{host} falls, the intercept declines and the regression line shifts downwards. Now more workers choose local employment.

(iii) When the local (source economy) distribution becomes more dispersed, i.e. σ_{local} rises, several changes take place: the intercept rises and the slope declines (in absolute value) so the regression line rises and flattens. In addition, the variance of the normal distribution around the line rises. The overall effect is ambiguous.

[15] According to (3), higher aggregate productivity $\frac{\partial F^i}{\partial T_i}$ implies higher π_i.

(iv) When the co-variance of the skills across the two economies declines, i.e. $\sigma_{local,host}$ falls, the same happens: the regression line shifts up and flattens and the normal distribution becomes more dispersed. Again, the overall effect is ambiguous.

(v) When the host country distribution becomes less dispersed, i.e. σ_{host} falls, the variance of the normal distribution falls. The overall effect is once more ambiguous.

Hence effects (i) and (ii) are contradictory – a higher migration premium offsets lower skill premia. Effects (iii), (iv) and (v) yield ambiguous outcomes. This implies that if occupational tasks offered to migrant workers were to become more complex then σ_{host}, $\sigma_{local,host}$ and μ_{host} are all likely to rise. But only effect (ii) in reverse – the rise in μ_{host} – would unambiguously lead to more migration. Effects (iv) and (v) in reverse are ambiguous, implying that this change will not necessarily lead to more migration.

5.4 Selection Quantified

Selection induces a rise in mean wages and a reduction in wage inequality (measured by the standard deviation) relative to random assignment. In Table 6 we report these effects using the estimates of Table 3 (column 1). The row marked wage premium 1 is the difference between observed, actual mean wages and the predicted mean, i.e. $\widehat{\ln \pi_i} + \widehat{\mu_i}$, in terms of log real hourly wages The latter would be the mean wage without selection, i.e. with random assignment. No selection effects would yield a zero difference. For wage inequality (reported in the third row), we divide the observed standard deviation by the estimated one (i.e. $\widehat{\sqrt{\sigma_{ii}}}$). Without selection, i.e. with random assignment, this latter ratio would be 1 (see the discussion in 2.2.1 above). Figure 3 shows the relevant distributions graphically[16].

The table and the figure show very substantial selection effects: a wage premium of 0.4 for local employment and around 0.2 for Israel employment. This means that while there is a positive selectivity effect in both sectors, it was stronger for local employment. There was a 25% reduction in wage inequality.

[16] T he selection log-normal distributions are depicted using the actual sample moments.

The second row in Table 6 shows another form of wage premium: it is the difference between the actual mean wage and the counterfactual: the predicted mean wage if local workers were to migrate (shown in the working locally column) and if migrant workers were to stay (shown in the working in Israel column). The former difference is about 0.2. It suggests that stayers are better off not migrating because the higher migration premium would not be sufficient to compensate for the lack of skill premia. The difference for migrant workers is 0.5; it suggests that if migrant workers were to work locally, though they will get premia for their skills, the absence of the migration premium would be bigger than this skill premia gain. These counterfactual comparisons are the result of the interaction of work location, the distributions of skills engendered by self-selection, the migration premium, and skill premia.

6 Decomposing The Wage Differential

The estimates allow us to decompose the wage differential between the two economies. The idea is to quantify the relative role played by the different elements of the model – task prices, skill premia, skill levels, and selectivity effects. We do this using actual data and the estimates of Table 3. We follow the methodology proposed by Oaxaca and Ransom (1994) and decompose the wage differential between the Israeli economy and the local economy into components: a part due to task prices plus the intercept of the task function (i.e. the constant in the wage equation); a part due to differences in skill premia across the two sectors; a part due to differences in skill levels across the two sectors; and a part due to differences in selection effects. This is done on average values as follows:

$$\begin{aligned} \overline{\ln w_2} - \overline{\ln w_1} &= \widehat{k}_2 - \widehat{k}_1 \\ &+ \overline{X}_1(\widehat{\boldsymbol{\beta}}_2 - \widehat{\boldsymbol{\beta}}_1) \\ &+ \widehat{\boldsymbol{\beta}}_2(\overline{X}_2 - \overline{X}_1) \\ &+ \widehat{\rho}_2 \widehat{\sqrt{\sigma_{22}}}\widehat{\overline{\lambda_2}} - \widehat{\rho}_1 \widehat{\sqrt{\sigma_{11}}}\widehat{\overline{\lambda_1}} \end{aligned} \tag{22}$$

where $\overline{\ln w_i}$ is the mean log hourly wage in economy $i, \widehat{k_i} = \ln \widehat{\pi_0} + \widehat{\beta_0}$ for economy i using the point estimates of the wage equation's constant, $\widehat{\boldsymbol{\beta}}_i$ is a vector of the point estimates of the coefficients in economy i, $\overline{X}_i$ is a vector of the mean values of the independent variables in economy i, and $\widehat{\rho}_i \widehat{\sqrt{\sigma_{ii}}} \widehat{\overline{\lambda}_i}$ are the estimates of the second moments times the average of the estimated inverse of Mills' ratio, all derived from the equations estimated in Table 3 (column 1).

There are two striking results: one is that the actual mean wage differential (in real hourly wage terms) between the economies is small, only 3%. The other is that this latter finding masks big disparities: there is a high constant differential in favor of the Israeli economy offset by all the other terms in the decomposition. The main offset comes from the skill premia differential $(\widehat{\boldsymbol{\beta}}_2 - \widehat{\boldsymbol{\beta}}_1)$ in favor of local employment. The offset due to skill levels differences $(X_2 - X_1)$ or to differences in the (positive) selection effect is much smaller. The key implication emerging from the table is that wage equalization across economies (i.e. Israel and the Palestinian economy, pertaining to Palestinian workers) is attained through the assignment of workers by the self-selection process. While clear disparities exist between the two economies – the migration premium and the wage skill premia – these cancel out through self-selection.

7 Conclusions

The analysis has yielded a consistent pattern of self-selection for migrant workers who were offered work in relatively low-skilled occupations in a more developed economy. Basically, this pattern is the following: a substantial migration premium coupled with no skill premia led workers to sort themselves so that the relatively highly skilled worked in local, more complex tasks, while the low skilled worked abroad in relatively simple tasks. There were no returns in the host economy to key observed skills like education and experience, probably due to the nature of the job tasks in question. This resulted in negative selection on observed skills. A significant migration premium was in place, due to the host economy being more developed than the source economy, luring migrant workers. In terms of the model this is expressed by a higher task price. This migration premium offset the negative effect of the absence of skill premia. Conditional on observed skills, selection on unobservable skills was positive. This was due to the negative correlation between the distributions of these skills in the two economies. The ensuing worker sorting was based on self selection according to absolute advantage and led to a substantial increase in mean wages and a significant decrease in wage inequality (relative to a random assignment). The negative correlation can be explained by the very different nature of occupations in the two economies and by the idea that these unobserved skills are multi-dimensional. Hence the different nature of jobs, offered to migrants and stayers, account for both the observed skill premia patterns and the relationship between the unobserved skill distributions. Taken together, these estimates appear quite reasonable, and fully consistent with the distributions of education, experience, occupations, and industries of migrants and stayers.[17]

As this study restricted attention to a particular data set, it cannot claim more general empirical implications. However, it describes a pattern of self-selection that seems plausible for many other cases of low-skilled migrant workers from developing economies working in developed ones. Therefore it puts into question some of the conclusions reached in the literature. This is so even though many, if not all, patterns of the data here are in accord with what has been reported elsewhere, i.e. low earnings of migrants in low-skill occupations. In particular, the findings suggest that there is negative selection on observed skills but positive selection on unobserved skills (conditional on observed skills), a distinction that is not clear, or even explored, in many papers. In the formal terminology of the model, both the literature and this paper find that $\frac{\sigma_{local}}{\sigma host} > 1$. The literature claiming negative self-selection then implies that $\frac{\sigma_{local}}{\sigma host} > \rho_{local,host} > \frac{\sigma_{host}}{\sigma_{local}}$ often with no direct evidence on ρ. A related problem is the assumption, sometimes made, that in the host economy, natives and migrants have the same task distribution; this may have led to erroneous conclusions with respect to the above comparison (i.e. mostly with respect to $\rho_{local,host}$). The results

[17] Another application of the concept of self-selection to questions of immigration was suggested recently by Berman and Rzakhanov (2000). Their analysis pertains to fertility decisions combined with migration decisions. While this kind of analysis is not empirically relevant here, in a more general context their ideas can serve to strengthen the argument made here about a migration premium.

here[18] indicate that $\frac{\sigma_{local}}{\sigma host} > \frac{\sigma_{host}}{\sigma_{local}} > \rho_{local,host}$, hence positive self-selection on unobservables. This then implies that migrant skill premia are overestimated, which has important implications for the study of the economic performance of immigrants. It also seems as though the literature has not given sufficient attention to the differential role played by (i) migration premia due to the difference between developed and developing economies, (ii) selection on observable skills, driven by skill premia differentials, and (iii) selection on unobservable skills, related to the differences in job requirements.

The results imply that skill premia for the source economy (inclusive of migrant workers) suffers from an aggregation bias, and that worker assignment through self selection leads to significant reductions in wage inequality. The analysis of wage differentials shows that wages were almost equalized due to this sorting pattern and the offsetting effects of migration premia and skill premia.

An important by-product that emerges from the current analysis relates to the literature on education and self-selection. The results lend support to the approach advocated by Willis and Rosen (1979) whereby unobserved skills are multi-dimensional and not highly correlated across occupations.

The approach implemented and tested in this paper may have wider applications and implications. One example is that it suggests a way of dealing with the increasingly important phenomenon of job outsourcing. The workers choosing to work in such jobs (usually high-skilled) could be characterized by (i) a developed vs. developing country difference, akin to the migration premium; (ii) selection on observable skills; and (iii) selection on unobservable skills.

[18] Based on estimates of these second moments.

References

[1] Amir, Shmuel, 1999. "The Effects of Foreign Workers Entry in the Construction Sector," pp. 119-154, in L.Ahdut and R.Natenson (eds.) **The New Laborers: Foreign Workers in Israel,** Hakibutz Hameuhad (in Hebrew).

[2] Angrist, Joshua D., 1996. "Short-Run Demand for Palestinian Labor," **Journal of Labor Economics** 14,3,425-453.

[3] Bank of Israel, 2003. **Annual Report:2002,** Jerusalem**.**

[4] Berman, Eli and Zaur Rzakhanov, 2000. "Fertility, Migration and Altruism," NBER working paper 7547, Cambridge, MA.

[5] Borjas, George J., 1987. "Self-Selection and the Earnings of Immigrants," **American Economic Review** 77, 531-53.

[6] Borjas, George J., 1999."The Economic Analysis of Immigration," in: O.Ashenfelter and D.Card (eds.) **Handbook of Labor Economics** vol 3, chapter 28, 1697-1760, North-Holland, Amsterdam.

[7] Central Bureau of Statistics, 1989. **Annual Statistical Report.**

[8] Central Bureau of Statistics, 1996. **Labor Force Survey in Judea, Samaria and the Gaza Strip.**

[9] Chiswick, Barry R., 1999. "Are Immigrants Favorably Self-Selected?" **AEA Papers and Proceedings, American Economic Review**, 89,2, 181-185.

[10] Cohen, Sarit and Zvi Eckstein, 2004. "Labor Mobility of Immigrants: Training, Experience, Language and Opportunities" working paper available online at http://www.econ.umn.edu/~eckstein/research/foerder-502.pdf.

[11] Dustmann, Christian and Costas Meghir, 2003. "Wages, Experience and Seniority," **Review of Economic Studies, forthcoming.**

[12] Friedberg, Rachel M. and Robert M. Sauer, 2004. "Does the Presence of Foreign Guest Workers in Israel Harm Palestinians from the West Bank and Gaza Strip?" working paper.

[13] Heckman, James J., 1979. "Sample Selection Bias as a Specification Error," **Econometrica** 47, 1, 153-161.

[14] Heckman, James J. and Guilherme Sedlacek, 1985. " Heterogeneity, Aggregation and market Wage Functions: An Empirical Model of Self-Selection in the Labor Market," **Journal of Political Economy** 93,6, 1077-1125.

[15] Heckman, James J. and Guilherme Sedlacek, 1990. "Self-Selection and the Distribution of Hourly Wages," **Journal of Labor Economics** 8,1pt.2, S329-S363.

[16] INS, 1999. **Statistical Yearbook,** Washington D.C.

[17] Kleiman, Ephraim, 1992. "The Flow of Labour Services from the West Bank and Gaza to Israel," Hebrew University Working Paper no. 260.

[18] Oaxaca, Ronald L., and Michael R. Ransom, 1994. "On Discrimination and the Decomposition of Wage Differentials," **Journal of Econometrics** 61, 5-21.

[19] OECD, 2001. "Trends in Immigration and Economic Consequences," Economics Department Working Paper No. 284, June.

[20] OCED, 2003. "Trends in International Migration," Annual Report 2002 Edition.

[21] Rosen, Sherwin, 1978. "Substitution and Division of Labor," **Economica** 45, 235-50.

[22] Roy, Andrew D., 1951."Some Thoughts on the Distribution of Earnings," **Oxford Economic Papers** 3, 135-146.

[23] Semyonov, Moshe and Noah Lewin-Epstein, 1987. **Hewers of Wood and Drawers of Water,** ILR Press, Ithaca, New York.

[24] Stalker, Peter, 2000. **Workers Without Frontiers: The Impact of Globalization on International Migration**, ILO, Geneva.

[25] Willis, Robert J., 1986. “Wage Determinants: A Survey and Reinterpretation of Human Capital Earnings Functions,” in O.Ashenfelter and R.Layard (eds.) **Handbook of Labor Economics**, vol I, 525-602, North-Holland, Amsterdam.

[26] Willis, Robert J., and Sherwin Rosen, 1979. “Education and Self-Selection,” **Journal of Political Economy** 87, 5, pt.2, S7-S36.

[27] Zlotnik, Hania, 1998.“International Migration 1965-96: An Overview,” **Population and Development Review** 24(3), 429-468.

Table 1

Sample Statistics

1987

variable	**Working in the Local Economy**	**Working in Israel**
N	6,499	10,947
wage (hourly, in logs)	-2.71 (0.33)	-2.68 (0.30)
education (in years)	9.1 (4.6)	7.8 (3.9)
experience (in years)	19.4 (12.9)	18.1 (13.1)
regions of residence		
Jenin	6%	7%
Nablus	14%	6%
Tulkarm	7%	13%
Ramallah	18%	14%
Jordan valley	2%	1%
Bethlehem	11%	12%
Hebron	21%	18%
Rafiah	2%	4%
Gaza	14%	16%
Khan Yunis	4%	10%

Notes:

1. For wages, education and experience, the table reports mean of variables with standard deviations in parentheses.

2. The region of residence numbers are percentage of workers living in the region out of total sample in the column.

Table 2

Selection Equation

	(1)	**(2)**	**(3)**	**(4)**
	Full ML	**no exclusion restrictions**	**wage cutoff point**	**two step**
constant	1.26	1.46	1.13	0.89
	(0.07)	(0.05)	(0.08)	(0.10)
education	-0.088	-0.085	-0.084	-0.100
	(0.003)	(0.003)	(0.003)	(0.003)
experience	-0.036	-0.038	-0.031	-0.040
	(0.003)	(0.003)	(0.003)	(0.003)
$\text{experience}^2/100$	0.030	0.033	0.023	0.033
	(0.005)	(0.005)	(0.005)	(0.005)
Jenin	0.46*		0.59*	0.78*
Nablus	0.05		-0.05	0.20
Tulkarm	0.84*		0.84*	1.17*
Ramallah	0.07		0.08	0.58*
Bethlehem	0.01		0.08	0.83*
Hebron	0.03		0.07	0.58*
Rafiah	0.32*		0.39*	1.13*
Gaza	0.04		0.09	0.83*
Khan Yunis	0.50*		0.49*	1.09*
n	10,947	10,947	11,602	10,947

Notes:

1. The equation relates to the selection of employment in Israel. The alternative specifications are spelled out in Section 4.3.

2. Sample includes all wage earners except those with wages below 320 NIS a month, except for column (3) where the wage cutoff point is 200 NIS a month.

3. n is the number of observations.

4. Standard errors of the coefficients are in parentheses, except for the region of residence variables where a star denotes significance at 1%.

5. The equations included dummy variables for quarters, which are not reported.

6. The baseline region of residence is the Jordan valley.

Table 3

Wage Equation

Dependent variable: log real hourly wage

	(1)		**(2)**		**(3)**	
	Full ML		**no exclusion**	**restrictions**	**wage cutoff**	**point**
	Local.	Israel	Local	Israel	Local	Israel
constant	-3.93	-2.89	-3.99	-2.93	-3.96	-3.04
	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)	(0.02)
education	0.048	-0.0042	0.050	-0.0055	0.048	-0.0042
	(0.001)	(0.0012)	(0.001)	(0.0012)	(0.001)	(0.0012)
experience	0.029	0.005	0.029	0.007	0.034	0.010
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
experience^2/100	-0.032	-0.014	-0.032	-0.016	-0.004	-0.018
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
ρ_i	0.92	0.91	0.93	0.80	0.75	0.80
	(0.01)	(0.01)	(0.005)	(0.01)	(0.02)	(0.01)
$\sqrt{\sigma_{ii}}$	0.440	0.390	0.462	0.365	0.427	0.402
	(0.006)	(0.004)	(0.007)	(0.004)	(0.007)	(0.005)
$\frac{\sqrt{\sigma_{11}}}{\sqrt{\sigma_{22}}}$	0.89		0.79		0.94	
ρ_{12}	-0.83		-0.22		o.a.r[6]	
n	6,499	10,947	6,499	10,947	7,085	11,602
Wald test (χ^2)	1830	292	1844	281	1829	390
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
$\rho_i = 0$ test (χ^2)	548	737	755	253	169	270

	(4)		(5)	
	two step		**OLS**	
	Local	Israel	Local	Israel
constant	-3.37	-2.97	-3.28	-2.98
	(0.03)	(0.02)	(0.02)	(0.05)
education	0.033	0.006	0.031	0.010
	(0.001)	(0.001)	(0.001)	(0.001)
experience	0.022	0.013	0.020	0.015
	(0.001)	(0.001)	(0.001)	(0.001)
experience squared/100	-0.025	-0.021	-0.024	-0.023
	(0.002)	(0.002)	(0.002)	(0.001)
ρ_i	0.17	0.27		
$\sqrt{\sigma_{ii}}$	0.303	0.299		
$\frac{\sqrt{\sigma_{11}}}{\sqrt{\sigma_{22}}}$	0.99			
ρ_{12}	o.a.r[6]			
n	6,499	10,947	6,499	10,947
Wald test (χ^2)	1773	1570		
	(0.00)	(0.00)		

Notes:

1. Sample includes all wage earners except those with wages below 320 NIS a month, except for column (3) where the cutoff wage is 200 NIS a month.
2. The alternative specifications are spelled out in Section 4.3.
3. n is the number of observations in the regression.
4. Standard errors of the coefficients are in parentheses.
5. The regressions included dummy variables for quarters, which are not reported.
6. The Wald test is distributed χ^2 with 6 degrees of freedom The $\rho_i = 0$ test using $\chi^2(1)$ is

an LR test of the null hypothesis that $\rho_i = 0$. P-values appear in parentheses.

7. In the cases marked o.a.r=outside admissible range, the second moment estimates are inconsistent with $\sigma^* > 0$ and $-1 \leq \rho_{12} \leq 1$. This can be seen by using the relations:

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

Table 4

Education and Age Distributions by Work Locations

a. Schooling Groups

	School 0	School 1	School 2	School 3	School 4	School 5
Israel	7%	9%	22%	17%	38%	7%
Local	6%	9%	19%	13%	31%	22%

b. Age Groups

	Age 1	Age 2	Age 3	Age 4	Age 5
Israel	39%	33%	15%	8%	5%
Local	28%	33%	21%	12%	6%

Notes:

1. Sample is the same as in Table 3 column 1.
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. Age groups are 18-24 (age 1), 25-34 (age 2), 35-44 (age 3), 45-54 (age 4) and 55-64 (age 5).

Table 5

Industry and Occupation Distributions by Work Locations

a. Industry Distributions

industry	**Local**	**Israel**
agriculture	3%	11%
manufacturing	24%	20%
construction	22%	50%
commerce	5%	9%
government	34%	6%
transportation	6%	2%
personal services	3%	3%
finance	1%	0%

b. Occupation Distributions

occupation	**Local**	**Israel**
academic	7%	0%
professionals	13%	1%
managers	1%	1%
clerical workers	9%	1%
agents, sales and service	3%	2%
skilled jobs in agriculture	8%	12%
manufacturing and construction skilled jobs	37%	42%
unskilled	22%	42%

Notes:

1. Sample is the same as in Table 3 column 1.

Table 6

Effects of Selection

	working locally	working in Israel
wage premium 1: $\overline{\ln w_{\text{actual}}} - \overline{\ln w_{\text{random}}}$	0.39	0.21
wage premium 2: $\overline{\ln w_{\text{actual}}} - \overline{\ln w_{\text{counterfactual}}}$	0.19	0.51
reduction in wage inequality $\frac{\text{observed standard deviation}}{\sqrt{\sigma_{ii}}}$	0.75	0.77

Notes:

1.Sample is the same as in Table 3 column 1.

2 $\overline{\ln w_{actual}}$ is the sample mean.

3. For definitions of $\overline{\ln w_{\text{random}}}$ and $\overline{\ln w_{\text{counterfactual}}}$ see Section 5.4.

Table 7

Decomposition of the Wage Differential

$$
\begin{aligned}
\overline{\ln w_{local}} - \overline{\ln w_{Israel}} &= \widehat{k}_{local} - \widehat{k}_{Israel} \\
&+ \overline{X}_{Israel}(\widehat{\boldsymbol{\beta}}_{local} - \widehat{\boldsymbol{\beta}}_{Israel}) \\
&+ \widehat{\boldsymbol{\beta}}_{local}(\overline{X}_{local} - \overline{X}_{Israel}) \\
&+ \widehat{\rho}_{local}\sqrt{\widehat{\sigma_{local}}}\overline{\widehat{\lambda_{local}}} - \widehat{\rho_{Israel}}\sqrt{\widehat{\sigma_{Israel}}}\overline{\widehat{\lambda_{Israel}}}
\end{aligned}
$$

$\overline{\ln w_{local}} - \overline{\ln w_{Israel}}$	-0.03
$\widehat{k}_{local} - \widehat{k}_{Israel}$	-1.03
$\overline{X}_{Israel}(\widehat{\boldsymbol{\beta}}_{local} - \widehat{\boldsymbol{\beta}}_{Israel})$	0.83
$\widehat{\boldsymbol{\beta}}_{local}(\overline{X}_{local} - \overline{X}_{Israel})$	0.09
$\widehat{\rho}_{local}\sqrt{\widehat{\sigma_{local}}}\overline{\widehat{\lambda_{local}}} - \widehat{\rho_{Israel}}\sqrt{\widehat{\sigma_{Israel}}}\overline{\widehat{\lambda_{Israel}}}$	0.18

Notes:

1.Sample is the same as in Table 3 column 1.

2 $\overline{\ln w_{local}}, \overline{\ln w_{Israel}}$ are sample means.

3. The other rows use the estimates of Table 3 column 1.

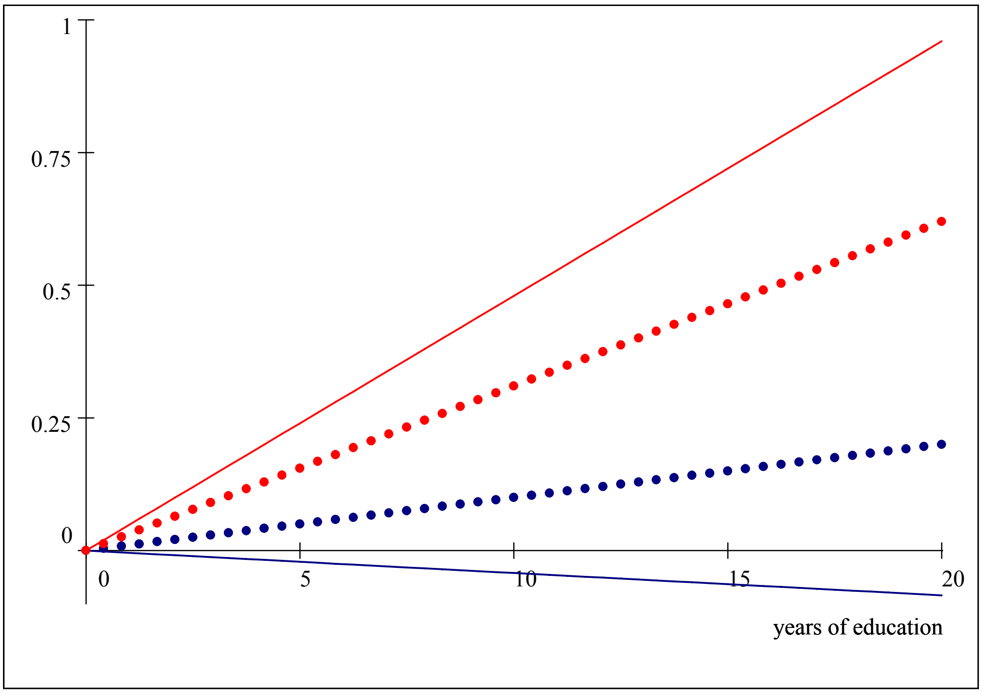

Figure 1a Educ. premia corrected (solid) vs. uncorrected (dotted) [local (top, red), Israel (bottom, blue)]

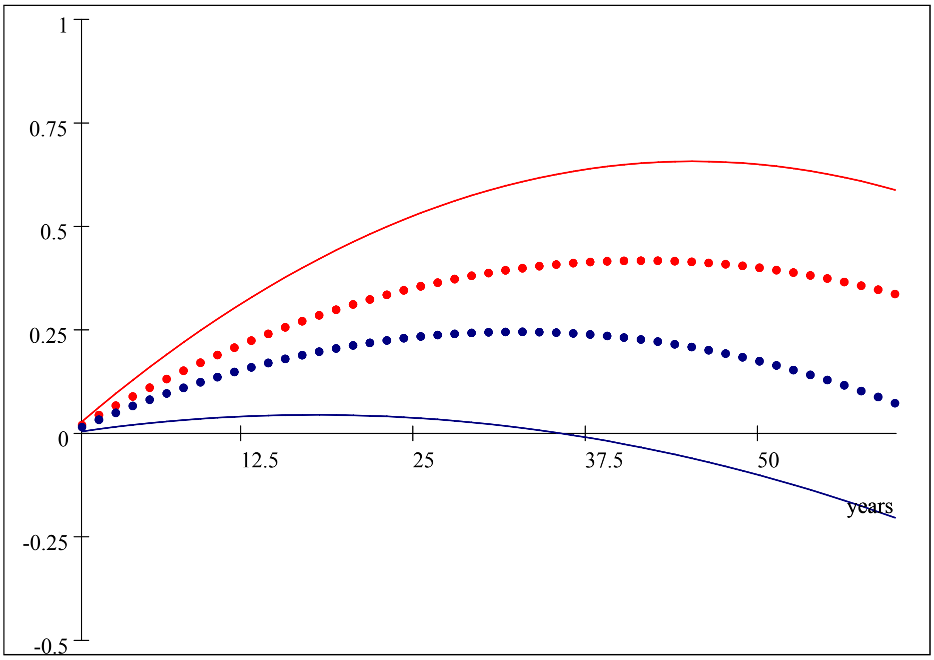

Figure 1b: Exp. premia, corrected (solid) vs. uncorrected (dotted) [local (top, red), Israel (bottom, blue)]

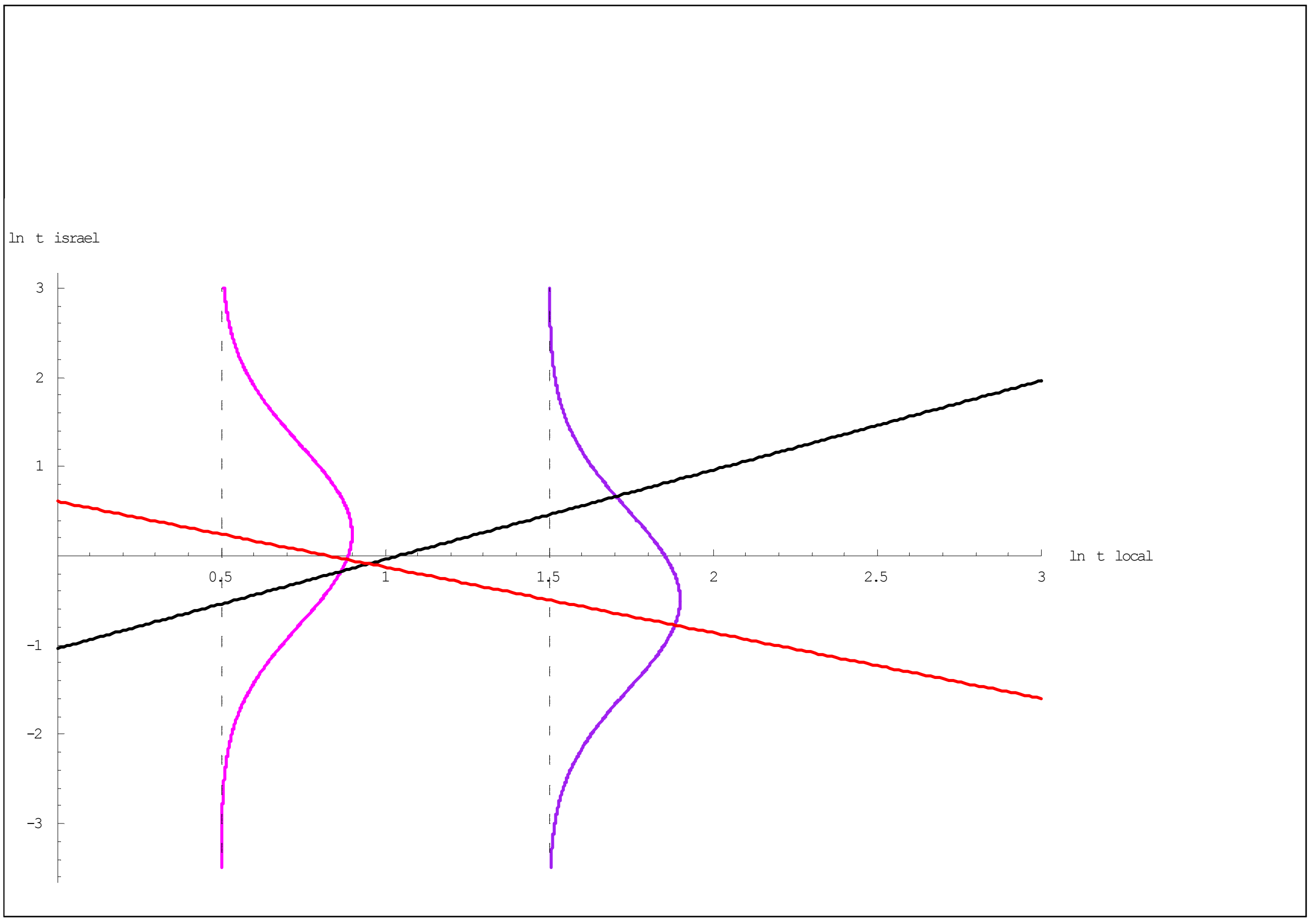

Figure 2: Regression [downward sloping] and equal income [45 degree] lines

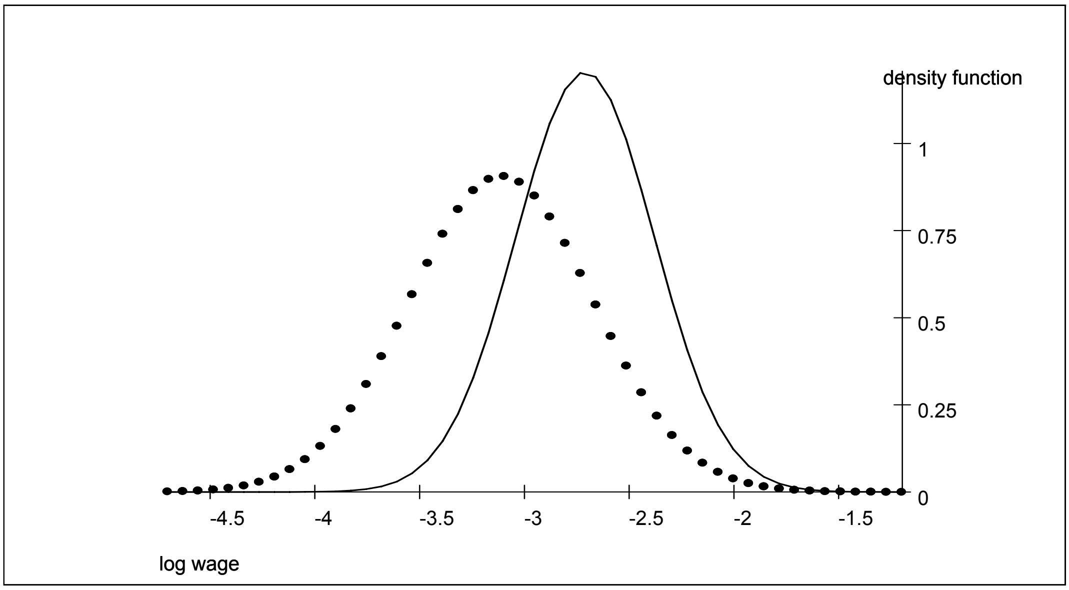

Figure 3a: Local employment: selection (solid) vs. random assignment (dotted)

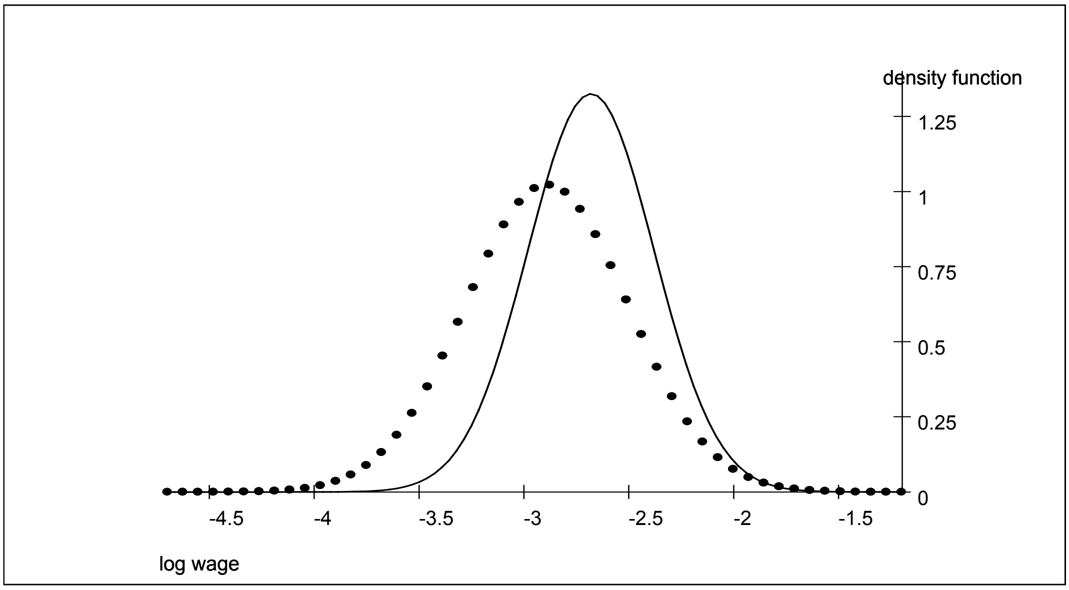

Figure 3b: Israel employment: selection (solid) vs. random assignment (dotted)

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