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Moving from a poor economy to a rich one: A job tasks approach ☆

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ABSTRACT

This paper studies outcomes for workers moving from a poor to a rich economy employing a job tasks based approach. It uses a data case, whereby a worker could decide to work in a richer economy and place himself there by a daily or weekly commute. This set-up faciliates the disentanglement of income differences motives from a plethora of other motives. Thus it eschews the bias inherent in many studies.

The paper emphasizes the idea that tasks are tied to locations, and workers choose a location-task-wage 'pack.' The task demanded, which is a bundle of skills, constrains human capital returns for movers. Relatively low task returns generate a substantial offset to the productivity gain for migrants, stemming from the rich economy having higher TFP and capital.

1. Introduction

The phenomenon of workers moving from a poor to a rich economy is a very prevalent one. It may be an internal migration or commuting move or migration across countries.[1] It is a salient issue, with such migration flows very high on the political agenda in many rich countries. When a worker moves to an economy richer than the home economy, what are the outcomes of the move? There is a view whereby the migrant gains from this move are very large. For example, Kennan (2013) estimates a gain in net income of 125% in a model of migrants from poor countries to rich ones. This view is reinforced by findings in the literature, whereby there are large GDP per capita and wage cross-country differences; see, for example, the review in Jones (2016).

It is not straightforward, however, to answer the question of the gains and costs of the move to a rich country. The difficulty is related to the need to disentangle the effects of income differences on movers decisions from many other determinants of such mobility. The set of determinants includes geographical distance, socio-demographic factors, including family linkages and social networks, credit constraints, welfare benefits, insurance motives, psychological issues, and more. Many estimates in the literature are potentially biased due to substantial misspecification of the model, when omitting relevant determinants, often because data are unavailable. This paper studies a case that allows to isolate the pure effects of cross-country income differences. The data set consists of repeated cross-sections of a Labor Force Survey of Palestinian workers who were working in Israel and in the local economy. The survey sampled both movers and stayers within a unified setting.[2] During most of the 1980s a sizeable fraction of the male labor force from these areas worked in Israel, a far richer economy.[3] The features of this labor market were such that the other cited determinants of mobility played no role. There existed a situation, whereby a worker could decide to

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[1] Consider two measures: (i) The permanent immigration *flows* into the G7 countries in 2016 was 3.4 million (OECD, 2020)) out of roughly 7.5 million immigrants globally, i.e., 45%. (ii) In 2019 out of an estimated *stock* of 130.2 million migrants worldwide, 51.9 million originated from less developed regions by UN classification (40%) and 46.5 million originated from non-high income countries by World Bank classification (36%). Source: U.N. (2019).

[2] This data set was processed and used by Angrist (1995), Angrist (1996) to study other issues.

[3] As the data set used here is comprised only of men, I will be using the masculine when referring to workers.

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work in a richer economy and place himself there by a daily or weekly commute. Without the confounding factors, the decision to work in the rich economy can be estimated without bias. The data used here engender the following set-up: capital and productivity differences were sufficiently high so as to conform oft-documented rich-poor countries differences, typically not found within a single country. At the same time, the relatively short distances facilitated a low-cost move from the poor to the rich economy.

A key rationale underlying the analysis is the distinction between factors external to the worker, such as technology, capital, and institutions, and factors embodied in the worker, such as skills and abilities. Hence, when estimating wage equations so as to infer the gains of the move from a poor to a rich economy, it explicitly address the question of what workers experience in the richer economy (say, higher TFP), what is taken from the poor economy (human capital), and their choices in moving (self-selection).

Importantly, it takes into account the fact that movers and stayers are typically constrained in terms of the job tasks offered and the skills required for them. The paper recognizes that workers face job tasks requirements and particular rewards for their skills in performing these tasks. It connects with Autor and Handel (2013), who estimate a similar self-selection model with U.S. job and wage data, and note the issue of skill bundling within tasks. The bundling in the current paper is in terms of location, tasks, and skills. Workers are demanded for a particular task, utilizing a bundle of skills, rewarded in a specific way, in each location.

The task perspective is relevant for many cases of foreign minorities in advanced economies. Often, workers belonging to such minorities are demanded to perform low-skill tasks. In a review of migration, productivity, and the labor market, Peri (2016) emphasizes, the importance of recognizing the role of tasks performed by migrants, especially manual tasks. He references studies documenting this widespread phenomenon, showing that employment in manual, low-skill occupations is a salient feature.

I use a self-selection model employing two alternative estimation methodologies to examine wage regressions of movers and stayers. I analyze the findings across the two economies both in terms of the mean wage differential and in terms of the distributions involved. My findings offer a new take on the outcomes, as the pure effects of income differences in the choice to move to a rich economy are made up of diverse elements, operating in opposition. Productivity differences in favor of the richer economy, due to differences in TFP and in the stock and quality of physical capital, are sizeable and operate to raise wages. However, lower returns to human capital and lower stocks of human capital for movers, operate to lower wages. The latter is due to negative selection on observables by movers, who are offered low-skill tasks in the rich economy. The latter effect offsets to large extent the former gain, sometimes overturning it. Self-selection on unobservables, however is positive, consistently with the nature of the tasks in question.

These findings reveal large *gross* differences and small *net* migrant gains, due to the afore-mentioned offset. The findings also imply that the self-selection of movers in terms of skills is not the unique major determinant here, and that the productivity differences involved need to be recognized as playing a big role. Knowing the patterns of self-selection does not suffice to understand the poor to rich economy move.

The contribution of this paper may be better understood when noting that the literature often looks at the move from poor to rich economies (i) without disentangling the income differences motive from the other motives, and (ii) anticipating a big productivity gain due to the rich economy having higher TFP and capital. This paper shows that with respect to point (i), there is normally the potential for substantial misspecification and bias, while the unique data set used here eschews such bias. With respect to point (ii), the paper emphasizes the idea that tasks are tied to locations, and so workers choose a location-task-wage 'pack' that determines rewards to the skills bundled in the task. The low rewards for tasks offered to movers generate a substantial offset to the productivity gain.

The paper proceeds as follows. Section 2 offers the background and context in the literature. Section 3 presents the model. It elaborates on the role of skills and tasks in the model and highlights the distinction between factors external to the worker and those embodied in the worker. Section 4 presents the Palestinian labor market and its key features, justifying the use of various elements in the model, and discusses the data set (with further elaboration in online Appendix A). Section 5 presents the two econometric methodologies, with details given in online Appendix B, and discusses why there is no misspecification in the current case. Section 6 presents the results and Section 7 discusses them, with further analysis in online Appendix C. Section 8 concludes.

2. Literature

This paper relates to two strands of literature. It is informed by papers studying cross-country income differences (sub-Section 2.1). The task-based self-selection literature provides the modeling framework used for the study of the movers' decisions (sub-Section 2.2).

2.1. Lessons from studies of cross country income differences

This paper is informed by papers in the literature, as follows.

TFP differences across countries. Jones (2016) offers a review of the evidence, documenting very substantial differences in GDP per worker across countries. Focusing on TFP differences, he offers a number of explanations, mostly having to do with misallocation. In particular, misallocation at the micro level shows up as a reduction in total factor productivity at the aggregate level. Banerjee and Moll (2010) offer explanations for the persistence of such misallocation.

TFP vs human capital differences across countries. In terms of the breakdown into components, the literature reports a wide range of estimates for TFP and human capital shares, ranging from 20% to 80% of cross-country income differences for the latter, with TFP accounting for most of the complementary share. Hendricks and Schoellman (2018) make key contributions to the debate on the relative size of TFP vs human capital shares. Examining data on migration to the U.S., mostly from poor economies, they attribute around 60% to human capital differences and the remainder to TFP and physical capital-related differences.

International Migration. There are papers in the migration literature, focusing on migration from poor to rich economies, which relate to similar questions. In a prominent contribution in this context, Kennan (2013) presents a general equilibrium model, which is subsequently evaluated empirically. He shows that if workers are much more productive in one country than in another, restrictions on immigration lead to large efficiency losses. Kennan quantifies these losses, using a set up in which efficiency differences are labor-augmenting, and free trade in product markets leads to factor price equalization, so that wages are equal across countries when measured in efficiency units of labor. The estimated gains from removing immigration restrictions are found to be large. Using data for 40 countries, the average gain is estimated at $10,798 per worker per year (in 2012 dollars, adjusted for PPP), compared to average income per worker in these countries of $8,633. Thus the gain in net income is 125% (see his Figure 6 and Appendix Tables 1 and 2).

The common thread of these various studies, and the issue that is relevant for the current paper, is the distinction between the environment in which the worker operates (technology, capital, and the related institutions) and what is embodied in the worker (skills and abilities). In this paper I discuss my findings of movers' wage gains in terms of the distinct components of TFP and physical capital and of human capital. I suggest a mechanism to account for the results, which has not been evaluated by the afore-cited literature.

2.2. Tasks, skills, and self-selection

The task approach to labor market analysis classifies jobs according to their task requirements and considers the skills required to carry out these tasks. Within this approach, Autor and Handel (2013) depart from the premise that job tasks are not fixed worker attributes, as workers can modify their task inputs by self-selecting into particular jobs. They use the Roy (1951) self-selection framework to analyze the relationship between tasks and wages. The authors note that their approach is motivated by the fact that workers, even if holding several jobs, can perform tasks only in one job at a time. The indivisible bundling of tasks within jobs implies that the productivity of particular task inputs will not necessarily be equated across jobs. Using U.S. job and task data, they test the model's predictions for this relationship, finding empirical support. The review by Peri (2016), cited above, indicates that tasks may be relevant in many migration contexts, and in this paper I use this self-selection framework in such a context.

Hurst et al. (2021) explicitly incorporate discrimination into the Autor and Handel (2013) self-selection model. Taking their model to micro U.S. data, they find that discrimination predicts differential sorting patterns across race groups as group-specific forces such as discrimination and racial skill differences make the task returns differ by group. Their work links up with the earlier work of Hsieh et al. (2019) which proposes and estimates a multi-sector Roy model of occupational sorting with workers of different races and gender who face differential frictions, including discrimination, in both human capital and labor markets. The latter paper quantifies the role of changes in racial and gender barriers during the last half century to U.S. economic growth. Hurst et al. (2021) complement this paper by extending the occupational sorting decision to a multi-dimensional task framework. In the current case, no comparable micro data exist which would facilitate undertaking such an empirical examination. The analysis here is consistent, though, with the possible existence of discrimination. Thus, discrimination may affect occupational sorting, which, in turn, affects growth and GDP per worker dynamics, tying up with the issues discussed in the preceding sub-section.

There is a vast literature using the Roy (1951) self-selection model in migration. Borjas George (1987) is a seminal study; Borjas et al. (2019) offer an update and a review. An emerging key empirical claim was that the self-selection of migrants to the United States depends on the source country wage distribution. In countries with high (low) returns to skill and high (low) wage dispersion, as in the developing world (Western Europe), there will be negative (positive) selection of migrants. This result was confirmed by many studies following this initial work. An important study by Chiquiar and Hanson (2005) reached other conclusions. Using data from Mexican and U.S. population censuses, these authors found that migrants in the United States are more educated than nonmigrants in Mexico, and that were Mexican immigrants to be paid according to skill prices in Mexico, they would be concentrated in the middle of Mexico's wage distribution. Other studies followed, presenting a plethora of findings within this framework. I discuss the findings here in these terms in Section 6 and sub-Section 7.2 below.

Inter alia, the role of migration policy was examined in this literature. The latter often imposes additional costs and limitations on migrants; for wide ranging international empirical evidence, see Ortega and Peri (2012). They find that tightening of laws regulating immigrant entry reduces their flow rapidly and significantly. I discuss this issue in the current context in Section 4 below.

3. The model

Given the afore-going discussion, the model needs to cater for the following features. Income differences between the two economies should play a role; there should be a distinction between TFP and physical capital determinants and human capital determinants in forming these income differences; it needs to model the job tasks involved; and it needs to cater for self-selection. A suitable model is the Roy (1951) model, as developed and implemented by Heckman and Sedlacek (1985). As is well known, this model has been applied to labor market issues on many occasions.

In sub-Section 3.1 the basic model is presented and in sub-section 3.2 I connect insights from the recent literature, discussed above, to the various components of the model. When coming to implement the model empirically, I use both the self-selection methodology proposed by Heckman (1979), as well as the more recent semi-parametric methodology of D'Haultfoeuille et al. (2018). Elaboration is given in online Appendix B.

3.1. The movers decision

The discussion in this sub-section is based on Heckman and Sedlacek (1985) and uses their notation.

Tasks and production. There are two localities, indexed i, j, the richer, Israeli economy, and the poorer, Palestinian, local economy, in which workers can work. Workers are free to enter the economy that gives them the highest income but are limited to work in only one location at a time. Each location requires a unique, specific task T_i. Each worker is endowed with a vector of skills ($\mathbf{S}$), which enables him to perform location-specific tasks. Packages of skills cannot be unbundled and different skills are used in different tasks. The vector $\mathbf{S}$ is continuously distributed with density $g(\mathbf{S} \mid \Theta)$, where Θ is a vector of parameters. $t_i(\mathbf{S})$ is a non-negative function that expresses the amount of task a worker with the given skill endowment $\mathbf{S}$ can perform and is continuously differentiable in $\mathbf{S}$.

Aggregating the micro supply of task to location i yields:

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

The output of location i is given by:

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

where $\mathbf{I}$ 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 location i. This task price will be denoted by π_i in real terms:

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

Assuming workers are paid their marginal products, real wages per worker in this set-up are given by:

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

Functional forms. I shall be using the following functional form for the task function:

$$\ln t_i(\mathbf{S}) = \beta_{i,0} + \sum_h \beta_{h,i} S_h + u_i \tag{5}$$

where h is an index of skills, $\beta_{i,0}$ is the intercept of the task function and u_i expresses unmeasured skills and their coefficients ($\sum_u \beta_{u,i} S_u$).

Hence:

$$\begin{aligned} \ln w_i(\mathbf{S}) &= \ln \pi_i + \ln t_i(\mathbf{S}) \\ &= \ln \pi_i + \beta_{i,0} + \sum_h \beta_{h,i} S_h + u_i \end{aligned} \tag{6}$$

Travel and psychic costs. The individual worker has travel costs to work. These depend on a vector of variables related to location, to be denoted $\mathbf{L}$, and are formulated as a fraction $k_i(\mathbf{L})$ of wages. This corresponds to the situation whereby part of the worker's wage was used to pay for the work commute. The next section provides more details and in the empirical work I discuss the $\mathbf{L}$ variables.

$$\text{travel costs} = k_i(\mathbf{L}) w_i \tag{7}$$

Income maximization. An income-maximizing individual chooses location i over location j if:

$$w_i(1-k_i(\mathbf{L})) > w_j(1-k_j(\mathbf{L})) \tag{8}$$

This can also be written as:

$$\left[\pi_i t_i(S)\right]\left[1-k_i(\mathbf{L})\right] > \left[\pi_j t_j(S)\right]\left[1-k_j(\mathbf{L})\right] \tag{9}$$

Density of skills. Further analysis requires the adoption of specific functional forms for the density of skills g. Roy (1951) assumed that these are such that the tasks are log-normal i.e., $(\ln t_i, \ln t_j)$ have a mean (μ_i, μ_j) and co-variance matrix Σ (with elements denoted by σ_{ij}). Denoting a zero-mean, normal vector by (u_i, u_j) the workers face two wages:

$$\ln w_i = \ln \pi_i + \mu_i + u_i \tag{10}$$
$$\ln w_j = \ln \pi_j + \mu_j + u_j$$

where

$$\mu_i = \beta_{i,0} + \sum_h \beta_{h,i} S_h$$
$$\mu_j = \beta_{j,0} + \sum_h \beta_{h,j} S_h$$

With these functional specifications, the following holds true:[4]

$$pr(i) = P\left(\ln w_i + \ln\left[1-k_i(\mathbf{L})\right]\right) > \ln w_j + \ln\left[1-k_j(\mathbf{L})\right]\Big) = \Phi(c_i) \tag{11}$$

where

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

and $\Phi(\cdot)$ the cdf of a standard normal variable. The proportion of workers in location i will increase as the relative task price $\ln\frac{\pi_i}{\pi_j}$ rises, as relative costs decline, i.e. as $\ln\frac{[1-k_i(\mathbf{L})]}{[1-k_j(\mathbf{L})]}$ rises, or as the relative mean task $\mu_i - \mu_j$ rises. In addition it depends on the variance and co-variance terms in Σ via σ^*.

3.2. The technology and capital component

I connect the afore-going model to the ideas discussed in sub-Section 2.1 above. Note at the outset that $\ln w_i$ always refers to a wage of a Palestinian worker, not an Israeli worker, and the index i refers to the location – Israel or the local economy. Hence wage gains are going to be empirically examined across locations and pertain to Palestinian workers only, i.e., movers and stayers, not across workers of the different economies, Israelis and Palestinians.

As a parametric specification of Eq. (2), assume a Cobb Douglas production function, with physical capital K, human capital T, and technology A to produce product output in location i:

$$Y_i = K_i^{\alpha}(A_i T_i)^{1-\alpha} \tag{12}$$

Define:

$$z_i \equiv \frac{Y_i}{T_i} \tag{13}$$

$$= K_i^{\alpha} A_i^{1-\alpha} T_i^{-\alpha} \tag{14}$$
$$= \left(\frac{K_i}{T_i}\right)^{\alpha} A_i^{1-\alpha}$$

where z_i is a function of the aggregate variables K, T and A in location i.

In logs:

$$\ln z_i = \alpha \ln\frac{K_i}{T_i} + (1-\alpha)\ln A_i$$

Given that

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

Using (3), one gets that the task price π_i, equals a multiple of the productivity measure, z_i, in the location:

$$\pi_i = \frac{\partial F^i}{\partial T_i} \tag{15}$$
$$= (1-\alpha)K_i^{\alpha}A_i^{1-\alpha}T_i^{-\alpha}$$
$$= (1-\alpha)z_i$$

Using Eq. (6) this means:

$$\ln w_i(\mathbf{S}) = \ln \pi_i + \ln t_i(\mathbf{S}) \tag{16}$$
$$= \ln(1-\alpha) + \ln z_i + \ln t_i(\mathbf{S})$$

Estimation of the log wage equation will provide estimates of z_i, facilitating comparisons with the findings of the development accounting literature. Note, though, that Y_i should not be confused with GDP of the country. Hence Y_i can be, for example, the output in the agriculture and construction sectors in Israel, with the associated job tasks (t_i), not Israeli GDP.

Workers can gain by a move to a richer economy with a higher level of z_i. The worker gains because of work in an economy with higher levels of K and/or A, as seen in Eq. (13). In terms of the preceding analysis, this means that the richer economy has a higher level of π_i. These, however, are not the only consequences for wages. Equation (6) has shown that the term $\sum_h \beta_{h,i} S_h + u_i$ will be important for wages too. This term expresses task performance through the bundle of measured skills ($\mathbf{S}$) and the rewards to these skills ($\beta_{h,i}$).

4. The Palestinian labor market and the data

I describe the features of the Palestinian labor market and explain why this data set suits the question of the move from poor to rich economies. In what follows I draw on Angrist (1995, 1996); Semyonov and Lewin-Epstein (1987), Arnon et al. (1997), (in particular Chapter 3)) and Bartram (1998).[5]

4.1. Palestinian workers in Israel

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 share of salaried employees employed in Israel stood at 22% in 1970, climbed to around 50% in the first half of the 1970s, and then fluctuated around that rate and up to 65%, starting to fall off in the late 1980s. Hence, a key employment decision of the Palestinian male worker was the choice of employment location – Israel or the local economy. Men constituted the bulk of the Palestinian labor force: labor force participation rates for men aged 14 and above in the sample period were about 70%, while women had low participation rates, 7% on average. Palestinian workers were commuting to work, travelling between 30 and 90 minutes to work daily or weekly. Angrist (1996) uses the term "migrant" to define these workers. If staying in Israel for a few nights weekly, they were lodged in low-quality housing, close to the site of employment.

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

[5] For overviews of the Israeli labor market for the relevant sample period, see Berman (1997) and Yashiv (2000).

Travel and housing were provided by the employers or by middlemen, and their costs were deducted from wages.

Angrist (1995) (page 1084) and 1996 (page 427)) reports that Palestinian workers had to apply for work through the Israeli Employment Service. The Employment Service channeled Palestinian workers to Israeli firms, was the unique legal entity through which Israeli firms may have employed them, and their wages were disbursed by the Employment Service. It also deducted taxes, social insurance contributions, and union dues from these payrolls. In this sense, conditions for hiring were the same as those for hiring an Israeli worker. It is also known, from the sources delineated above, that many workers were recruited informally. Employers hiring workers in these ways did not engage in labor union membership, social insurance, and the like. At the same time, workers recruited informally got higher daily take-home wages than legal workers.[6]

The study here differs from the extensive literature on workers-commuters; see Monte et al. (2018) for a prominent recent contribution. In the current case, the two economies (source and host) are not only situated in different countries but also exhibit huge GDP gaps, as delineated below. In the typical commuting case, as discussed in the afore-cited paper, it is the same country and there are substantially smaller gaps in terms of the economies involved. Concurrently, the gaps between source and host countries here in terms of average worker wages are actually very small. In this paper, locals actually earn just slightly less than commuters, on average.

4.2. Changes over time

There were significant changes in the flows of Palestinians into Israel, and in restrictions imposed, or lack of them, over time. These are key in determining the choice of the time period for the data sample used.

In the first few years following 1967, the flow of Palestinian workers into Israel was regulated through the issue of work permits and through centralized payment arrangements. But the market gradually became unrestricted and de-regulated by the end of the 1970s, when employment in Israel increased considerably.

Beginning in December 1987 the labor links between the Israeli and the Palestinian economies 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. Following the August 2005 Israeli withdrawal from the Gaza Strip there has been a series of violent confrontations. Consequently, Palestinian employment in Israel since the end of 1987 was subject to restrictions, much more volatile and, generally, on a declining trend.[7]

4.3. The data and its relations to model formulations

Data. I use data on Palestinian men[8] aged 18–64 from repeated cross sections of the Palestinian Territories Labor Force Survey (TLFS) conducted by the Israeli Central Bureau of Statistics (CBS); for detailed descriptions of this data set, see Central Bureau of Statistics (1996) and Angrist (1995, 1996).[9] The survey used a 1967 CBS-conducted Census as the sampling frame, with a major update in 1987. It was conducted quarterly and included 6500 households in the West Bank and 2000 in Gaza. The TLFS sampling frame included most households in the West Bank and Gaza Strip, regardless of the employment status or work location of the head of household. It included questions on demographics, schooling, and labor market experience. Wages were measured in Israeli Shekels, the currency in circulation both in Israel and in the Palestinian economy. The sample period is 1981–1987, when were no restrictions on Palestinians working in Israel nor any special screening process. I thus purposefully abstain from using pre-1981 or post-1987 data, which did feature extensive and time-varying restrictions. The data follows the model in relating to two groups – movers and stayers; there was no other major location decision and hence no third group. Table A-1 in online Appendix A presents sample statistics.

Key Features. For most, but not all, years, local workers (stayers) earned slightly lower wages. Throughout the sample years, stayers were more educated and more experienced than workers in Israel (movers). Decomposing each group into types of residence, it can be seen that rural residence was the main type for movers. For stayers, rural and urban residence had similar employment shares.

There are three issues that deserve special attention.

Labor Market Setting. Angrist (1995) has empirically studied schooling and the demand for skills using the same data set. He finds (pp. 1065–1071) that returns to schooling in the local Palestinian economy were determined largely by the forces of supply and demand in a segmented market for skilled labor. Israeli firms did pay a premium for some Palestinian schooling groups, but it was much lower than the local premium.

Angrist (1996) estimated a short run demand function for Palestinian workers in Israel. He used a competitive model (see his pages 437–439) and implemented it empirically using data which is taken from the same TLFS survey used here, but relates to a somewhat later time period relative to the current paper. The χ^2 goodness of fit statistics suggest a good fit (see his Table 4 on page 447). The model here accords with this empirical work in the sense that there was a well-behaved demand function for Palestinian workers in Israel within a competitive setting.

The Rich and Poor Economies Context. An important fact in the present context is that there was a substantial rich-poor country difference between Israel and the Palestinian economy. In the sample period, GDP per capita in the Palestinian economy was 20% of the Israeli level using data for both economies from the Israeli Central Bureau of Statistics (CBS), in local currency and current prices.[10] The World Bank puts it at 16%, for that year, using a PPP methodology. This ratio did not rise since then; the World Bank reports the average ratio was 13% in the 25 year period from 1994 to 2018.[11]

How much of this differential holds true for the specific industries which have provided employment for the Palestinian migrant workers? Table 1 presents employment, output, and output per worker data for Israel and for the West Bank and Gaza in 1986 in three industries – construction, manufacturing, and agriculture. As will be seen below, these industries provided for over 80% of employment in Israel for Palestinian workers.

It should be noted that the reported employment and output numbers in each industry in Israel refer to both native and migrant workers. The share of Israeli natives in employment was 26% in construction, 94% in manufacturing, and 78% in agriculture.[12] The table shows that with the exception of West Bank agriculture, output per worker in the Palestinian economies was 13% to 23% of the Israeli figure, similar to the GDP per capita ratios reported above. The exception was a 67% ratio for West Bank agriculture.

[6] Semyonov and Lewin-Epstein (1987, pp.13–15) further describe the institutional arrangements.

[7] For details on developments over time in the Palestinian labor market, see the afore-cited references.

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

[9] I am grateful to Joshua Angrist for the use of his processed version of the TLFS data set.

[10] Source: Tables 2.1, 6.7, 27.1 and 27.9 in the 1991 CBS Statistical Abstract.

[11] Computation is in PPP terms; see https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD

[12] The source is the 1988 CBS Statistical Abstract.

Table 1
Employment, output, and output per worker 1986.

	employment			output			output per worker			ratio	
	Is[a]	WB[b]	Gaza[b]	Is[c]	WB[d]	Gaza[d]	Is	WB	Gaza	WB	Gaza
Construct.	61.8	40.7	23.5	2.1	0.2	0.1	34.2	6.2	4.5	0.18	0.13
Manuf.	322.4	27.2	16.2	6.8	0.1	0.06	21.2	4.9	3.6	0.23	0.17
Agric.	70.0	38.6	17.9	1.6	0.6	0.1	22.4	14.9	5.7	0.67	0.25

Notes:

1. Source is the Israel CBS Statistical Abstract for 1988 as follows: a. Table 9, Chapter 12; b. Table 20, Chapter 27; c. Table 7, Chapter 6; d. Table 10, Chapter 27.
2. Employment is in thousands, output is in billions of ILS, output per worker in thousands of ILS, and ratio is of output per worker in the two locations.
3. Employment and output numbers in each industry in Israel pertain to both native and migrant workers. The share of Israeli natives in employment was 26% in construction, 94% in manufacturing, and 78% in agriculture.

Table 2
Industry and occupation distributions by work locations, 1987.

a. Industry Distributions		
industry	Local	Israel
agriculture	4%	12%
manufacturing	25%	20%
construction	22%	49%
commerce	6%	9%
government	32%	6%
transportation	6%	2%
personal services	5%	3%
finance	1%	0%
b. Occupation Distributions		
occupation	**Local**	**Israel**
academic	6%	0%
professionals	12%	1%
managers	1%	0%
clerical workers	9%	1%
agents, sales and services	12%	14%
skilled job in agriculture	4%	13%
manufacturing and construction skilled jobs	35%	29%
unskilled	22%	42%

Thus, despite the relatively short geographical distances, significant differences in productivity existed (and continue to exist) between the economies. This, then, was a special situation: capital and productivity differences were sufficiently high so as to conform oft-documented rich-poor countries differences, typically not found within a single country. At the same time, the relatively short distances facilitated a low-cost move from the poor to the rich economy.

Occupations and industries employment distributions. It is worthwhile to look at the local and Israel employment distributions across occupations and industries in light of the discussion on tasks. These are presented in Table 2.

Government, personal, and financial services account for about 40% of local employment, while in Israel employment was highly concentrated (over 80%) in three industries – construction, manufacturing and agriculture. In terms of occupations, 19% of local workers were employed in high-skilled occupations (the top three in the table) vs. 1% in such occupations in Israel. These facts will be important for the interpretation of the results.

5. Methodology

I estimate self-selection and wage equations for Palestinian men working in Israel and East Jerusalem as one location and working locally in the West Bank and Gaza as the other location. In what follows I present the two econometric methodologies (5.1) and discuss the uniqueness of this data set in terms of eschewing mis-specification and potential bias (5.2).

5.1. The econometric methodologies

I use two alternative methods to estimate Eq. (10), for workers employed locally and those employed in Israel. These methods are elaborated in online Appendix B; the following is a short summary.

5.1.1. The Heckman selection method

The Heckman (1979) selection methodology is applied. The way the model here can be estimated using exclusion restrictions is by postulating variables that affect travel costs, and hence selection, but possibly not wages. Three variables may fit this requirement. One is geographical regions or localities . This is a useful measure of the determinants of travel costs because workers' homes are located in different distances from the locations of employers. Its variability (second moment) is sufficient for this purpose, though its level (first moment) is not high (see Table B-2 and the discussion around it in online Appendix B). The second variable is type of residence. It includes rural areas, urban areas, and refugee camps. These may serve to indicate travel costs as rural residents are likely to be more spread out and refugee camps residents are likely to be more concentrated. In camps there are likely to be organized, common means of transport. The third variable is marital status. While not directly related to travel costs, it may serve to indicate costs that pertain to the economic life of the household. I use either the first (geographical regions) or all three variables as exclusion restrictions. Note that in what follows I also use a semi-parametric specification, which does not necessitate the use of exclusion restrictions as an alternative methodology.

For the task function variables **S**, included in both the selection and wage equations, I use education and a linear-quadratic formulation for experience.[13] I also use indicator variables for the quarters.

The dependent variable in the wage equation is the log of hourly wages ($\ln w_i$), defined as the monthly wage divided by hours worked. The use of hourly wages is designed to avoid confounding the choice of work place with the choice of work time (hours or days).[14] Education ($educ$) and experience (exp) are defined in years. The first specification reported below features only the geographical exclusion restrictions. The second specification includes in the set of exclusion restrictions all three variables discussed above. The third specification uses OLS to test for the effect of selection correction, running only the wage equation.

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

[14] The sample truncates the bottom 1% and the top 0.2% of the wage distribution. For these observations wages are either extremely low or unreasonably high, 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).

5.1.2. Semi-parametric estimation

I use the semi-parametric methodology proposed by D'Haultfoeuille et al. (2018) and D'Haultfoeuille et al. (2019) to estimate the model equations (10) without relying on exclusion restrictions. The background to this methodology is the finding that identification without instruments is possible. The key condition for that is that selection be independent of the covariates at infinity, i.e., when the outcome takes arbitrarily large values. If selection is indeed endogenous, one can expect the effect of the outcome on selection to dominate those of the covariates, for sufficiently large values of the outcome. This idea is implemented by using an estimator based on an extremal quantile regression, i.e., a quantile regression applied to the upper tail of the outcome variable. Online Appendix A provides a formal definition.

5.2. Data uniqueness and issues of misspecification bias

The current model, given the unique data features discussed above, is not subject to potential mis-specification, which is prevalent in many self-selection models. This is so as generally there may be other determinants, beyond wage differences net of costs, affecting the moving decision. The set up of the current paper *precludes* this possibility. In what follows I show what a model with these other variables entails and the ensuing mis-specification when these determinants are not taken into account. As shown below, this is *not* just a case of omitted variables bias in the wage equation.

5.2.1. Determinants affecting the move to a rich economy

The analysis in Dao et al. (2018) presents variables that potentially drive the moving decision. In the current case they do not play a role and hence their omission is not problematic, as explained in the subsequent discussion.

Geographical distance. The distance to be travelled is an obvious determinant, affecting costs, including possibly socio-psychological costs. In the current case this was a commute and the distance was travelled, usually daily or weekly, in a matter of 30 to 90 minutes. Hence, while it can be used to facilitate identification as done below, it did not generate large scale costs.

Family linkages and local social networks. Movers may be motivated by the wish to bring and join families in host economies or by the possibility to use local migrant networks. This is not the case here, as the families of movers did not leave their homes and there was no host economy network.

Credit constraints. Credit constraints play a big role in moving decisions. The costs involved may be such that they require taking out loans. In the current case, costs were relatively small. In many cases the relevant costs, such as transportation and housing in Israel, were paid for by the employers, partly or fully out of wages. This did not necessitate the use of loans.

Welfare benefits. Movers are frequently attracted by the possibility to receive welfare benefits and various other forms of social assistance from host economies. This was completely absent in the current case.

Insurance motives. Movers may be concerned in some cases with negative events or shocks in the home economy, actual or anticipated. Moving has therefore a kind of insurance motive, including from the perspective of the wider family. This kind of motive may have played a certain role after 1987, when adverse shocks did occur. But in the sample period this kind of motive did not exist.

Social-Psychological issues. Movers are often affected by difficulties in leaving home for social and psychological reasons. In this case the separation from home was very short-lived, a few consecutive days at most. Hence this determinant had much less power, if at all.

It should be noted that the list above encompasses both benefits and costs of migration. On both dimensions this is not an issue in the current data. Indeed, the main costs were travel costs, which are captured by the formulation discussed in sub-Section 5.1.1.

5.2.2. Potential mis-specification

To understand the potential mis-specification here, the following is a brief version of a generalized Roy model, incorporating the determinants discussed above, implemented to the current setting.

Following the formulation of D'Haultfoeuille and Maurel (2013) of such a Roy model, the non-wage component of the location decision is allowed to vary across individuals and is given by:

$$G_i(X) = \mu_i(X) + U_i \tag{17}$$

whereby $\mu_i(X)$ is the deterministic part, and $U_i \sim N(0, \sigma_U^2)$. X is a vector of variables, and U_i is a distribution, both reflecting the afore-listed variables. Note that $-G_i(X)$ can be interpreted as a cost of moving to location i. It is the $G_i(X)$ function, which captures the effects of the variables discussed in the preceding sub-section above.

Denote by w_i potential wages in location i and by η_i location specific productivity terms, and so:

$$E(w_i \mid X, \eta_i) = \psi_i(X) + \eta_i \tag{18}$$

Assuming

$$\eta_i \sim N(m_i, \sigma_{\eta_i}^2) \tag{19}$$

Importantly the functions μ_i and ψ_i are not the same and η_i reflects productivity and not non-wage factors of the kind discussed above and captured by U_i. Essentially, $m_i = \pi_i$ in the current model.

Unlike the model presented above, choice in this case is based not only on income maximization. Rather, each worker chooses the location, which yields the highest utility, given by

$$\bar{U}_i = \psi_i(X) + \eta_i + G_i(X) \tag{20}$$

The point is that the current paper posits $G_i(X) = 0$ in line with the data but in many empirical cases this does not hold true.

Heckman and Sedlacek (1985, Appendix B) analytically derive, in their equations B2 and B3,[15] the density of wages in each location, w_i, conditional on the choice $\bar{U}_i > \bar{U}_j$.These conditional wage densities are functions of trivariate normal integrals, which themselves are functions of (inter-alia) the non-wage component $G_i(X)$.Within this latter component, $\mu_i(X)$ and U_i, with its variance σ_U^2, play a role. Thus, the potential mis-specification arises whenever $\mu_i(X) \neq 0$ or $\sigma_U^2 \neq 0$ or both, as is very likely to be the case in numerous applications.

Note, then, the potential problem is not just a case of omitted variables bias in the wage equation. The optimal location selection, based on Eq. (20), is mis-specified, and, as the object of interest are wages conditional on selection, any estimation of wages is mis-specified. One needs a data set of the kind used in this paper to avoid this state of affairs, or, alternatively, a very rich data set which can allow for the identification of $G_i(X)$.

The idea, then, is that most, if not all, self-selection models of migration, which run wage regressions corrected for self selection – as does Borjas (1997) and the large literature reviewed in sub-Section 2.2 – suffer from mis-specification. This is so as they typically do not include the full list of variables spelled out above (drawing on Dao et al. (2018)). The consequence is, in terms of the equations above, that the term $G_i(X)$ is omitted. In the current case these variables do not play a role and hence their omission is not problematic.

6. Results

Table 3 reports the full results of the Heckman methodology using the two alternative sets of exclusion restrictions, and using OLS, for the TLFS cross-section in the year 1987, which has the highest data quality.[16]

[15] Assuming particular functional forms for $\psi_i(X)$ and $\mu_i(X)$.

[16] I include estimates of the implied second moments and the Wald test (using χ^2 test statistics, with p-values in parentheses).

The OLS estimates are relatively close to the Heckman selection-corrected ones, except for slight differences in the estimates of the intercept in Israel employment. The emerging picture across columns 1 and 2 is the same, but column 1 has higher point estimates for the returns to skills. Overall, the differences in point estimates across specifications are not substantial. In what follows, I use the specification of column 1 as the benchmark, i.e., the one with the smaller exclusion restrictions set.

Fig. 1 present key point estimates for the seven repeated cross-sections in the years 1981 to 1987, using this preferred specification. Table B-1 in online Appendix B reports the full set of results.

The main results to note from Table 3 and Fig. 1, as well as from Table B-1, are as follows.

(i) The constant of the equation, essentially capturing $(1-\alpha)z_i \equiv (1-\alpha)\left(\frac{K_i}{Y_i}\right)^{\frac{\alpha}{1-\alpha}} A_i$, is much higher in Israel relative to the local economy.
(ii) The returns to education and experience are much lower in Israel than in the local economy.
(iii) The selection of work in Israel is negatively related to education, experience, refugee camp and urban residence, and is positively related to being married. The magnitudes of the region coefficients are reasonable; areas that are relatively more distant from Israeli employment locations have lower coefficients of Israel selection than regions, which are relatively closer.

Table 4 reports the results of implementing the semi-parametric methodology discussed in sub-Section 5.1.2 above. It presents the skill premia estimates,[17] and repeats the results of the Heckman specification for all cross-sections in the years 1981–1987.

The table shows that, overall, the finding in point (ii) above holds true across all years and across the two estimation methodologies. This means that the returns to education and experience are found to be much lower in Israel than in the local economy. The semi-parametric estimates of returns to education and to experience in the local (Israeli) economy are somewhat lower (higher) than the Heckman estimates, hence the semi-parametric methodology points to a somewhat lower gap of the skill premia between the two economies.

[17] This methodology does not facilitate the estimation of the intercept.

In the next sections I discuss the these results.

7. Discussion

7.1. Components of Mean Wage Differentials and Their Significance

Understanding the move to a rich economy, which is based solely on the wage differential between movers and stayers, requires analysis of its components.[18]In Fig. 2, I quantify the relative role played by the key elements of the model, in terms of means – task prices, skill premia, skill levels, and selectivity effects.[19]

The figure reports the constituents of mean wages in each of the locations, using the following equations (see Heckman (1979)):

$$\begin{aligned} &\overline{\ln w_{local}} \mid (w_{local} > w_{Israel}) \\ &= \hat{k}_{local} + \hat{\boldsymbol{\beta}}_{local}\overline{\mathbf{S}}_{local} + \left(\widehat{\rho_{local}\sqrt{\sigma_{local}}}\right)\overline{\widehat{\lambda_{local}}} \\ &\overline{\ln w_{Israel}} \mid (w_{Israel} > w_{local}) \\ &= \hat{k}_{Israel} + \hat{\boldsymbol{\beta}}_{Israel}\overline{\mathbf{S}}_{Israel} + \left(\widehat{\rho_{Israel}}\widehat{\sqrt{\sigma_{Israel}}}\right)\overline{\widehat{\lambda_{Israel}}} \end{aligned} \tag{21}$$

where $\overline{\ln w_i}$ is the mean log hourly wage (conditional on selection) in economy $i, \hat{k}_i = \ln \hat{\pi}_i + \widehat{\beta_{i,0}}$ for economy i using the point estimates of the wage equation's constant, $\hat{\boldsymbol{\beta}}_i$ is a vector of the point estimates of the coefficients in economy i, $\overline{\mathbf{S}}_i$ is a vector of the mean values of the independent variables in economy i, and $\hat{\rho}_i\widehat{\sqrt{\sigma_i}}\overline{\widehat{\lambda_i}}$ are the estimates of the second moments $(\hat{\rho}_i\widehat{\sqrt{\sigma_{ii}}})$ times the average of the estimated inverse of Mills' ratio $(\overline{\widehat{\lambda_i}})$. The figure pertains to the repeated cross-sections in the period 1981–1987, using the Heckman methodology.

The mean wage differential between Palestinian workers in the Israeli economy and in the local economy $(\overline{\ln w_{local}} - \overline{\ln w_{Israel}})$, broken down into components, can be presented as follows.

$$\overline{\ln w_{local}} \mid (w_{local} > w_{Israel}) - \overline{\ln w_{Israel}} \mid (w_{Israel} > w_{local}) \tag{22}$$

[18] Note that the wage differential analysis undertaken here pertains to Palestinian workers movers and stayers, not to native workers of the two economies.
[19] I do so using actual data and the point estimates reported in Table B-1. Table B-2 in Online Appendix B presents the full set of results.

Table 3
Heckman two step estimates 1987.

a. The Selection Equation: Probability of selection of employment in Israel

	1	2
constant	0.54***	1.37***
	(0.096)	(0.102)
education	−0.09***	−0.09***
	(0.003)	(0.003)
experience	−0.03***	−0.04***
	(0.003)	(0.004)
experience^2/100	0.03***	0.04***
	(0.005)	(0.006)
married		0.17***
		(0.030)
urban residence		−0.99***
		(0.026)
refugee camp residence		−0.36***
		(0.032)
Jenin	1.00***	0.35***
Nablus	0.24***	−0.17*
Tulkarm	1.30***	0.83***
Ramallah	0.70***	0.08
Bethlehem	0.93***	0.42***
Hebron	0.71***	0.24***
Rafah	1.32***	1.13***
Gaza	0.97***	0.96***
Khan Yunis	1.46***	1.22***

(*continued on next page*)

Table 3 (*continued*)

b. The Wage Regression

	(1)		(2)		(3)	
exclusion	**one, Set 1**		**three, Set 2**		**OLS**	
restrictions	Local	Israel	Local	Israel	Local	Israel
constant	−0.125**	0.582***	0.021	0.583***	0.110***	0.583***
	(0.040)	(0.017)	(0.027)	(0.017)	(0.020)	(0.017)
Q2	0.073***	0.113***	0.079***	0.112***	0.080***	0.112***
	(0.013)	(0.009)	(0.013)	(0.009)	(0.013)	(0.009)
Q3	0.055***	0.178***	0.068***	0.177***	0.068***	0.177***
	(0.014)	(0.009)	(0.013)	(0.009)	(0.013)	(0.009)
Q4	0.139***	0.246***	0.145***	0.246***	0.144***	0.246***
	(0.013)	(0.009)	(0.013)	(0.009)	(0.013)	(0.009)
education	0.044***	0.010***	0.039***	0.012***	0.037***	0.012***
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
experience	0.036***	0.017***	0.034***	0.017***	0.033***	0.017***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
experience^2	−0.047***	−0.027***	−0.045***	−0.028***	−0.044***	−0.028***
(/100)	(0.003)	(0.002)	(0.003)	(0.002)	(0.003)	(0.002)
ρ_i	0.362	0.084	0.157	0.004		
$\sqrt{\sigma_{ii}}$	0.415	0.346	0.401	0.345		
R^2					0.187	0.094
Wald/F test	1,335	1,131	1,576	1,144	278	200
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
n	7,248	11,580	7,248	11,580	7,248	11,580

Notes:

1. The equation in panel a relates to the probability of selection of employment in Israel. According to the model one observes $\ln w_i$ only if $z^* > 0$ i.e., when $z = 1$. So we have:

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

Thus:

$$\begin{aligned} \Pr(z &= 1) = \Phi(\ln \frac{\pi_i}{\pi_j} + \ln \frac{(1-k_i(\mathbf{L}))}{(1-k_j(\mathbf{L}))} + \beta_i \mathbf{S} - \beta_j \mathbf{S} + u_i - u_j) \\ \Pr(z &= 0) = 1 - \Phi(\ln \frac{\pi_i}{\pi_j} + \ln \frac{(1-k_i(\mathbf{L}))}{(1-k_j(\mathbf{L}))} + \beta_i \mathbf{S} - \beta_j \mathbf{S} + u_i - u_j) \end{aligned}$$

2. The wage equation in panel b is given by:

$$\ln w_i \mid (z=1) = \ln \pi_i + \beta_i \mathbf{S} + \rho_i \sqrt{\sigma_{ii}} \lambda(c_i) + v_i$$

It is estimated with two sets of exclusion restrictions in columns 1 and 2, respectively, and uses OLS in column 3 (dropping $\lambda(c_i)$).

3. For the exclusion restrictions, Set 1 is given by

$$\mathbf{L} \in [\text{region of residence}]$$

Set 2 is given by

$$\mathbf{L} \in [\text{region of residence, marital status, urban status}]$$

4. Q_t $(t = 2, 3, 4)$ indicates quarter within the year.

5. The sample includes all wage earners except those with hourly wages below the lowest 1% or above the highest 0.2%.

6. Standard errors of the coefficients are reported in parentheses, except for the region of residence variables in panel a.

7. Three stars denote significance at 1%, two at 5%, and one at 10%.

8. The baseline region of residence is the Jordan valley and the baseline type of residence is rural.

9. The second moments satisfy the following relation:

$$\rho_i = \frac{\sigma_{ii} - \sigma_{ij}}{\sqrt{\sigma_{ii}}\sigma^*}$$

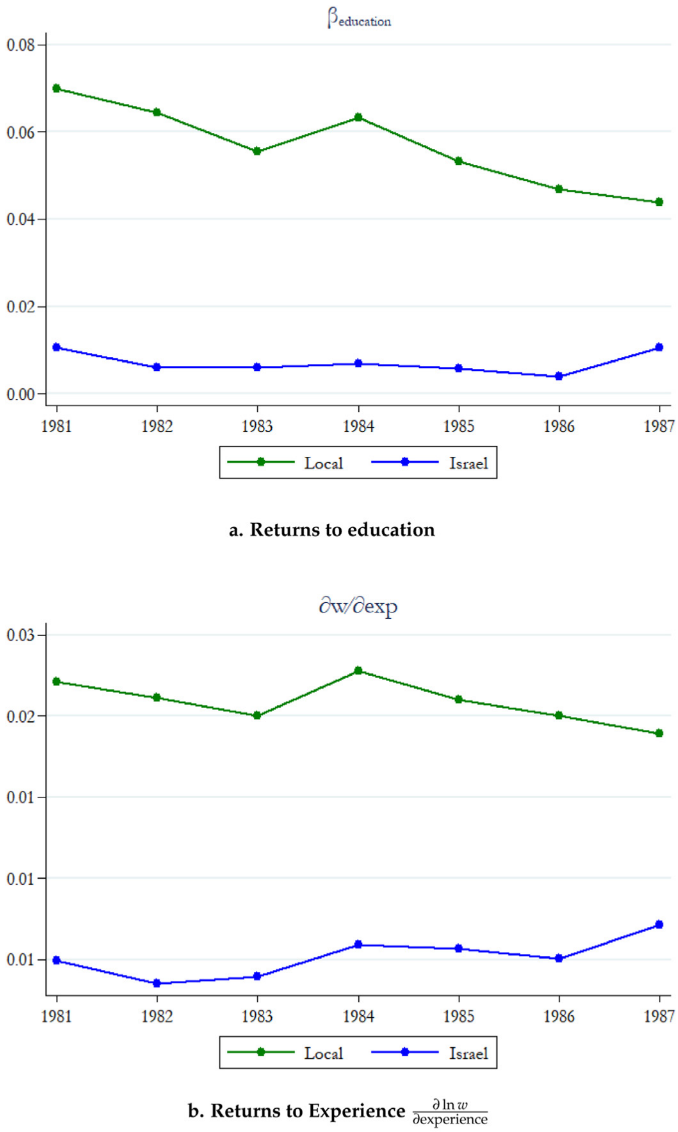


Fig. 1. Point estimates of skills returns. Note: Based on the estimates reported in Table B-1.

$$
\begin{aligned}
&= \widehat{k}_{local} - \widehat{k}_{Israel} \\
&\quad + \overline{\mathbf{S}}_{Israel}(\widehat{\boldsymbol{\beta}}_{local} - \widehat{\boldsymbol{\beta}}_{Israel}) + \widehat{\boldsymbol{\beta}}_{local}(\overline{\mathbf{S}}_{local} - \overline{\mathbf{S}}_{Israel}) \\
&\quad + \left(\widehat{\rho}_{local}\sqrt{\widehat{\sigma_{local}}}\right)\overline{\widehat{\lambda}_{local}} - \left(\widehat{\rho_{Israel}}\sqrt{\widehat{\sigma_{Israel}}}\right)\overline{\widehat{\lambda}_{Israel}}
\end{aligned}
$$

The components include the part due to differences in task prices plus the intercept of the task function $\widehat{k}_{local} - \widehat{k}_{Israel}$; a part due to differences in skill premia across the two locations $(\widehat{\boldsymbol{\beta}}_{local} - \widehat{\boldsymbol{\beta}}_{Israel})\overline{\mathbf{S}}_{Israel}$; a part due to differences in skill levels across the two locations $\widehat{\boldsymbol{\beta}}_{local}(\overline{\mathbf{S}}_{local} - \overline{\mathbf{S}}_{Israel})$; and a part due to differences in selection effects $\left(\widehat{\rho}_{local}\sqrt{\widehat{\sigma_{local}}}\right)\overline{\widehat{\lambda}_{local}} - \left(\widehat{\rho_{Israel}}\sqrt{\widehat{\sigma_{Israel}}}\right)\overline{\widehat{\lambda}_{Israel}}$).

The key findings from Fig. 2 (as well as Table B-3) are as follows.

The mean wage differential in the data. The data show that the mean wage differential for Palestinian workers across locations $\overline{\ln w_{local}} - \overline{\ln w_{Israel}}$ is small and changes sign across years. It ranges between −0.08 and +0.17 log points.

Moving premium. The wage equation's intercept – reflecting the task price π_i and the task function intercept $\beta_{i,0}$ – is substantially higher in Israel. The $\widehat{k}_{local} - \widehat{k}_{Israel}$ difference ranges between −0.48 and −1.09 log points across the seven years of repeated cross sections. Note that this difference in baseline wages, or 'moving premium,' is much higher than the afore-cited difference in mean wages between Israel and local employment. Hence there is a large offset to the moving premium to which I turn now.

Skill premia.

Table 4
Heckman and semi parametric estimates 1981-1987.

	Semi Parametric			Heckman		
1981	**local**	**Israel**	**diff**	**local**	**Israel**	**diff**
educ	0.052***	0.021***	−0.031	0.070***	0.011***	−0.059
	(0.003)	(0.004)		(0.002)	(0.002)	
exp	0.022***	0.022***	0.000	0.044***	0.017***	−0.027
	(0.004)	(0.003)		(0.002)	(0.001)	
exp^2	−0.021***	−0.032***	−0.011	−0.050***	−0.029***	0.020
/100	(0.006)	(0.006)		(0.003)	(0.002)	
1982	**local**	**Israel**	**diff**	**local**	**Israel**	**diff**
educ	0.041***	0.018***	−0.023	0.064***	0.006***	−0.058
	(0.003)	(0.003)		(0.002)	(0.002)	
exp	0.023***	0.019***	−0.004	0.043***	0.013***	−0.030
	(0.002)	(0.003)		(0.002)	(0.001)	
exp^2	−0.024***	−0.026***	−0.001	−0.050***	−0.024***	0.026
/100	(0.005)	(0.005)		(0.003)	(0.002)	
1983	**local**	**Israel**	**diff**	**local**	**Israel**	**diff**
educ	0.044***	0.013***	−0.031	0.055***	0.006***	−0.049
	(0.002)	(0.003)		(0.002)	(0.002)	
exp	0.030***	0.015***	−0.016	0.044***	0.014***	−0.031
	(0.002)	(0.002)		(0.002)	(0.001)	
exp^2	−0.036***	−0.023***	0.013	−0.058***	−0.025***	0.033
/100	(0.004)	(0.003)		(0.004)	(0.002)	
1984	**local**	**Israel**	**diff**	**local**	**Israel**	**diff**
educ	0.051***	0.030***	−0.021	0.063***	0.007***	−0.056
	(0.002)	(0.003)		(0.002)	(0.002)	
exp	0.031***	0.027***	−0.004	0.044***	0.017***	−0.027
	(0.002)	(0.003)		(0.002)	(0.002)	
exp^2	−0.034***	−0.037***	−0.002	−0.054***	−0.030***	0.024
/100	(0.004)	(0.006)		(0.003)	(0.003)	
1985	**local**	**Israel**	**diff**	**local**	**Israel**	**diff**
educ	0.051***	0.020***	−0.031	0.053***	0.006***	−0.047
	(0.003)	(0.003)		(0.002)	(0.002)	
exp	0.029***	0.024***	−0.006	0.041***	0.017***	−0.024
	(0.003)	(0.002)		(0.002)	(0.001)	
exp^2	−0.029***	−0.035***	−0.006	−0.050***	−0.029***	0.021
/100	(0.006)	(0.003)		(0.003)	(0.002)	
1986	**local**	**Israel**	**diff**	**local**	**Israel**	**diff**
educ	0.040***	0.014***	−0.026	0.047***	0.004 * *	−0.043
	(0.002)	(0.003)		(0.002)	(0.002)	
exp	0.027***	0.015***	−0.012	0.038***	0.014***	−0.024
	(0.002)	(0.002)		(0.001)	(0.001)	
exp^2	−0.031***	−0.022***	0.009	−0.048***	−0.026***	0.022
/100	(0.003)	(0.003)		(0.003)	(0.002)	
1987	**local**	**Israel**	**diff**	**local**	**Israel**	**diff**
educ	0.032***	0.011***	−0.021	0.044***	0.010***	−0.033
	(0.002)	(0.001)		(0.002)	(0.001)	
exp	0.026***	0.014***	−0.012	0.036***	0.017***	−0.020
	(0.002)	(0.001)		(0.001)	(0.001)	
exp^2	−0.034***	−0.022***	0.012	−0.047***	−0.027***	0.020
/100	(0.004)	(0.002)		(0.003)	(0.002)	

Notes:
1. The Heckman estimates are taken from Table B-1.
2.The semi-parametric estimation methodology is described in sub-section 5.1.2 and in online Appendix B.

The local returns to education and experience[20] are higher in the local economy, as seen in Table 2 and in Fig. 2 (as well as in Tables B-1 and B-2). Hence one gets $\widehat{\boldsymbol{\beta}}_{local}\overline{\mathbf{S}}_{local} - \widehat{\boldsymbol{\beta}}_{Israel}\overline{\mathbf{S}}_{Israel} >> 0$. This difference ranges between 0.60 and 1 log points across the sample years.

Equation (22) breaks this latter expression down into two components: the skill premia difference component $\overline{\mathbf{S}}_{Israel}(\widehat{\boldsymbol{\beta}}_{local} - \widehat{\boldsymbol{\beta}}_{Israel})$ plays the major part, ranging between 0.54 and 0.88 across the sample years; the skill stocks component $\widehat{\boldsymbol{\beta}}_{local}(\overline{\mathbf{S}}_{local} - \overline{\mathbf{S}}_{Israel})$ ranges between 0.07 and 0.12 across the years.

Selection on Observables. Less educated and less experienced workers chose to work in Israel; those with better skills chose to work locally and were compensated for the baseline 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 by the actual, observed locational distributions by education and age, presented below.

Tasks, skill premia, and selection. How can one account for the fact that the returns to the same skills differ markedly for movers and stayers? The local economy rewarded education and experience substantially more, which can be explained by looking more closely at the types of jobs in each economy. Table 2 above has shown the distribution of employment across industries and occupations. Local employment was characterized by industries and occupations that presumably require the performance of more analytical tasks. As noted, government, personal, and financial services account for about 40% of local employment. In contrast, in Israel employment was highly concentrated (over 80%) in three industries – construction, manufacturing and agriculture, typically requiring manual tasks. In terms of occupations, 19% of local workers were employed in high-skilled occupations (the top three in the table) vs. 1% in such occupations in Israel. Hence it is not surprising that local employment offered higher returns for education and experience. This set-up is consistent with the formulations of the model, whereby the two locations require the performance of different tasks T_i and which rewards skills differentially.

Importantly, this pattern is consistent with the findings of Autor and Handel (2013) on returns to analytical and manual skills (see their Tables 5 and 6), using detailed U.S. task and job data. This last point is key, as will be shown in the interpretation of the results against the background of the findings of the development accounting literature.

Selection on Unobservables. The last term in Eq. (22), $\left(\widehat{\rho}_{local}\sqrt{\widehat{\sigma_{local}}}\right)\overline{\widehat{\lambda_{local}}} - \left(\widehat{\rho_{Israel}}\sqrt{\widehat{\sigma_{Israel}}}\right)\overline{\widehat{\lambda_{Israel}}}$, ranges between −0.09 and +0.03. Section 7.2 below goes into detail about the type of selection involved here.

Summary – Accounting for the Wage Differential. The afore-going discussion portrays the following picture. While there is variation across sample years, the constant in Israel is substantially higher, i.e., $\widehat{k}_{Israel} >> \widehat{k}_{local}$; the converse in true for the task component whereby $\widehat{\boldsymbol{\beta}}_{local}\overline{\mathbf{S}}_{local} >> \widehat{\boldsymbol{\beta}}_{Israel}\overline{\mathbf{S}}_{Israel}$. The skill premia difference, with $\widehat{\boldsymbol{\beta}}_{local} - \widehat{\boldsymbol{\beta}}_{Israel} >> 0$, played the major role. The differences in self-selection on unobservables were relatively small. Hence the afore-cited two big components offset each other to a large extent, yielding a small wage differential in four sample years in favor of the Israeli location, twice in favour of the local location, and once there was no differential across sample years.

Online Appendix C undertakes an analysis of the differences across the local and Israel wage distributions, not just the means, reaching similar conclusions.

[20] The table makes use of point estimates. The linear-quadratic experience premia *profile* in the local economy, shown in Fig. 1 above, lies well above that of Israel.

7.2. Patterns of self-selection on unobservables

I turn to discuss the results in terms of self-selection on unobservables. To see the roles of unobserved skills within a task framework, consider the following equation:[21]

$$\begin{aligned}\ln t_{Israel} &= \mu_{Israel} + \frac{\sigma_{local,Israel}}{\sigma_{local}}(\ln t_{local} - \mu_{local}) + \varepsilon_{Israel} \\ &= \left(\mu_{Israel} - \frac{\sigma_{local,Israel}}{\sigma_{local}}\mu_{local}\right) + \frac{\sigma_{local,Israel}}{\sigma_{local}}\ln t_{local} + \varepsilon_{Israel}\end{aligned} \tag{23}$$

where:

$$\varepsilon_{Israel} = u_{Israel} - u_{local}\frac{\sigma_{local,Israel}}{\sigma_{local}}; \qquad E\varepsilon_{Israel} = 0;$$

$$var\ \varepsilon_{Israel} = \sigma_{Israel}\left[1 - \frac{\sigma^2_{local,Israel}}{\sigma_{local}\sigma_{Israel}}\right]$$

Fig. 3 depicts this relation in the 3D space of log tasks $(\ln t_{local}, \ln t_{Israel})$ and ε_{Israel} (the latter expressing differences between unobserved skills in Israel and in the local economy), using the point estimates and second moments for 1981 and for 1987 (in two panels).

The figure has the following elements. For any given worker, his log task value in each location is indicated on two axes and his unobserved skills differences (ε_{Israel}) value is given on the third axis. The (red) regression line gives the linearly predicted log task value in the Israel location, i.e., predicted $\ln t_{Israel}$. It has the intercept given by $\mu_{Israel} - \frac{\sigma_{local,Israel}}{\sigma_{local}}\mu_{local}$,[22] and the slope given by $\frac{\sigma_{local,Israel}}{\sigma_{local}}$. Actual values lie along the normal distribution around the regression line, as shown in two places in the figure in orange. The data points are distributed – conditional on the $\ln t_{local}$ value – with $var\ \varepsilon_{Israel}$. The black line in the figure is the 45 ° line serving as the line of equal income $(\ln w_{local} = \ln w_{Israel})$.[23] This 45 ° line is the demarcation line in this figure for the moving decision: when the worker has a value below this line he chooses the local economy; above it, he chooses to work in Israel. Hence, the fraction of workers choosing to move is the part of the normal distribution above the line, while the part below it is the fraction of stayers. The green and blue lines express the average $\ln t_i$ values for local and Israel employment, respectively.

Three major features of the analysis are manifested in the figure.

The effect of the move to the rich economy. The Israeli economy, being more productive, has a higher task price i.e., $\pi_{Israel} > \pi_{local}$. Hence the (black) line of equal income starts from below 0.[24]

Negative selection on observables. Moving along the (red) regression line, the workers with relatively low $\ln t_{local}$ (low observable skills) choose to work in Israel, as in that region the regression line lies above the 45 ° line; with relatively high $\ln t_{local}$ workers (those with high observable skills) choose to work locally.

Positive selection on unobservables. The figure illustrates the positive selection on unobservables in each location.[25] In 1981, the term $\frac{\sigma_{local,Israel}}{\sigma_{local}}$ is positive and less than 1, a case of comparative advantage. The regression line is less steep than the black 45 degrees line and starts above it. In 1987, as in most of the sample years, the regression slope is negative, a case of absolute advantage. In both cases, when individuals

[21] Derived from multiplying both sides of the equation $\ln t_{local} = \mu_{local} + u_{local}$ by $\frac{\sigma_{local,Israel}}{\sigma_{local}}$ and subtracting from $\ln t_{Israel}$.

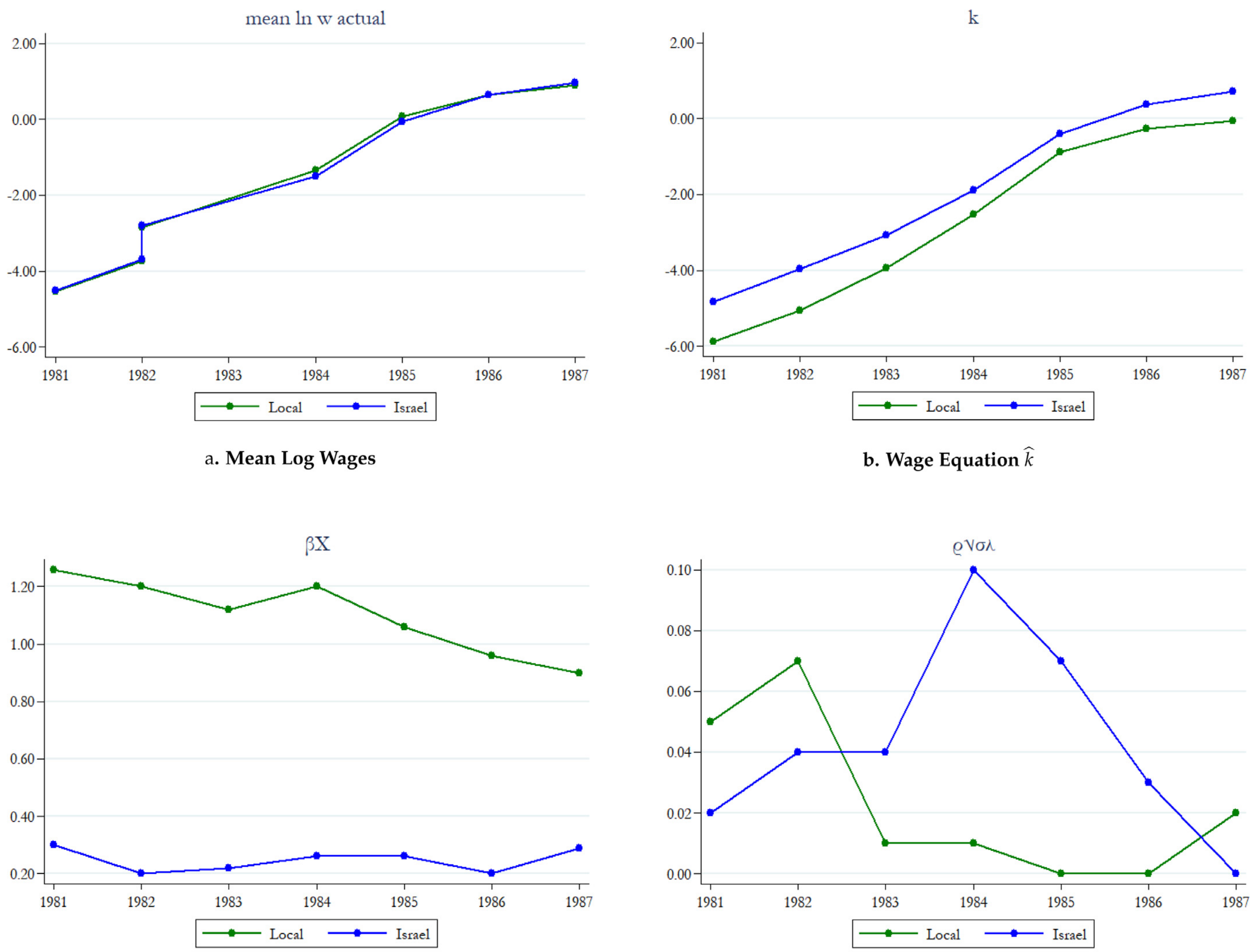
[22] I use the point estimates of the coefficients in 1981 and 1987, and the sample means of the X variables, to generate μ_{local} and μ_{Israel}. I adopt the normalization of $\beta_0 = 0$.

[23] Equal income means $\ln w_i = \ln w_j$ or $\ln \pi_i + \ln t_i = \ln \pi_j + \ln t_j$. Hence it is given by $\ln t_j = \ln \pi_i - \ln \pi_j + \ln t_i$.

[24] The intercept is given by $\ln \pi_{local} - \ln \pi_{Israel}$.

[25] This means that in each sector

$$E\left(\ln w_i \mid \{\ln w_i + \ln\left[1 - k_i(\mathbf{L})\right] > \ln w_j + \ln\left[1 - k_j(\mathbf{L})\right]\}\right) > E(\ln w_i).$$



a. **Mean Log Wages**

b. **Wage Equation** $\widehat{k}$

c. $\widehat{\beta}\overline{\mathbf{X}}$

d. **Selection term** $\widehat{\rho}\widehat{\sqrt{\sigma}}\widehat{\overline{\lambda}}$

Fig. 2. Log wage regressions decompositions. Note: Based on Table B-3.

are classified according to their task value, the fraction of people working locally increases as the local task level increases. In other words, as one moves up the $\ln t_{local}$ axis, the fraction of workers in the normal distribution selecting the local economy rises. A similar graph with $\ln t_{israel}$ on the horizontal axis (not plotted here) would show a similar selection effect in the Israeli economy.

Comparative statics and policy effects. One question of interest is to consider how moving behavior would change following changes in the observed skill premia and in the unobserved skills distributions. The model is able to predict the size of moving when key parameters (π, μ), determining first moments, change. But changes in second moments $(\sigma_{ii}, \sigma_{ij})$ lead to ambiguous outcomes, as contradictory effects are at play. These results can be seen in the graphical framework of Fig. 3 as follows.

Moving unambiguously rises when:

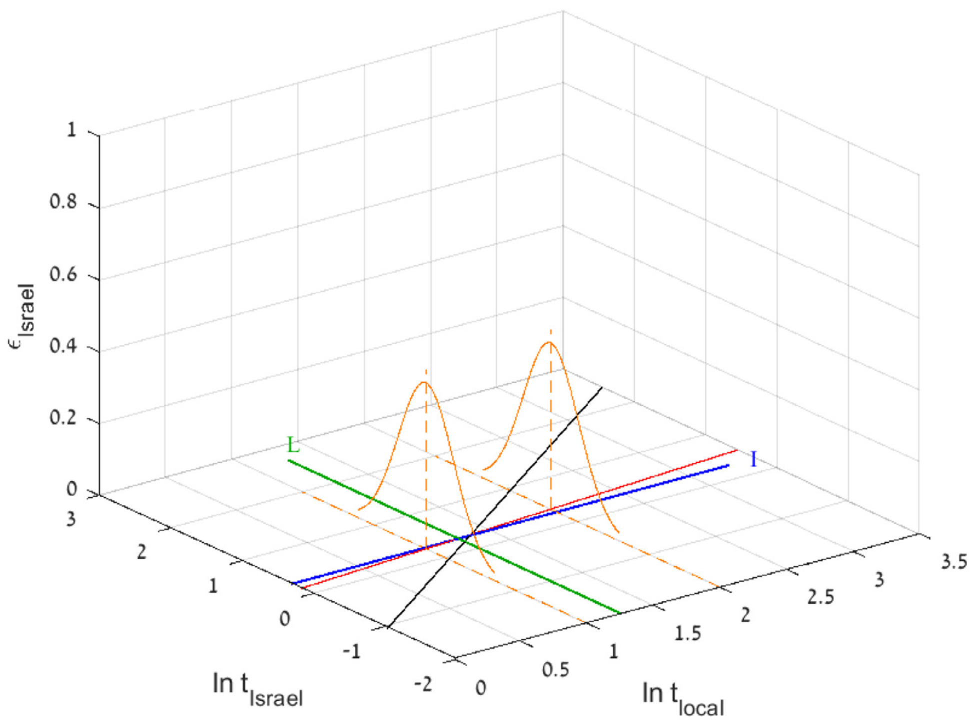
a. The moving premium rises, i.e., when $\frac{\pi_{host}}{\pi_{local}}$ rises. The line of equal income shifts downwards (i.e., the black line moves down). Fewer workers choose the local economy and more move. This is the effect of the productivity element discussed above (and again below).
b. When skill premia in the host economy (μ_{host}) rises or skill premia in the local economy (μ_{local}) fall. This raises the intercept, shifting the regression line upwards (the red line in the figure). More workers choose foreign employment. This is an expression of the task rewards element.

The change in moving is ambiguous when the following changes in the unobserved skills distributions take place:

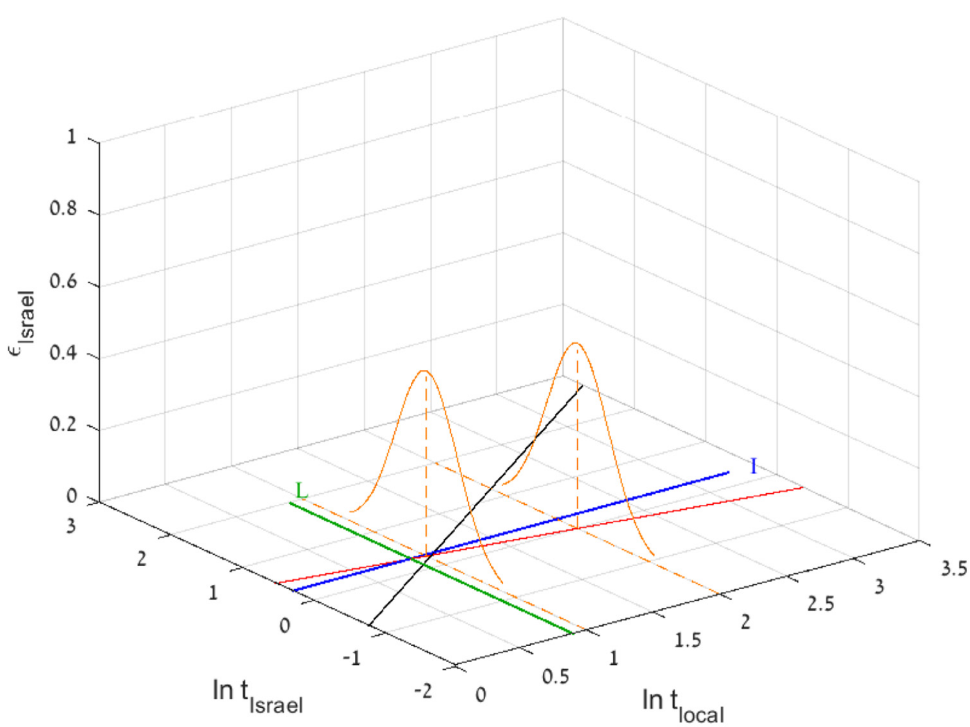
a. When the local (source economy) distribution becomes more dispersed, i.e., σ_{local} rises, the intercept rises and the slope declines so the regression line rises and flattens. In addition, the variance of the normal distribution around the line rises. The overall effect is ambiguous.
b. When the 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.
c. When the host location distribution becomes less dispersed, i.e., σ_{host} falls, the variance of the normal distribution falls. The overall effect is once more ambiguous.

The last three changes could be generated by changes in task demanded across locations. This analysis also implies that government policy would generate unambiguous moving changes if it affects task prices, for example through taxation. Any policy which affects skills, such as education policy, has more complex outcomes. In particular, policy influencing $\sum$ has ambiguous moving outcomes.

Fig. 3. Tasks and unobserved skills.



a. 1981 estimates



b. 1987 estimates

7.3. Broader contexts

I turn to discuss two issues which place the findings here in broader contexts.

7.3.1. Technology, human capital, and tasks

The essential point of linkage between the issues explored in the literature discussed in sub-Section 2.1, and the current paper is that both make the distinction between what characterizes rich and poor economies in terms of technology, capital, and institutions, external to the workers, and what constitutes human capital, embodied in people.

I have defined the variable z as follows:

$$z_i \equiv K_i^{\alpha} A_i^{1-\alpha} T_i^{-\alpha} = \left(\frac{K_i}{T_i}\right)^{\alpha} A_i^{1-\alpha}$$

This variable captures the role of technology, capital, and institutions. Using Eq. (15), z differences across locations are given by:

$$\ln z_i - \ln z_j = \ln \pi_i - \ln \pi_j \tag{24}$$

I have used the estimates of the wage equation (fully reported in Table B-3) which relate to $\hat{k}_i = \ln \hat{\pi}_i + \widehat{\beta_{i,0}}$. The presence of the task function intercept makes the estimated $\hat{k}_i - \hat{k}_j$ a lower bound on task prices π or z differentials. The estimates of $\hat{k}_i - \hat{k}_j$ vary between 0.48 and 1.09 log points, across the seven years of repeated cross sections, in favor of the Israeli economy. This implies a lower bound on the $\frac{z_{Israel}}{z_{local}}$ ratio ranging between 1.6 and 3.

In the development accounting literature, the analysis of Hendricks and Schoellman (2018) breaks down the differential of GDP per capita across countries into a wage differential capturing a country differential and a human capital differential. Their analysis (see their pages 670–672) postulates the following accounting relations:

$$\ln y_c - \ln y_{c'} = \ln z_c - \ln z_{c'} + \ln h_c - \ln h_{c'} \tag{25}$$

where c, c' denote two different countries, y is GDP per capita, and h is human capital per worker. Their z_c is defined as

$$z_c \equiv \left(\frac{K_c}{Y_c}\right)^{\frac{\alpha}{1-\alpha}} A_c \tag{26}$$

where K_c, Y_c, A_c are the capital, output, and technology of country c, respectively. It captures similar elements to the z variable in the current model, with the important distinction that here z pertains to a location-task product and in their case it refers to the GDP of the entire economy.

The authors call the ratio $\frac{\ln z_c - \ln z_{c'}}{\ln y_c - \ln y_{c'}}$ the country share and the ratio $\frac{\ln h_c - \ln h_{c'}}{\ln y_c - \ln y_{c'}}$ the human capital share in the GDP per capita differential.[26]

Postulating worker i wages as

$$\ln w_{i,c} = \ln(1-\alpha) z_c + \ln h_i \tag{27}$$

they get that the country share is therefore given by:

$$\frac{\ln w_{i,c} - \ln w_{i,c'}}{\ln y_c - \ln y_{c'}} = \frac{\ln z_c - \ln z_{c'}}{\ln y_c - \ln y_{c'}} \tag{28}$$

Hendricks and Schoellman (2018) then use data on these variables across countries, comparing each country to the U.S. Using wage differentials of immigrants pre- and post-migration to compute $\ln w_{i,c} - \ln w_{i,U.S.}$ they report (see their Table II) country shares ranging between 0.34 and 0.52; summing over different empirical checks they point to 0.40 as the country share. The values of the $\frac{z_{U.S.}}{z_c}$ ratios (same table) range between 1.8 and 3.2. This is a very similar range to the one estimated in the current paper for the z ratio across locations, as reported above, namely 1.6 to 3. For Hendricks and Schoellman (2018), the human capital share in the GDP per capita differential is simply the complement of the country share discussed above. Hence their results range between 0.48 and 0.66. For the literature this result is important, as it assigns a substantial role to human capital differences, higher than the one typically assumed previously.

The current paper does not estimate human capital differences across countries, as it looks at wage differentials of workers who are stayers and movers from one single economy, the Palestinian one. What this paper does show is that in terms of human capital tasks, there is a big offset effect. The total wage differential across locations ranges over the seven repeated cross sections between −0.08 and +0.17 log points only. This is so despite the big z differential in favor of the Israeli economy. The offset comes through the task term, the $\hat{\boldsymbol{\beta}}_{local}\overline{\mathbf{S}}_{local} - \hat{\boldsymbol{\beta}}_{Israel}\overline{\mathbf{S}}_{Israel}$ difference, which ranges between 0.60 and 1 log points.

What are the implications for the Hendricks and Schoellman (2018) type of analysis? As noted, the z differences are similar, though these authors use a breakdown of GDP per capita across countries whereas this paper uses wage differentials of workers (stayers and movers) from one single economy. Human capital is higher in Israel and it is highly likely that human capital differences play a big role in the GDP per capita differential, which is a factor of about 5, or more, here. The latter point, however, is not examined in the current paper. Likewise, the findings here, whereby the foreign task bundle has a relatively low value in terms of wages for the movers, is not an issue examined by Hendricks and Schoellman (2018). The latter point implies that migrant tasks differences across host and source economies (including returns differentials) need to be taken into account in the decompositions in (27)-(28). This may significantly affect the results and their implications in an analysis of this kind.[27]

7.3.2. Applicability to other cases of movers

The analysis here is potentially pertinent to many cases worldwide. The following is a brief survey of recent papers which indicate that the phenomenon of workers from poor countries working in*manual tasks* in rich countries is very prevalent. Cassidy (2019) uses data on men aged 25–64 from the US census Integrated Public Use Microdata Series in the period 1970–2010 and the US Department of Labor's O*NET database. His key findings are that immigrants have on average higher manual and lower analytical and interactive task requirements than natives, and this gap has expanded greatly over the past several decades. An earlier study with similar data covering the period 1960 to 2000, by Peri and Sparber (2009), found that foreign-born workers specialize in occupations intensive in manual and physical labor skills while natives hold jobs more intensive in communication-language tasks. Lewis and Peri (2015) and Foged and Peri (2015) report further results in this direction, for Denmark as well as for the U.S. They highlight the mechanism whereby migrant workers fill manual-intensive jobs that are often at the bottom of the career ladder for natives; hence in locations with large inflows of immigrants, native workers move more rapidly toward communication-intensive and more complex type of jobs.

Dustmann and Frattini (2013) document sizable differences in educational attainment between the foreign and native born in most Western European nations, with immigrants considerably less educated than the native born. The authors find that migrants are occupationally segregated from the native born, working in lower paying, less prestigious occupational categories. They are also considerably less likely to be employed and considerably more likely to have earnings in the lower deciles of the earnings distribution of the host country.

[26] The underlying logic is that immigrants enter the U.S with the human capital they have acquired in their birth country and work with U.S physical capital and TFP. Their wage gains compared to GDP per capita differences allows to separate the human capital factor from these country-specific factors.

[27] I thank Francesco Caselli for making this point in personal communication (Caselli (2019)).

The afore-cited survey by Peri (2016) stresses the importance of these patterns. He suggests that manual abilities are transferable across countries but other abilities, such as communication abilities (especially if languages differ), are much harder to transfer.

8. Conclusions

The contribution of the current analysis is twofold: first, it identifies the specific or "pure" roles of income differences in the move from a poor to a rich economy; second, it shows that the wage gains to movers are actually mitigated by human capital differences, within a task-based approach.

A significant challenge for future research is to get the necessary data so as undertake similar decompositions in prevalent cases, whereby confounding factors are present, and try to disentangle their relative, and potentially contradictory, effects. It has been shown here that the model to be studied in these cases should cater for multiple determinants in order to avoid mis-specification, and would thus need a very rich data set.

Additionally, recent literature has pointed to two phenomena which may play an increasing role in the current context.

One relates to technological changes and tasks. . Autor and Salomons (2018) and Goos et al. (2019) have shown that there are changes in productivity, wage, and occupational distributions related to changing tasks distributions. Technological processes, like increased automation and the related decline in routine jobs, change task requirements in significant ways. These processes imply that foreign and home tasks requirements undergo changes, and so task requirements of movers and stayers are bound to change.

The other phenomenon was explored by Jaimovich and Siu (2020). They point out that jobless recoveries, the slow rebound in aggregate employment following recent recessions despite recoveries in aggregate output, are related to job polarization, the shrinking share of employment in middle-skill, routine occupations. This relation is manifested in that all employment loss in routine occupations occurs in economic downturns and that jobless recoveries in the aggregate can be accounted for by jobless recoveries in the routine occupations that are disappearing. There is a business cycle aspect to changing task distributions. Movers from poor to rich economies are subject to these recessions-induced changes in the task distribution and so their move is affected by business cycle conditions in the host, rich economy. Once the important role of job tasks offered to movers is recognized, the effects of these business cycle induced tasks changes need to be recognized and studied.

These important issues are left for future research.

Supplementary material

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.labeco.2021.102032.

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