Middle East and North Africa

Working Paper Series

No. 24

June 2001

The World Bank

Produced by the Office of the Chief Economist

Summaries in Arabic and French

The Impact of Future Labor Policy Options on the Palestinian Labor Market

by
Elizabeth Ruppert Bulmer

The Impact of Future Labor Policy Options on the Palestinian Labor Market

By

Elizabeth Ruppert Bulmer*

Social and Economic Development Group
Middle East and North Africa Region

Email: Eruppertbulmer@worldbank.org

June 2001

Table of Contents

Figures

Tables

موجز

تسعى هذه الدراسة إلى القياس الكمي للنواتج الخاصة بالعمل الناجمة عن التغييرات في السياسة بشأن القوى العاملة في إطار اتفاق وضع نهائي محتمل بين الحكومتين الفلسطينية والإسرائيلية. ويتيح نموذج القوى العاملة التوازني الإطار النظري لاختبار الخيارات البديلة الخاصة بسياسات العمل بشأن سوقي العمل الفلسطيني والإسرائيلي الشديدي التكامل. ويصف هذا التحليل العوامل الرئيسية التي تؤثر في القرارات المتعلقة بجانبي العرض والطلب الخاصين بالأيدي العاملة في الضفة الغربية وقطاع غزة وإسرائيل –أي أهمية الطلب الإسرائيلي على الأيدي العاملة بالنسبة للعمال الفلسطينيين، والفجوات المستمرة في الأجور بين العمالة المحلية وفرص العمل الأفضل أجرا في إسرائيل التي لا تتوفر إلا بأعداد محدودة، والبطالة الهيكلية المشاهدة في الضفة الغربية وقطاع غزة. ومما يجسد هذه المسائل نموذج يعتمد على إمدادات مستمرة من الأيدي العاملة الفلسطينية إلى إسرائيل نتيجة سياسات الهجرة الإسرائيلية. ويتم حل هذا النموذج لتحديد أثر التغييرات الطارئة (الخارجية) في تدفقات الأيدي العاملة الفلسطينية لإسرائيل نتيجة تغييرات في سياسة الأذونات الإسرائيلية، وفي الضوابط الأمنية وإغلاقات الحدود. وتضبط نتائج هذا النموذج باستعمال البيانات المتوفرة لوضع تقديرات كمية للأثر البعيد الأمد على مستويات العمالة، والبطالة، والأجور في الاقتصادين الفلسطيني والإسرائيلي. وتشير نتائج الإحصاءات المقارنة إلى أن الزيادة في تدفقات الأيدي العاملة إلى إسرائيل تؤدي إلى زيادة الأجور المحلية الفلسطينية نظرا لأن بعض العمال غير العاطلين العاملين محليا تشدّهم فرص العمل الإسرائيلية الأعلى أجورا التي أصبحت أكثر توفرا وبتكلفة ذهاب للعمل وإياب أقل من السابق. لذلك، لا يوازن هبوط في البطالة بين الفلسطينيين الزيادة في عمالة الفلسطينيين في الخارج إلا موازنة جزئية، ومن المتوقع هبوط عمالة الفلسطينيين محليا. وستضيق نوعا ما الفجوة في الأجور بين فرص العمل المحلية وفرص العمل في إسرائيل، ولكن مع استمرار الفجوة المتبقية في التأثير في القرارات بشأن جانبي العرض والطلب على الأيدي العاملة.

* يقدر هذا الكاتب بامتنان البيانات والمساعدة التي قدمها مكتب الإحصاء المركزي الفلسطيني، والتعليقات التي قدمها كل من سيباستين ديسوس، وبيتر فالون، ورضوان شعبان، وشخص آخر مغفل الاسم.

Résumé

Le présent document cherche à quantifier les résultats du travail imputables aux changements de la politique du travail dans le contexte d'un accord éventuel de statut définitif entre l'autorité palestinienne et le gouvernement israélien. Un modèle d'équilibre du travail donne le cadre théorique pour tester les différentes options de la politique du travail pour les marchés du travail palestinien et israélien fortement intégrés. L'analyse décrit les principaux facteurs qui affectent les décisions d'offre et de demande de la main-d'œuvre en Cisjordanie et dans la Bande de Gaza et en Israël – à savoir, l'importance de la demande de main-d'œuvre israélienne pour des travailleurs palestiniens, les écarts salariaux persistants entre emplois domestiques et emplois israéliens mieux payés qui ne sont disponibles qu'en quantités limitées, et le chômage structurel observé en Cisjordanie et à Gaza. Ces distorsions sont saisies dans un modèle qui s'articule sur l'offre fixe de main-d'œuvre palestinienne à Israël en raison de la politique d'immigration israélienne. Le modèle sert à caractériser l'impact des changements exogènes dans les flux de main-d'œuvre palestinienne à Israël en conséquence des changements de la politique des permis, des contrôles de sécurité et des fermetures des frontières en Israël. Les résultats du modèle sont calibrés en utilisant les données disponibles pour produire des estimations quantitatives de l'impact à long terme sur les niveaux d'emploi, le chômage et les salaires dans les économies palestinienne et israélienne. Les résultats statiques comparatifs indiquent qu'une augmentation des flux de main-d'œuvre à Israël accroît le salaire domestique palestinien car des travailleurs déjà employés chez eux sont attirés par des emplois mieux payés en Israël qui sont devenus plus aisément disponibles et à un coût moins élevé de transport. L'augmentation de l'emploi extérieur palestinien n'est par conséquent que partiellement compensée par une chute du chômage palestinien, et l'emploi palestinien domestique devrait chuter selon les prévisions. L'écart de salaire qui en résulte entre emplois domestiques et en Israël diminue quelque peu, mais l'écart qui reste continue à affecter les décisions d'offre et de demande de main-d'œuvre.

* L'auteur tient à remercier le Bureau central des statistiques de l'Autorité palestinienne pour les données et l'assistance qui lui ont été fournies ainsi que Sébastien Dessus, Peter Fallon, Radwan Shaban et un examinateur anonyme pour leurs commentaires.

Summary

This paper seeks to quantify the labor outcomes arising from changes to labor policy in the context of a potential final status agreement between the Palestinian and Israeli governments. An equilibrium labor model provides the theoretical framework to test different labor policy options for the highly integrated Palestinian and Israeli labor markets. The analysis describes the main factors affecting labor supply and demand decisions in the West Bank and Gaza and Israel – namely, the importance of Israeli labor demand for Palestinian workers, the persistent wage gaps between domestic employment and better-paying Israeli jobs that are available only in limited supply, and the structural unemployment observed in the West Bank and Gaza. These distortions are captured in a model that hinges on the fixed supply of Palestinian labor to Israel due to Israeli immigration policy. The model is solved to characterize the impact of exogenous changes in Palestinian labor flows to Israel as a result of changes in Israeli permit policy, security controls and border closures. The model's results are calibrated using available data to generate quantitative estimates of the long-run impact on employment levels, unemployment, and wages in the Palestinian and Israeli economies. The comparative statics results indicate that an increase in labor flows to Israel raises the domestic Palestinian wage as some workers already employed domestically are drawn to higher-paying Israeli jobs which have become more readily available and at a lower commuting cost. The increase in external Palestinian employment is therefore only partially offset by a decline in Palestinian unemployment, and domestic Palestinian employment is predicted to decline. The resulting wage gap between domestic and Israeli jobs narrows somewhat, but the remaining gap continues to affect labor supply and demand decisions.

* The author gratefully acknowledges the data and assistance provided by the Palestinian Central Bureau of Statistics, and comments from Sébastien Dessus, Peter Fallon, Radwan Shaban, and an anonymous reviewer.

The Impact of Future Labor Policy Options on the Palestinian Labor Market

I. Introduction

Palestinian and Israeli policy makers are grappling with an array of policy questions in the context of future final status negotiations to define the terms of a permanent political accord between Israel and an independent Palestinian state. The final political decisions will have direct and indirect economic implications, and labor policies will be central. The Israeli and Palestinian economies are highly integrated, especially the two labor markets; under conditions of relatively open but controlled borders – that is, prior to the 2000/01 crisis – more than 100,000 Palestinian workers, or one-fifth of the total labor force, commute daily to relatively high-paying jobs in Israel. Although Palestinian labor flows to Israel are constrained through permit requirements and border closures, employment in Israel provided one-third of total Palestinian labor earnings in 1999. Labor mobility to Israel affects employment levels (both domestically and in the Israeli unskilled sector), relative wages, and growth outcomes in both economies, implying that the potential impact of final status policies regarding Palestinian labor flows is significant. Any change in policy that affects labor supply and demand, namely through tightening or easing Palestinian labor mobility across borders, will lead to different labor allocations in the Palestinian economy and in Israel, especially vis-à-vis Israel's unskilled foreign labor force. Potential final status economic arrangements – both broadly and with respect to labor policy – will fall somewhere in the range between complete separation (i.e., closed borders) and full economic integration (i.e., open borders).

The objective of this analysis is to quantify the impact of potential final status labor policies on Palestinian employment, unemployment and wage outcomes in the long run. To this end, the analysis develops a theoretical model that characterizes the labor market in the West Bank and Gaza (WBG) and its links to the unskilled labor market in Israel. The analytical framework captures the main factors affecting labor supply and demand decisions in the West Bank and Gaza and Israel – namely, the importance of Israeli labor demand for Palestinian workers, the persistent wage gaps between domestic Palestinian employment and better-paying Israeli jobs that are available only in limited supply, and the structural unemployment observed in the West Bank and Gaza. By calibrating the model using labor force survey data from the Palestinian Central Bureau of Statistics (PCBS) and other available data, the analysis generates concrete estimates of the possible long-term impact of labor policy changes on employment, relative wages, and unemployment.

The paper is organized as follows. Section II presents an overview of the Palestinian labor market and recent trends in employment and worker flows to Israeli jobs. These stylized facts are reflected in the equilibrium labor market model described in section III. In section IV, the model is solved to determine the impact of exogenous policy changes on domestic and Israeli employment and wages, and the predicted effects are calibrated to generate quantitative estimates. The final section draws conclusions from the results of the analysis.

II. Stylized facts of the Palestinian labor market

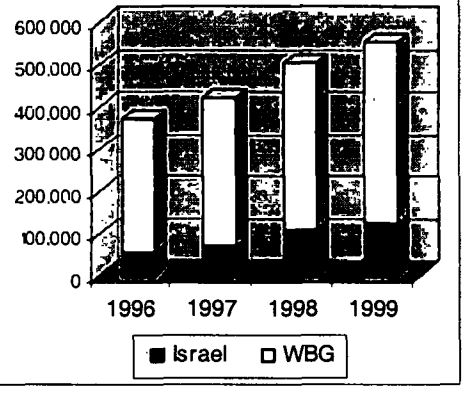
The Palestinian and Israeli economies have a long history of interdependence that pre-dates the current political and economic arrangements. Until the late 1980s, Palestinians and Israelis could move freely between each other's territory. Israel introduced permit requirements in 1991 to control the movements of Palestinian workers, and the 1993 Oslo accords marked a fundamental shift in Israeli labor policy, as permit controls and other mobility restrictions (i.e., temporary border closures) were strictly enforced. This effectively discouraged Israeli demand for Palestinian labor, which was

gradually replaced by foreign workers. Quarterly labor force surveys conducted by PCBS since 1995 provide data on trends in Palestinian employment (both domestic and in Israel), unemployment, and wages. The Palestinian labor market exhibits six main features, or stylized facts: (i) segmentation between domestic employment and employment in Israel; (ii) constrained labor mobility; (iii) high unemployment rate negatively correlated with employment in Israel; (iv) rising wages concurrent with falling unemployment; (v) a persistent wage gap between domestic and Israeli jobs; and (vi) unskilled Palestinian and foreign workers in Israel are substitutes.

i. Segmentation between domestic employment and employment in Israel

Israeli demand for Palestinian labor has a large impact on aggregate Palestinian employment outcomes. In 1999, nearly 23 percent of employed Palestinians held jobs in Israel or Israeli settlements (averaging 126,000 out of a total employment level of 555,000, as shown in Figure 1).[1] This represents an increase from the 15-16 percent average in 1995 and 1996, but is below historical levels around 30 percent observed during the 1980s and into the early 1990s.

Figure 1
Palestinian Employment by Location



ii. Constrained labor mobility

Palestinians entering Israel for work must hold valid work permits in order to pass through border controls. The qualifying criteria for a permit are selective (i.e., based on gender, age, and marital status), and workers are prohibited from spending the night in Israel. Border controls are very strict along the perimeter of the Gaza Strip, but monitoring is less rigorous in the West Bank due to its porous borders. Even workers commuting between Gaza and the West Bank, or between separated areas of the West Bank, are subject to security checks and limits on their movements. The situation improved somewhat with the introduction of a "safe passage" between Gaza and the West Bank in 1999, although access remained subject to certain qualifying criteria. Since 1993, there have been periodic episodes of severely restricted labor mobility imposed by Israel. Under "comprehensive" closures, Palestinians are effectively constrained to remain in their home villages.[2] Although large numbers of Palestinians manage to cross illegally into Israel, total labor flows are reduced sharply during closures, bringing average daily labor flows down to between 50,000 and 60,000 (based on historical PCBS data).

iii. High unemployment rate negatively correlated with employment in Israel

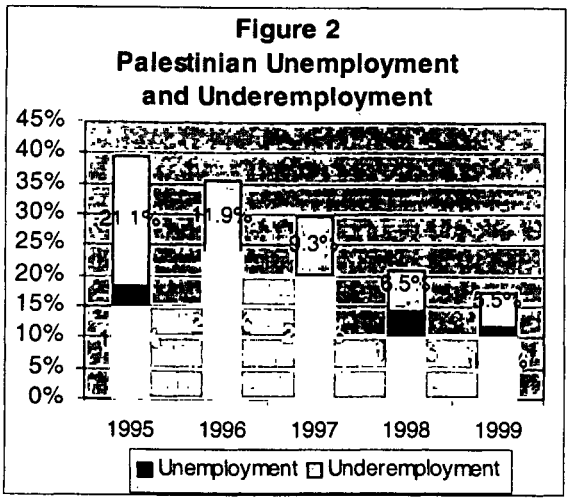
Border closures and other security controls on Palestinian labor flows during 1995-1997 coincided with high rates of unemployment within WBG which averaged nearly 24 percent in 1996. Unemployment declined substantially in 1998 and 1999, falling to half its 1996 level (see Figure 2). Underemployment followed a similar pattern.[3] Disaggregating the data by region, Gaza suffers much higher rates of unemployment relative to the West Bank (depicted in Figure 3). Figure 4 illustrates

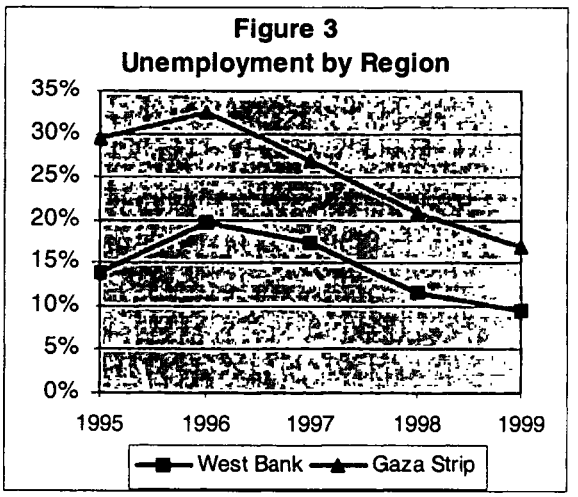
---

[1] Data are from PCBS Labor Force Surveys, and reflect full employment only (excluding underemployment).

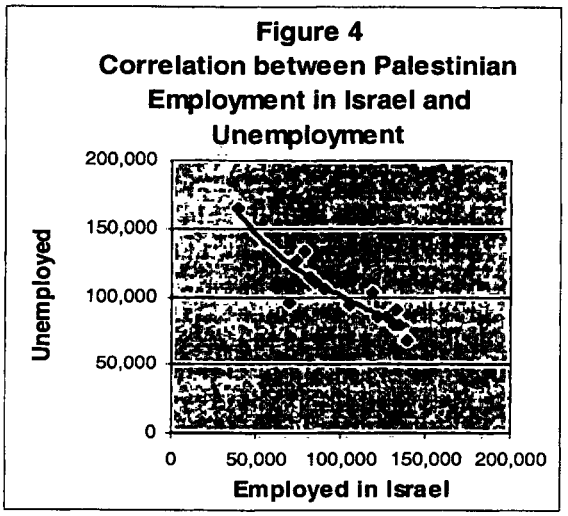
[2] During October 2000-June 2001 (the time of this writing), mobility restrictions reached their most extreme level to-date; border closures were in effect *total*, and in some areas Palestinian residents were subject to extended periods of round-the-clock curfews.

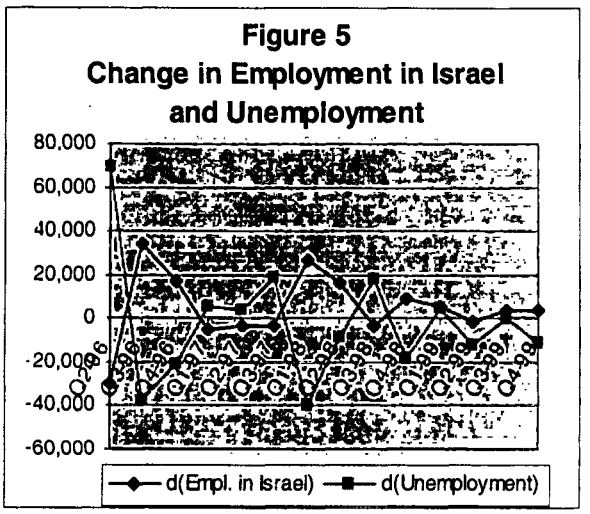
[3] A worker is defined to be underemployed if his/her employment is inadequate relative to alternative employment. This includes those who work less than 35 hours per week but desire additional hours of work.





the close link between Palestinian employment in Israel and domestic Palestinian unemployment; when Palestinian employment in Israel is low, unemployment is high, reflected by a correlation coefficient of –0.9. Quarter-to-quarter fluctuations in Palestinian labor flows and unemployment





(depicted in Figure 5) suggest that in the short run, sharp reductions in Israeli jobs lead to large increases in unemployment, as domestic Palestinian wages do not adjust immediately to absorb returning Palestinians.

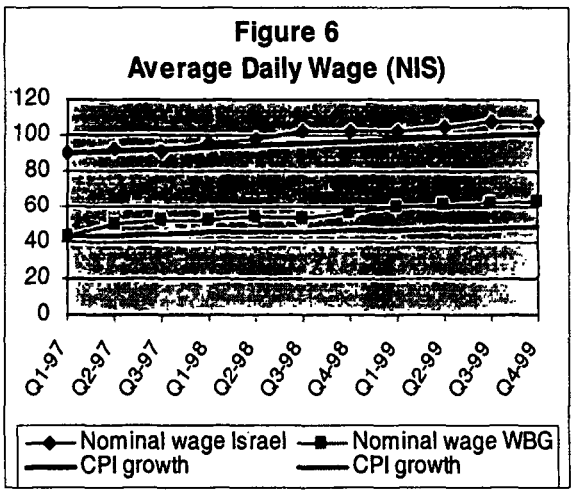
iv. Rising wages concurrent with falling unemployment

According to PCBS labor force survey data, Palestinian wages have increased in both nominal and real terms since 1997, as depicted in Figure 6 by the fact that nominal wages increased faster than inflation. These findings are surprising given that unemployment declined markedly over the same period, contradicting the theory that declining unemployment and rising employment drive wages down. This evidence implies that job creation was not accommodated by downward wage adjustment to absorb additional job seekers, but rather that pent-up demand for labor was eased through additional supply.

v. Persistent wage gap between domestic and Israeli jobs

Although average wages earned within WBG appreciated more than those earned by Palestinians working in Israel during the past 4 years, a significant gap persists (see Figure 6). In 1999, wages earned by Palestinians employed within WBG averaged nearly 60 percent of those earned by Palestinians working in Israel and the settlements (according to PCBS data). Wage gaps of comparable magnitude were observed prior to the interim period as well (Angrist 1996). Several factors might explain higher wages in Israel: higher average productivity in Israel, excess Israeli demand for unskilled labor, or minimum wage and other labor legislation and payroll tax financing (relevant to formal sector workers only). In 1999, the marginal returns to working in Israel compared to working domestically were over 90 percent, controlling for individual factors.[4]

vi. Unskilled Palestinian and foreign workers in Israel are substitutes



It is useful to examine the features of the Israeli unskilled labor market in order to understand the dynamics of Palestinian employment and wages. The non-Palestinian portion of the unskilled labor force in Israel consists primarily of foreign workers, far outnumbering Palestinians. This reflects a fundamental composition shift since the early 1990s, when the number of foreign workers in Israel was negligible and Palestinian commuters exceeded 100,000 (Shaban 1999). Israeli labor demand for unskilled workers was accommodated by immigration policies that granted easier access to foreign rather than Palestinian workers, and at a lower unit labor cost to the employer, effectively institutionalizing discrimination against Palestinians in favor of foreigners. For workers in the formal sector, payroll tax rates for Palestinians range from 16 to 29 percent (Farsakh 1999), compared to an effective rate of 7-9 percent for foreign workers (Eckshtein and Prizat 2000). Although foreign work permits have a fixed duration (typically 1 year), most foreign workers remain longer – either through permit renewal or in informal jobs – suggesting an unconstrained supply of foreign labor. This is evidenced by the fact that illegal foreign workers are at least equal in number to legal foreigners, and by some estimates outnumber them three-to-one.

Data on wages of foreign workers in Israel is unavailable, but anecdotal evidence and international experience suggest that foreign workers have a low reservation wage that reflects sending-country conditions. Moreover, this reservation wage may be significantly below the prevailing wage paid to Palestinians in Israel's formal sector, as implied by the lower unit labor cost and the continued inflow of foreigners to meet increasing Israeli labor demand (Bartram 1998). Given that jobs in the unskilled sector have low value-added, Palestinian and foreign workers are close technical substitutes, evidenced by the fact that Israeli employers have to a large extent replaced Palestinians with foreigners since 1993. They may not be perfect substitutes, however, in light of continued Israeli demand for Palestinian workers despite their higher cost compared to foreigner labor. Although possible explanations include language ability or skills specialization which give Palestinians a comparative advantage (Farsakh 1999), these employment trends are surprising, and suggest that political factors play some role.

---

[4] See annex I for regression results using micro-level labor force survey data from the second quarter of 1999. The determinants of wage earnings were estimated using Mincerian specifications that control for individual characteristics including age, gender, educational attainment, occupation and sector of employment.

Synthesis of the stylized facts

This combination of stylized facts points to the dynamic processes and pressures that shape current Palestinian labor market outcomes. Decisions of labor supply and demand can be broadly characterized as follows: Palestinians can choose to work domestically within WBG, but wages are lower than those offered by Israeli employers. Jobs in Israel are not readily available, however, due to permit requirements, uncertain access as a result of security controls and border closures, and high transportation and search costs. Nevertheless, the prospect of higher wages leads many Palestinians to seek jobs in Israel despite the associated costs and risks of unemployment and income loss. The fact that some portion of the Palestinian labor force is effectively searching or queuing for a job in Israel rather than accepting less remunerative work in the domestic economy implies that high Israeli wages raise the market wage in the Palestinian labor market, thereby reducing the level of domestic employment. Because permit requirements and border controls constitute limits on the supply of Palestinian labor to Israel, wages are not market-clearing. This rigidity vis-à-vis Palestinian labor supply leads to a persistent wage gap and gives rise to structural unemployment. In other words, Palestinian unemployment and domestic wages respond to external job opportunities and wages in Israel. And although supply controls on Palestinian labor flows are at least partially binding, those on foreign workers are not, suggesting a potentially infinite supply of foreign labor. The model developed in this analysis reflects these features (see annex II for details of the model).

III. Equilibrium model of the Palestinian and Israeli labor markets

The observed labor market segmentation in Israel and wage rigidity in the Palestinian economy supports the use of a theoretical approach based in labor market dualism and structural unemployment. Policy changes vis-à-vis labor flows between the Palestinian and Israeli economies will have far-reaching implications: although Israeli employers can substitute foreign workers for Palestinian labor (albeit at a higher social cost), the employment and earnings implications on the Palestinian side will be significant. The model presented here describes the equilibrium allocation of labor and wages under existing arrangements implemented during the 1990s, and is subsequently used to examine the impact of positive or negative changes in labor mobility.

Whereas the model incorporates the interaction of labor demand in Israel and the West Bank and Gaza, the model abstracts away from aggregate labor demand in Israel in order to focus on unskilled labor only.[5] Much of the literature on dual labor markets applies to the segmentation between the formal and informal sectors and the associated wage differentials (e.g., Dickens and Lang 1985). This analysis, in contrast, addresses the segmentation that arises in the Palestinian labor market between workers employed domestically and in Israel. The model examines total demand for Palestinian labor by incorporating the relevant part of aggregate Israeli labor demand (namely, the demand for unskilled workers), accounting for substitution effects between foreign and Palestinian workers. By assuming that Palestinian and foreign workers are substitutes, changes in labor supply and demand are transmitted to the Israeli unskilled labor market and throughout the Palestinian labor market.

---

[5] The Israeli labor market is highly segmented between skilled and unskilled labor, where skilled jobs are typically held by Israelis, and unskilled jobs are held by Palestinians or foreign workers (in this analysis, "foreign" refers to non-Palestinians). Palestinian labor is assumed to have no role in the Israeli skilled sector, such that there is no substitution between skilled Israelis and all non-Israeli workers. There are, of course, skilled Palestinian and foreign workers employed in high productivity occupations in Israel, but this simplifying assumption enables the analysis to focus on the Israeli unskilled sector.

The model developed in this analysis (see annex II for details) captures the main factors contributing to Palestinian labor market outcomes, namely limited labor supply of Palestinians to Israeli jobs, effectively unlimited supply of foreign workers to Israel's unskilled sector, exogenously determined foreign wages, domestic Palestinian labor demand, the relative unit labor costs of Palestinians and foreigners working in Israel and Palestinians employed in WBG, and structural unemployment. The model uses a static equilibrium framework to assess the long-run impact of exogenous shocks to Israeli immigration policy on the distribution of the Palestinian labor force among domestic employment, Israeli employment, and unemployment. The size of the Palestinian labor force is treated as constant, such that the model does not account for labor force entry and exit due to demographic factors or the discouraged worker effect. In addition, feedback effects from employment and income growth on labor demand are not considered. The labor model also assumes a production function of fixed capital costs, thus abstracting away from substitution between labor and capital.

The level of Palestinian employment in Israel is determined by labor demand on the part of Israeli employers, the number of permits issued, and the effective control of labor flows across borders. Palestinians are drawn to better-paying Israeli jobs, but are limited by mobility constraints that affect legal and illegal workers alike. In the model, therefore, Palestinian labor supply to Israel is exogenously fixed below its market-clearing level (i.e., $L_{PI} = \bar{L}_{PI}$), and the demand for Palestinian labor in Israel is assumed to exceed Palestinian labor supply to Israel.

The persistence of Palestinian unemployment and the lack of downward adjustment in the domestic Palestinian wage described in section II suggest some wage stickiness, which cannot be due to labor regulation since there is little, and thus must be due to the proximity of Israeli jobs which pay considerably higher wages. By fixing the level of Palestinian labor flows to Israel, labor supply cannot respond fully to demand and therefore real wages are not equilibrated. However, the model assumes that *expected* wages are equilibrated through changes in labor supply and demand.[6] Specifically, a Palestinian worker is assumed to choose between a domestic job, which he/she can obtain with certainty but at a lower wage, or an Israeli job, which is available with some probability less than one, depending on Palestinian labor mobility and the unemployment rate. That is, when the number of permits is restricted and Palestinian unemployment is high, the competition for obtaining an Israeli job increases sharply, reducing the probability of earning the higher Israeli wage. Furthermore, Palestinians working in Israel incur additional costs for transportation, job search, and permit requirements (or permit evasion efforts), all of which contribute to lower the Israeli wage in real terms. The expected wage for Israeli employment is therefore discounted by these costs as well as the reduced probability of obtaining the job. In equilibrium – that is, at the margin – expected earnings are equalized when a worker is indifferent between working domestically or seeking employment in Israel.

In the model, the probability of obtaining an Israeli job is expressed as a linear function of the employment rate, or 1 minus the unemployment rate, $(1-u_P)$, and is less than 1. Note that by defining employment as full employment (i.e., those who worked more than 35 hours per week during the reference period), the residual unemployment rate, u_P, includes underemployment as well. This is consistent with the fact that underemployment represents excess labor supply, given that workers who are underemployed would, by definition, prefer to be fully employed.

---

[6] This approach was delineated in the migration literature by Harris and Todaro (1970) to describe the wage gap between rural and urban jobs. More recently, Ruppert (1999a,1999b) employed a different application of expected wage equalization to analyze labor markets with structural unemployment.

Domestic Palestinian wages are denoted by w_{PD}, and wages earned by Palestinians in Israel are denoted w_{PI}. The costs associated with working in Israel (e.g., for transportation, search and permits costs) are captured in the model by the fraction β, such that in real terms, Palestinian workers in Israel earn βw_{PI} ($\beta<1$), and β depends positively on the degree of Palestinian labor mobility and thus the magnitude of labor flows to Israel, L_{PI}. In other words, as the number of permits increases and security controls are eased, the transportation and search costs decline and the share β of the actual wage w_{PI} increases (namely, $\beta'(L_{PI})>0$). The equilibrium wage condition that describes the wage gap between domestic Palestinian wages and those earned by Palestinians employed in Israel is given by:

$$w_{PD} = (1 - u_P) \cdot \beta \cdot w_{PI}$$

Since $0<(1-u_P)<1$ and $0<\beta<1$, then $w_{PD}<w_{PI}$ in equilibrium. The intuition behind this equation is that Palestinian workers search or queue for high-paying Israeli jobs but are unemployed or underemployed while searching.[7] The expected wage for an Israeli job depends on the actual Israeli wage w_{PI}, discounted by related costs β and the imperfect probability of finding employment ($1-u_P$), and in equilibrium, this is equal to the actual domestic wage w_{PD}.

Palestinian employment in Israel depends on Israeli demand for unskilled workers, the supply of foreign workers, and the elasticity of substitution between Palestinian and foreign workers. Total Israeli demand for unskilled labor is met by a combination of Palestinian and foreign workers, whose earnings are denoted w_{PI} and w_{FI}, respectively. Because Israeli employers of Palestinians incur additional costs due to absenteeism linked to security controls and closures, however, the unit labor cost of Palestinian workers is in fact higher than w_{PI}. Whereas Palestinian workers are paid w_{PI} (equivalent to only βw_{PI} in real terms), they cost their Israeli employers $w_{PI}\Phi$, $\Phi>1$. The size of Φ depends negatively on the magnitude of Palestinian labor flows into Israel; as more Palestinians are allowed to cross into Israel and security restrictions are eased, the risk of absenteeism diminishes and Φ declines (i.e., $\Phi'(L_{PI}) < 0$).

The model assumes that wages of foreign workers are determined by labor market conditions in the sending, or labor-exporting, country, and that the supply of foreign workers is effectively infinite, as discussed above in the stylized facts. Foreign wages therefore do not respond directly to changes in Israeli labor demand. Palestinian and foreign workers in Israel are assumed to be close technical substitutes, but have different unit labor costs.

The distortions reflected in the stylized facts and captured by the model – namely the limits on Palestinian labor supply to Israel ($\overline{L}_{PI}$), the costs of commuting (β), the uncertainty of finding an Israeli job, the Israeli employer's cost of Palestinian absenteeism (Φ), and the difference in wages paid to Palestinian and foreign workers in Israel – create wedges that affect outcomes in equilibrium by preventing full employment and wage adjustment to equate labor supply and demand.

IV. Exogenous policy shocks and predicted quantitative effects

The model is solved to assess the impact of changes in Palestinian employment in Israel on the long-run allocation of Palestinian and foreign labor in Israel, domestic Palestinian employment, domestic and Israeli wages, and Palestinian unemployment. Comparative statics exercises are used to determine the effect of exogenous changes in L_{PI} as a result of new labor policies under a final status

[7] This assertion is supported by evidence from the 1999 labor force survey that a disproportionate share of unemployed Palestinians previously held jobs in Israel or the settlements.

agreement, and the results are calibrated to the Palestinian context using available data (discussed below). The comparative statics results summarized here indicate the direction of impact on the model's endogenous variables (reflecting calibrated results):

(a) $\frac{dw_{PI}}{d\bar{\bar{L}}_{PI}} > 0$

(b) $\frac{dL_{PD}}{d\bar{\bar{L}}_{PI}} < 0$

(c) $\frac{dw_{PD}}{d\bar{\bar{L}}_{PI}} > 0$

(d) $\frac{du_P}{d\bar{\bar{L}}_{PI}} < 0$

(e) $\frac{dL_{FI}}{d\bar{\bar{L}}_{PI}} < 0$

Calibrating the model

The model is calibrated by assigning parameter values using available data (summarized in Table 1) to generate quantitative estimates of the impact of changes in labor mobility.

Data on labor force size, employment levels, underemployment, and unemployment comes from PCBS quarterly labor force surveys for 1999. Employment data on foreign workers is less reliable; official Israeli estimates of L_{FI} range from 150,00-160,000, including both legal and illegal workers, while other estimates lie in the 200,000-250,000 range (Oxford Analytica 1996, Arnon et al. 1997, Kav La'Oved 2000). To address the uncertainty surrounding the magnitude of L_{FI}, the model is calibrated for 5 different values, two of which are reported below. Wages of foreign workers are estimated to be 10 percent less than Palestinian wages, which reflects anecdotal evidence vis-à-vis informal workers, and the maximum difference in payroll tax rates for legal foreign workers compared to legal Palestinians (Farsakh 1999). Palestinian wages in Israel w_{PI} are indexed to 100. The wage of domestically-employed Palestinians w_{PD} relative to w_{PI} is given by the equilibrium

Table 1: Initial Parameter Values

Parameter[1]	Value	Data Source
L^S	671,307	PCBS labor force surveys 1999
L_{PD}	428,918	PCBS labor force surveys 1999
L_{PI}	126,253	PCBS labor force surveys 1999
U_P	116,136	PCBS labor force surveys 1999
u_P	17.3%	PCBS labor force surveys 1999
L_{FI}	160,000	Israeli Ministry of Labor
	250,000	Oxford Analytica 1996, Arnon et al. 1997
w_{PI}	100	index
w_{PD}	52	author's regression estimates on PCBS labor force data Q2 1999
w_{FI}	90	author's estimates
β	0.63	equilibrium wage equation
ε_β	$\lvert\varepsilon_\Phi\rvert$	author's estimates
δ	0.3	international experience[2]
σ	1000	author's estimates
Φ	1.15	author's estimates
ε_Φ	-0.20	author's estimates
γ	1.00	author's estimates

[1] Defined in annex

[2] Hamermesh 1993, Guasch et al. 1997, World Bank 1997

wage condition, and depends on wage, unemployment, and underemployment data from PCBS labor force surveys. Using regression analysis on the determinants of earnings, the marginal returns to working in Israel averaged 91 percent in the second quarter of 1999 (as reported in annex I), implying a domestic Palestinian wage equivalent to 52 percent of the Israeli wage. By substituting values for w_{PD}, u_P and w_{PI} into the equilibrium wage equation, β is calculated to be 0.63. This value of β is more or less consistent with observed transport costs equivalent to one-third of daily income (World Bank 2000). The degree to which β responds to shifts in labor flows is unknown; for simplicity, ε_β – the elasticity of β with respect to L_{PI} – is assumed to be equivalent in magnitude to ε_Φ, the elasticity of Φ with respect to L_{PI} (discussed below).

The elasticity of domestic Palestinian labor demand, denoted by δ in the model, is assigned a value of 0.3, which lies within the [0.15, 0.75] range identified by Hamermesh (1993) as reflecting "normal" values based on studies measuring aggregate constant-output labor demand elasticity for homogenous labor in industrial countries. Evidence from Argentina and Morocco suggest that employers in developing countries exhibit similar tendencies, with values falling between 0.3 and 0.75 (see Guasch et al. 1997, World Bank 1997). In the Palestinian case, δ is set in the low end of the range to reflect the domestic economy's resource constraints and resulting limited capacity.

Assigning a value to σ – the elasticity of substitution between Palestinian and foreign workers in Israel's unskilled sector – is problematic due to lack of data on foreign workers, especially wage data. By assuming the two types of labor are very close technical substitutes, σ takes a high value. The model is calibrated for σ equal to 1,000 (near-perfect substitutes), and sensitivity to this assumption is tested below.

The non-wage premium for absenteeism Φ paid by Israeli employers of Palestinians represents an implicit cost that cannot be easily quantified. Data on the gap between foreign and Palestinian net wages is needed, in addition to information on Israeli demand for unskilled labor and the actual size of the foreign labor force. If L_{PI} and L_{FI} are close substitutes, then the observed demand for Palestinian workers despite cheaper labor alternatives suggests that the premium is not very large. For this calibration, it is assigned a value of 1.15, implying a 15 percent premium. As L_{PI} increases, Φ adjusts downward; the degree to which Φ responds to shifts in labor flows is estimated to be moderate (namely, elasticity ε_Φ is set equal to –0.2) to reflect the size of variation in L_{PI} observed in the past. Although the magnitudes of Φ and β are unlikely to move linearly with changes in L_{PI}, as implied by assuming ε_Φ and ε_β constant, the lack of data precludes a more complicated assumption.

Finally, because the model uses production function $g(L_{PI},L_{FI})$ to describe the marginal conditions of employing particular types of labor, it is necessary to specify the functional form of production. For purposes of generality, a CES production function is used.

Results

The model is calibrated for three different labor policy changes, resulting in (i) marginally improved Palestinian labor mobility, (ii) greatly improved labor mobility and therefore large Palestinian inflows into Israeli jobs, and (iii) sharp reductions in Palestinian employment in Israel. The three scenarios are discussed separately, and results are reported in Table 2 below (note that because the model is linear, the results for case 2 and case 3 are directly proportional to case 1).

Case 1: Improved Palestinian labor mobility to Israel. In case 1, Palestinian labor mobility is assumed to improve slightly under a future final status arrangement, but essentially reflects the

current policy of limited Palestinian access to the Israeli labor market through permit requirements and border controls. The results reported in Table 2 below illustrate the impact of an increase in Palestinian labor flows by 10,000 workers. In columns A and B (for L_{FI} equal to 160,000 and 250,000, respectively), the inflow of 10,000 additional Palestinians into Israeli jobs displaces 5,000-8,000 foreign workers from employment, leading to a net increase in Israel's unskilled employment (L_{UI}) by 2,100-5,000. Although the unit cost to Israeli employers of Palestinian labor $w_{PI}\Phi$ declines slightly, due to the decline in Φ as more Palestinians are given access to Israeli jobs, the wage itself (w_{PI}) is predicted to rise by 1.6 percent, drawing more Palestinians to search for Israeli jobs. This effectively raises the domestic Palestinian wage w_{PD} by 4 percent, and reduces domestic Palestinian labor demand. Domestic employment L_{PD} is estimated to fall by 5,200. The resulting wage gap is narrower, which is consistent with lower unemployment and lower commuting costs (β rises by 1 point to 0.64, as shown in the bottom of Table 2). In net terms, the pool of unemployment (including underemployed workers) declines by 4,800 workers – considerably less than the 10,000 new Palestinian jobs in Israel – and the unemployment rate falls from its initial rate of 17.3 percent to 16.6 percent.

Table 2: Predicted Results of Labor Policy Changes

	Case 1		Case 2		Case 3	
	$dL_{PI}>0$ *Improved mobility*		$dL_{PI}>>0$ *Large inflows*		$dL_{PI}<<0$ *Large outflows*	
Scenario	**A**	**B**	**C**	**D**	**E**	**F**
L_{FI}	160,000	250,000	160,000	250,000	160,000	250,000
Nominal change in L_{PI}:	10,000	10,000	82,000	82,000	-75,000	-75,000
Resulting change in:						
L_{PD}	-5,175	-5,178	-42,432	-42,457	38,810	38,833
U_P	-4,825	-4,822	-39,568	-39,543	36,190	36,167
L_{FI}	-7,893	-5,054	-64,720	-41,439	59,195	37,902
L_{UI}	2,107	4,946	17,280	40,561	-15,805	-37,098
β	0.01	0.01	0.08	0.08	-0.07	-0.07
Φ	-0.02	-0.02	-0.15	-0.15	0.14	0.14
% change in w_{PI}	1.6%	1.6%	12.9%	12.9%	-11.8%	-11.8%
% change in w_{PD}	4.0%	4.0%	33.0%	33.0%	-30.2%	-30.2%
New equilibrium values (*):						
L_{PI}^*	136,253	136,253	208,253	208,253	51,253	51,253
L_{PD}^*	423,743	423,740	386,485	386,461	467,728	467,750
u_P^*	16.6%	16.6%	11.4%	11.4%	22.7%	22.7%
L_{FI}^*	152,107	244,946	95,280	208,561	219,195	287,902
L_{UI}^*	288,360	381,199	303,533	416,814	270,448	339,154
β^*	0.64	0.64	0.71	0.71	0.55	0.55
Φ^*	1.13	1.13	1.00	1.00	1.29	1.29
w_{PI}^*	101.6	101.6	112.9	112.9	88.2	88.2
w_{PD}^*	54.1	54.1	69.1	69.2	36.3	36.3

Case 2: Large labor inflows to Israel. In case 2, future labor policies are assumed to lead to a much larger inflow of Palestinian workers into Israel, allowing greater integration of the Palestinian and Israeli (unskilled) labor markets. Assuming that changes to Israel's immigration policy result in an additional 82,000 Palestinian labor flows, the non-wage premium paid by Israeli employers disappears (i.e., Φ=1), leading to a lower unit labor cost ($w_{PI}\Phi$ falls from 115 to under 113) despite a 13 percent increase in w_{PI} (as shown in columns C and D of Table 2). The higher Israeli wage draws some Palestinians already employed within WBG, thus raising the domestic wage w_{PD} by 33 percent, from 52 to 69. Under this scenario, therefore, greater openness between WBG and Israel is predicted

to depress domestic employment. The new parameter values reported in the bottom of Table 2 illustrate that despite a sharp reduction in unemployment, a wage gap between w_{PD} and w_{PI} persists in the long run, reflecting the continued albeit less significant presence of transportation and other commuter costs incurred by Palestinians (β rises to 0.71).

Case 3: Large labor outflows. In case 3, Palestinian labor flows to Israel are assumed to be sharply reduced as a result of much tighter border enforcement under a possible future labor agreement. Labor flows are not eliminated altogether, however, because informal workers will continue to cross borders illegally. The underlying assumption in case 3 is that Palestinian labor flows decline by 75,000, which reflects levels observed during periods of partial border closure (based on PCBS labor force survey data). The non-wage premium Φ is greatly affected by this policy change, estimated by the model to almost double from 15 percent to 29 percent (the results for case 3 are reported in columns E and F of Table 2). For a reduction in L_{PI} by 75,000, the substitution toward foreign workers ranges from 38,000 to 59,000 (depending on the initial value of L_{FI}), implying that the loss of 75,000 Palestinian employees in Israel is compensated for by 38,000 to 59,000 new hires of foreign workers. At the margin, Palestinian wages in Israel fall by 12 percent, although the unit labor cost of Palestinians to Israeli employers declines by less than 2 percent, due to the concurrent rise in Φ. The return of Palestinian workers to the domestic labor market puts downward pressure on domestic wages w_{PD}, which decline by 30 percent, and domestic employment increases by about 39,000 jobs. These gains are offset by higher unemployment, however, as the pool of unemployed workers increases by 36,000, raising the unemployment rate to 22.7 percent.

Sensitivity analysis

How sensitive are the quantitative estimates of employment and wage outcomes to parameter assumptions? Sensitivity analysis (summarized in Table 3) indicates that the model's results do not vary significantly with changes in parameters ε_β, δ, σ, w_{FI}, Φ, ε_Φ, and γ. For a 1 percent increase in the value of each of these parameters, the endogenous variables respond by 1 percent or less. The sensitivity results are reported with respect to reference scenario A, and express for each endogenous variable the percentage difference in response to dL_{PI}=10,000 at the new parameter value compared to the initial parameter value (e.g., δ =0.303 compared to δ =0.3).

Table 3: Sensitivity Analysis

For a 1% increase in:	ε_β	δ	σ	w_{FI}	ϕ	ε_Φ	γ
Resulting change in:							
dL_{PD}	0.3%	0.8%	0.0%	0.0%	0.0%	0.3%	0.0%
du_P	-0.3%	-0.9%	0.0%	0.0%	0.0%	-0.3%	0.0%
dL_{FI}	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
dL_{UI}	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
$d\beta$	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
$d\Phi$	0.0%	0.0%	0.0%	0.0%	1.0%	1.0%	0.0%
dw_{PI}	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%	0.0%
dw_{PD}	0.3%	-0.2%	0.0%	0.0%	0.0%	0.3%	0.0%

N.B. Results are relative to case 1, scenario A (improved labor mobility, L_{FI}=160,000).

Suppose that very little is known about parameter values for ε_β, δ, σ, w_{FI}, Φ, ε_Φ, and γ. The lack of information may mean that even educated guesses as proffered above are inaccurate. To test the implications of "poor" assumptions, the sensitivity of the model is considered for much larger parameter changes with respect to reference scenario A. The results reported in Table 4 indicate a degree of sensitivity, particularly vis-à-vis δ and ε_Φ. The effects can be explained primarily by the small comparator base, however, and in any case are not large enough to drive the model's

predictions. For example, consider domestic Palestinian labor demand that is two-thirds more elastic than initially assumed (i.e., δ equal to 0.5 instead of 0.3). Domestic Palestinian employment L_{PD} declines by 1.8 percent instead of 1.2 percent under the reference scenario (implying a 48 percent larger change in L_{PD}), domestic wages w_{PD} increase by only 3.6 percent compared to 4 percent in the reference case (an 11 percent difference), and unemployment declines by only 2 percent, compared to 4.2 percent under initial parameter values (a 52 percent difference). Note that for a more elastic Φ, namely ε_Φ= -0.3 instead of -0.2 as initially assumed, the apparently large change in dw_{PI} (51 percent) is due to the small change in w_{PI} in the reference scenario. In levels, w_{PI} rises from 100 to 102.4 when ε_Φ is equal to -0.3, compared to 101.6 under initial parameter assumptions. This modest adjustment in wages (the effect is even smaller for domestic wages) is accompanied by a 16 percent greater decline in domestic employment and therefore a smaller decline in unemployment. These non-negligible findings of the sensitivity analysis underscore the importance of interpreting the model's predicted results carefully until better information on parameter values becomes available.

Table 4: Sensitivity Analysis for Large Parameter Changes

	ε_β	δ	σ	w_{FI}	ϕ	ε_ϕ	γ
% increase in parameter:	50.0%	66.7%	20.0%	22.2%	13.0%	50.0%	20.0%
Resulting change in:							
dL_{PD}	16.0%	48.1%	0.1%	0.0%	0.0%	16.0%	0.0%
du_P	-17.1%	-51.6%	-0.1%	0.0%	0.0%	-17.1%	0.0%
dL_{FI}	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
dL_{UI}	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
$d\beta$	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
$d\Phi$	0.0%	0.0%	0.0%	0.0%	13.0%	50.0%	0.0%
dw_{PI}	0.0%	0.0%	0.2%	0.1%	-0.1%	50.5%	0.1%
dw_{PD}	16.0%	-11.1%	0.1%	0.0%	0.0%	16.0%	0.0%

N.B. Results are relative to case 1, scenario A (improved labor mobility, L_{FI}=160,000).

V. Significance of the results

The predicted results of the modeling exercise reflect the observed trends in Palestinian labor mobility to Israel as summarized in the stylized facts above. An increase in the number Palestinians employed in Israel leads to a net increase in employment and reduction in unemployment. The persistent gap between domestic and Israeli wages (modeled to arise from commuting and search costs and the risk of absenteeism) results in structural and thus persistent unemployment. The model's predictions are consistent with the observed narrowing of the wage gap (based on average real wages) and the decline in unemployment. The model illustrates that in the long run, domestic wages respond to changes in labor supply and demand in WBG and Israel, and the trade-off between new Palestinian jobs in Israel and unemployment is not one-to-one. This result is contrary to the short-run evidence in Figure 4 depicting a correlation between labor flows and unemployment close to 1. Whereas the model's predicted outcomes reflect the long run, in the short run border closures translate directly into spikes in unemployment in light of no wage adjustment (as observed in the fourth quarter of 2000 and first half of 2001, when comprehensive border closures were imposed by Israel).[8]

[8] The events associated with the 2000/01 crisis (the Al-Aqsa Intifada) involve severe restrictions on domestic labor movements, as discussed above. Additional trade constraints have also been imposed, under which Palestinian imports are limited to food and medicine only, effectively eliminating exports and strangling domestic production dependent on imported inputs, thus diminishing labor demand in the short run. The equilibrium labor model developed in this analysis does not capture these effects.

The predicted effects of improved labor mobility are magnified in case 2, in which the inflow of 82,000 Palestinian workers leads to an elimination of the non-wage premium incurred by Israeli employers. The attendant increase in domestic wages and decline in domestic employment is substantial, suggesting that accelerated integration of the Palestinian and Israeli labor markets may in fact hamper domestic economic development and growth by reducing the competitiveness of Palestinian industry through higher domestic wages, and possibly inducing a reallocation away from labor-intensive activities. These results are driven by the persistent wage gap and unemployment which continue to draw Palestinians to Israel rather than seek domestic jobs. It is important to note that these predicted outcomes do not account for potentially large positive feedback from higher aggregate Palestinian income on domestic aggregate demand for goods and services. Moreover, because the analysis is limited to questions of distribution of employment and unemployment by fixing the size of the labor force, domestic employment and wages cannot respond to additional factors such as demographic pressures. In fact, the labor force survey data indicate an increase in domestic employment concurrent with a rapidly expanding labor force (which averaged 6 percent annual growth since 1995). Taken together, these two limiting features of the model imply that the predicted negative domestic employment impact is overstated.

The results of case 3, on the other hand, predict that a sharp reduction in Palestinian labor flows to Israel would increase unemployment in the long run despite raising domestic employment and reducing wages. By focusing only on labor, however, the model does not allow concurrent adverse effects on trade flows and domestic industry dependent on access to imported inputs or to export markets. The assumption of constant elasticity of demand for Palestinian labor implies that the predicted increase in domestic employment may be overstated. Furthermore, the very high estimated unemployment rates could have potentially devastating dynamic effects on aggregate demand, growth, and social development.

This analysis represents an effort to quantify the labor outcomes arising from potential changes to labor policy under a future agreement between the Palestinian and Israeli governments. The equilibrium labor model developed above provides a theoretical framework to test the impact of different policy options for the highly integrated Palestinian and Israeli labor markets. The analysis describes the main factors affecting labor supply and demand decisions in the West Bank and Gaza and Israel – namely, the importance of Israeli labor demand for Palestinian workers, the persistent wage gaps between domestic employment and better-paying Israeli jobs that are available only in limited supply, and the structural unemployment observed in the West Bank and Gaza. The model characterizes the distortions present and captures the interaction of the main labor variables in response to these distortions.

The predicted outcomes have important and somewhat contradictory implications for Palestinian economic policy and long-term development objectives. For example, continued or increased Palestinian reliance on Israeli jobs may improve average Palestinian earnings and increase average consumption levels, but the long-term returns are predicted to be small or negative, especially with respect to domestic Palestinian economic growth. Palestinian productivity would remain low due to the nature of low value-added jobs available in Israel, and the tax base, which depends on the domestic economy, would be small. Inflation risks may be associated with the higher aggregate earnings, and fiscal pressures could result in higher tax rates on domestic firms and workers, further constraining the domestic economy. Finally, reliance on Israeli demand for unskilled labor leaves the Palestinian labor market, and more broadly the Palestinian economy, vulnerable to shocks on various fronts, the effects of which are known from episodes of high unemployment during comprehensive closures in the recent past. The alternative, however – namely, a reduction in Palestinian employment in Israel – is likely to increase unemployment in the long run, limiting the use of available productive assets of the Palestinian economy for years to come. And whereas the theoretical framework

describes the main factors affecting labor outcomes, it necessarily simplifies some complex realities that may be important. It is therefore essential to exercise caution in interpreting the model's results.

By calibrating the model using the available data, this analysis generates quantitative estimates of the long-run effects on employment levels, unemployment, and wages in the Palestinian and Israeli economies following changes to Israeli immigration policy and the magnitude of daily Palestinian labor flows into Israel. The quality of these estimates depends on the quality of the data, however; whereas data quality is very good in some areas (e.g., Palestinian employment and unemployment rates from PCBS labor force surveys), in other key areas, data is altogether lacking. In order to increase the usefulness of the model, it will be necessary to obtain better data on foreign wages and the size of the foreign labor force in Israel, Palestinian wages over a longer time horizon than currently available, and some measure of the non-wage costs incurred by Israeli employers of Palestinians as a result of absenteeism, for example, as well as job search costs incurred by Palestinians commuting to Israel. The model's results nevertheless provide insight into the effects of different labor policies on Palestinian labor outcomes, and as such may be useful to policy makers.

References

Angrist, Joshua. 1996. "Short-run Demand for Palestinian Labor", *Journal of Labor Economics* vol. 14, no. 3: 425-453.

Arnon, Arie et al. 1997. *The Palestinian Economy: Between Imposed Integration and Voluntary Separation*. Leiden: Brill.

Bartram, David. 1998. "Foreign Workers in Israel: History and Theory", *International Migration Review* vol. 32 (Summer): 303-325.

Dickens, William and Kevin Lang 1985. "A Test of Dual Labor Market Theory", *The American Economic Review* vol. 75, no. 4 (September): 792-805.

Eckshtein, Zvi and Shlomy Prizat. 2000. "The Unemployment Rate – A Result of Labor market Policy", Ha'aretz newspaper, April 3, 2000.

Farsakh, Leila. 1999. *The Implementation of Labor-related Articles in the Protocol on Economic Relations between the Government of Israel and the PLO: A Critical Assessment.* Jerusalem: Palestine Economic Policy Research Institute (MAS).

Guasch, J. L., A. Cox Edwards, I. Gill, and C. Pessino. 1997. "Estimating the Benefits of Labor Reform in Argentina." Latin America I Department, World Bank, Washington, D.C.

Hamermesh, Daniel. 1993. *Labor Demand.* Princeton, New Jersey: Princeton University Press.

Harris, John and Michael Todaro. 1970. "Migration, Unemployment and Development: A Two-Sector Analysis", The American Economic Review vol.60 (1): 126-142.

Kav La'Oved. 2000. "Numbers Can Be Deceptive: Non-Israelis in the Israeli Labor Market", Kav La'Oved Newsletter, May 2000.

Oxford Analytica. 1996. "Israel: Foreign Workforce", August 21, 1996 (www.oxan.com).

Ruppert, Elizabeth. 1999a. "The Algerian Retrenchment System: A Financial and Economic Evaluation", *World Bank Economic Review* vol. 13, no.1: 155-183.

Ruppert, Elizabeth. 1999b. "A Model of Labor Adjustment in Transition Economies with Special Application to Algeria", University of Maryland Ph.D. dissertation.

Shaban, Radwan. 1999. "The Harsh Reality of Closure" in I. Diwan and R. Shaban, eds., *Development Under Adversity: The Palestinian Economy in Transition.* Washington, D.C.: The World Bank.

World Bank. 1997. "Kingdom of Morocco: Growth and Labor Markets: An Agenda for Job Creation." Report 16598-MOR. Human Development Sector, Middle East and North Africa Regional office, World Bank, Washington, D.C.

World Bank. 2000. "West Bank and Gaza: Transport Sector Study", Infrastructure Development Group, Middle East and North Africa Regional office, World Bank, Washington, D.C.

Annex I

Table 1: Regression Results for Wage Determinants					
PCBS Labor Force Survey, Round 13, Q2 1999					
Reference: Male worker employed in West Bank or Gaza in the manufacturing sector, plant or machinery operator, with preparatory educational attainment.					
Dependent Variable: Log of daily wage (NIS, method 2)					
	Coefficients B[a]				
	Regression 1	**Regression 2**	**Regression 3**	**Regression 4**	**Regression 5**
(Constant)	3.007	2.998	3.055	3.029	3.046
Age	4.86E-02	4.75E-02	5.02E-02	5.23E-02	5.13E-02
Age squared	-4.96E-04	-4.73E-04	-5.43E-04	-5.64E-04	-5.56E-04
Female	-0.289	-0.274	-0.298	-0.321	-0.323
Works in Israel or in settlement	0.651	0.587	0.683	0.650	0.655
College degree or higher	0.252	0.293			
Associate diploma	0.116	0.142			
Secondary school degree	3.05E-03	1.77E-02			
Elementary schooling	-6.40E-02	-6.16E-02			
Less than elementary	-0.197	-0.175			
Agriculture and fishing		-0.325			
Mining and quarrying		0.346			
Utilities		0.302			
Construction		0.177			
Wholesale and retail trade		-2.54E-02			
Hospitality industry		0.143			
Transport, storage, communications		4.55E-02			
Financial, real estate sectors		0.182			
Public administration		-9.32E-02			
Education, health, social work		-3.19E-02			
Community, social and personal services		-1.19E-04			
Extra-Territorial organizations		0.221			
Adjusted R2	**0.390**	**0.441**	**0.401**	**0.411**	**0.419**
[a] Significant at 0.01 unless otherwise indicated			Not significant		

Annex II

The model

Palestinian workers are assumed to be either employed in the domestic (i.e., Palestinian) economy, employed in Israel, or unemployed. Let L_{ij} denote labor demand for worker of type i (i=P, F for Palestinian and foreign, respectively) in sector j (j=D,I for domestic and Israel, respectively). In equilibrium, the supply of Palestinian labor L_P^S is equal to total Palestinian employment (or labor demand) plus unemployment U_P:

(1) $L_P^S = L_{PD} + L_{PI} + U_P$

Normalizing Palestinian labor supply L_P^S to 1, equation 1 becomes:

(2) $1 - u_P = L_{PD} + L_{PI}$,

where u_P denotes the unemployment rate.

The domestic Palestinian economy is assumed to produce a single non-tradable good $f(L_{PD})$ using labor input L_{PD}. Wages are given by w_{PD}, and non-labor inputs are assumed to have fixed cost C_D. Let $f(L_{PD})$ be continuously twice differentiable, with $f'(L_{PD}) > 0, f''(L_{PD}) < 0$. Competitive Palestinian firms maximize profits by solving the following:

(3) $\underset{L_{PD}}{\text{Max}}\, f(L_{PD}) - w_{PD}L_{PD} - C_D$,

which leads to first order condition

(4) $f'(L_{PD}) = w_{PD}$.

Notice that prices are normalized to 1, implying that w_{PD} represents real wages. The elasticity of domestic (i.e., within WBG) labor demand for Palestinian workers L_{PD} at wage w_{PD} is given by:

(5) $\delta = -\left(\frac{dL_{PD}}{dw_{PD}}\frac{w_{PD}}{L_{PD}}\right) > 0$

The level of Palestinian employment in Israel is determined by labor demand on the part of Israeli employers, the number of permits issued, and the effective control of labor flows across borders. Palestinians are drawn to better-paying Israeli jobs, but are limited by mobility constraints that affect legal and illegal workers alike. In the model, therefore, L_{PI} is exogenously fixed below its market-clearing level (i.e , $L_{PI} = \overline{L}_{PI}$), and the demand for Palestinian labor in Israel is assumed to exceed Palestinian labor supply to Israel.

A wage gap arises in equilibrium when expected wages are equal at the margin, given by:

(6) $w_{PD} = (1 - u_P)\beta(L_{PI})\, w_{PI}$,

where $(1-u_P)<1$, and β (which captures the transportation, search and permits costs associated with working in Israel) depends on Palestinian labor mobility to Israel ($\beta(L_{PI})<1$ and $\beta'(L_{PI})>0$). The sensitivity with which β responds to changes in L_{PI} is given by elasticity ε_β:

$$(7) \quad \varepsilon_\beta = \frac{d\beta(L_{PI})}{dL_{PI}} \cdot \frac{L_{PI}}{\beta(L_{PI})} > 0 .$$

Palestinian employment in Israel L_{PI} depends on Israeli demand for unskilled workers, L_{UI}, the supply of foreign workers, and the elasticity of substitution between Palestinian and foreign workers. Total Israeli demand for unskilled labor is given by:

$$(8) \quad L_{UI} = L_{PI} + L_{FI} .$$

The Israeli unskilled sector is assumed to produce a single non-tradable good $g(L_{PI},L_{FI})$ using two types of labor inputs, Palestinian and foreign. Non-labor inputs are assumed to have fixed cost C_I. Let $g(L_{PI},L_{FI})$ be continuously twice differentiable, with $dg(\cdot)/dL_{PI} = g_P > 0$, $dg(\cdot)/dL_{FI} = g_F > 0$, cross-partial derivatives $dg_P/dL_{FI} = g_{PF} = dg_F/dL_{PI} = g_{FP} > 0$, and second derivatives $dg_P/dL_{PI} = g_{PP} < 0$ and $dg_F/dL_{FI} = g_{FF} < 0$. Palestinians in the Israeli unskilled sector earn wage w_{PI}, but employers incur an additional non-wage cost Φ ($\Phi>1$) associated with Palestinian workers, where Φ represents a premium linked to absenteeism due to closures and other security constraints. This non-wage premium is endogenous and depends on the magnitude of Palestinian labor flows into Israel; as more Palestinians are allowed across the border, Φ declines (i.e., $\Phi'(L_{PI}) < 0$). The sensitivity with which Φ responds to changes in L_{PI} is given by elasticity ε_Φ:

$$(9) \quad \varepsilon_\Phi = \frac{d\Phi(L_{PI})}{dL_{PI}} \cdot \frac{L_{PI}}{\Phi(L_{PI})} < 0 .$$

Foreign workers earn wage w_{FI}, which is exogenously determined by labor market conditions in the sending, or labor-exporting, country (i.e., $w_{FI} = \overline{w}_{FI}$). The supply of foreign workers is effectively infinite, and foreign wages do not respond directly to changes in Israeli labor demand. However, there may be other costs borne by employers, denoted in the model by the parameter γ ($\gamma \geq 1$), where γ depends on L_{FI}.

Competitive Israeli firms maximize profits by solving:

$$(10) \quad \underset{L_{FI}}{\text{Max}} \; g(\overline{L}_{PI}, L_{FI}) - w_{PI}\Phi(\overline{L}_{PI})\overline{L}_{PI} - \gamma(L_{FI})\overline{w}_{FI}L_{FI} - C_I ,$$

generating the following first order conditions:

$$(11) \quad g_F = \gamma \overline{w}_{FI}$$

$$(12) \quad g_P = w_{PI}\Phi(\overline{L}_{PI}) + w_{PI}\overline{L}_{PI}\frac{d\Phi(\overline{L}_{PI})}{d\overline{L}_{PI}} .$$

Note that the price of $g(\overline{L}_{PI}, L_{FI})$ is also normalized to 1.

In order to solve the model for the equilibrium labor allocation and wages in the various sectors, two additional pieces of information are needed: the elasticity of Israeli labor demand for Palestinians, η, and the elasticity of technical substitution between Palestinian and foreign labor, σ. These are defined in equations 13 and 15 respectively (Hamermesh 1993).

$$(13)\quad \eta = \frac{dL_{PI}}{d(w_{PI}\Phi(L_{PI}))}\frac{w_{PI}\Phi(L_{PI})}{L_{PI}} = -(1-s)\sigma\,,$$

where s is the cost-share of input L_{PI} in total revenues:

$$(14)\quad s = \frac{w_{PI}\Phi(L_{PI})L_{PI}}{g(L_{PI},L_{FI})}\,,\ 0 < s < 1$$

$$(15)\quad \sigma = \frac{d\ln\left(L_{FI}/L_{PI}\right)}{d\ln\left(g_P/g_F\right)} > 0\,.$$

Nine variables are endogenously determined: L_{PD}, L_{FI}, L_{UI}, u_P, w_{PD}, w_{PI}, β, Φ and γ. Exogenous variables are: $\overline{L}_{PI}$, $\overline{w}_{FI}$, C_D, C_I, , δ, ε_β, ε_Φ, and σ.

The main comparative statics results are as follows:

$$(a)\quad \frac{dw_{PI}}{d\overline{L}_{PI}} = -\frac{w_{PI}}{\overline{L}_{PI}}\left(\varepsilon_\Phi + \frac{1}{(1-s)\sigma}\right)$$

$$(b)\quad \frac{dL_{PD}}{d\overline{L}_{PI}} = \frac{-\left[\delta L_{PD}\dfrac{\varepsilon_\beta}{\overline{L}_{PI}} - \dfrac{\delta L_{PD}}{\overline{L}_{PI}}\left(\varepsilon_\Phi + \dfrac{1}{(1-s)\sigma}\right) - 1\right]}{1 + \dfrac{\delta L_{PD}}{(1-u_P)}} - 1$$

$$(c)\quad \frac{dw_{PD}}{d\overline{L}_{PI}} = \frac{-w_{PI}(1-u_P)\beta(L_{PI})}{\delta L_{PD}} \cdot \left(\frac{-\left[\delta L_{PD}\dfrac{\varepsilon_\beta}{\overline{L}_{PI}} - \dfrac{\delta L_{PD}}{\overline{L}_{PI}}\left(\varepsilon_\Phi + \dfrac{1}{(1-s)\sigma}\right) - 1\right]}{1 + \dfrac{\delta L_{PD}}{(1-u_P)}} - 1 \right)$$

$$(d)\quad \frac{du_P}{d\overline{L}_{PI}} = \frac{\left[\delta L_{PD}\dfrac{\varepsilon_\beta}{\overline{L}_{PI}} - \dfrac{\delta L_{PD}}{\overline{L}_{PI}}\left(\varepsilon_\Phi + \dfrac{1}{(1-s)\sigma}\right) - 1\right]}{1 + \dfrac{\delta L_{PD}}{(1-u_P)}}$$

(e) $\dfrac{dL_{FI}}{d\bar{L}_{PI}} =$

$$\frac{\dfrac{s(1+\varepsilon_\phi)}{1-\rho}\cdot\left(\dfrac{1-\alpha}{\alpha}\right)^{1/1-\rho}\left[g\dfrac{\rho}{1-\rho}g_P^{2\rho-1/1-\rho}g_{PP}+g_P^{1/1-\rho}\right]-\sigma L_{FI}\dfrac{1}{1-\rho}g_F^{\rho/1-\rho}g_{FP}}{-\dfrac{s(1+\varepsilon_\phi)}{1-\rho}\cdot\left(\dfrac{1-\alpha}{\alpha}\right)^{1/1-\rho}\left[g\dfrac{\rho}{1-\rho}g_P^{2\rho-1/1-\rho}g_{PF}+g_P^{\rho/1-\rho}g_F\right]+\sigma L_{FI}\dfrac{1}{1-\rho}g_F^{\rho/1-\rho}g_{FF}+\sigma g_F^{1/1-\rho}}$$

MENA Working Paper Series

No. 1 **Has Labor Migration Promoted Economic Integration in the Middle East?** June 1992. *Nemat Shafik, The World Bank and Georgetown University.*

No. 2 **The Welfare Effects of Oil Booms in a Prototypical Small Gulf State.** September 1992. *Ahmed Al-Mutuwa, United Arab Emirates University and John T. Cuddington, Georgetown University.*

No. 3 **Economic and Social Development in the Middle East and North Africa.** October 1992. *Ishac Diwan and Lyn Squire, The World Bank.*

No. 4 **The Link Between Trade Liberalization and Multi-Factor Productivity: The Case of Morocco.** February 1993. *Mona Haddad, The World Bank.*

No. 5 **Labor Markets in the Middle East and North Africa.** February 1993. *Christopher A. Pissarides, The London School of Economics and Political Science.*

No. 6 **International Competitiveness of the Private Industry and the Constraints to its Development: The Case of Morocco.** June 1993. *Hamid Alavi, The World Bank.*

No. 7 **An Extended RMSM-X Model for Egypt: Quantifications of Market-Oriented Reforms.** September 1993. *Karsten Nimb Pedersen, The World Bank.*

No. 8 **A Report on the Egyptian Tax System.** October 1993. *Mark Gersovitz, Roger H. Gordon and Joel Slemrod, The World Bank.*

No. 9 **Economic Development and Cooperation in the Middle East and North Africa.** November 1993. *Ishac Diwan and Lyn Squire, The World Bank.*

No. 10 **External Finance in the Middle East: Trends and Prospects.** December 1993. *Ishac Diwan, John Underwood and Lyn Squire, The World Bank.*

No. 11 **Tax Incidence on Agriculture in Morocco (1985-1989).** April 1994. *Jean-Paul Azam, CERDI, University of Auvergne, Clermont-Ferrand (France), et CSAE, Oxford (U.K.).*

No. 12 **The Demographic Dimensions of Poverty in Jordan.** August 1994. *Chantal Worzala, The World Bank.*

No. 13 **Fertility and Family Planning in Iran.** November 1994. *Rodolfo A. Bulatao and Gail Richardson, The World Bank.*

No. 14 **Investment Efficiency, Human Capital & Migration A Productivity Analysis of the Jordanian Economy.** May 1995. *Gaston Gelos, Yale University, Department of Economics.*

No. 15 **Tax Effects on Investment in Morocco.** August 1995. *David Sewell, Thomas Tsiopoulos and Jack Mintz, The World Bank.*

No. 16 **Reconstruction in Lebanon: Challenges for Macroeconomic Management.** April 1999. *Daniela Gressani and John Page, The World Bank.*

No. 17 **Towards a Virtuous Circle: A Nutrition Review of the Middle East and North Africa.** August 1999. *Regional HNP Knowledge Management, The World Bank.*

No. 18 **Has Education Had a Growth Payoff in the MENA Region?** December 1999. *Lant Pritchett, The World Bank.*

No. 19 **Rationalizing Public Sector Employment in the MENA Region.** December 2000. *Elizabeth Ruppert Bulmer, The World Bank.*

No. 20 **Achieving Faster Economic Growth in Tunisia**. March 2001. *Auguste T. Kouamé. The World Bank.*

No. 21 **Trade Options for the Palestinian Economy: Some Orders of Magnitude**. March 2001. *Claus Astrup and Sébastien Dessus. The World Bank.*

No. 22 **Human Capital and Growth: The Recovered Role of Educational Systems.** April 2001. *Sébastien Dessus. The World Bank.*

No. 23 **Governance And The Business Environment In West Bank/Gaza** May 2001. *David Sewell. The World Bank.*

Copies of MENA Working Papers may be obtained from Ms. Gena Gorospe, MNAVP, Ph: (202) 473-2623.