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SHORT-RUN DEMAND FOR PALESTINIAN LABOR
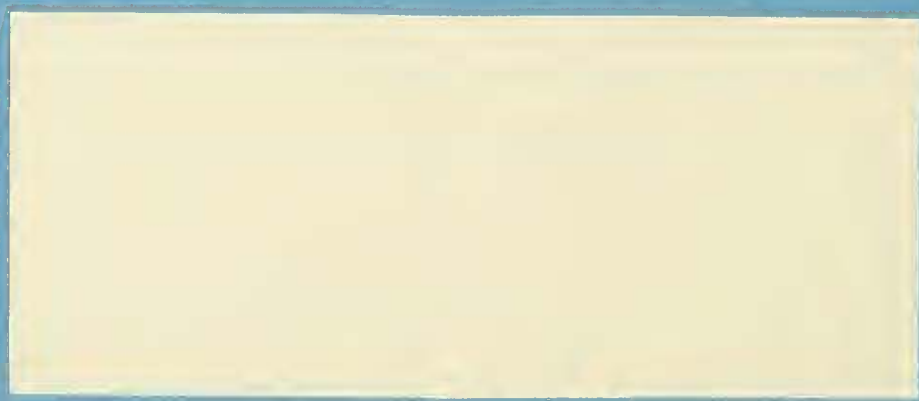
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by

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Abstract

Palestinian residents of the West Bank and Gaza Strip have the option of working in Israel. Wages paid to residents of the territories who are employed in Israel are generally higher than wages paid in the territories, but the Israel wage premium is highly volatile. Beginning in late 1987 with the Palestinian uprising, changes in wage differentials by work location roughly parallel the pattern of Palestinian absences from work in Israel. This paper discusses aspects of the demand for Palestinian labor and explores the possibility that recent changes in relative wages by work location are explained by movements along an Israeli demand curve for migrant workers. A model of the labor markets in the West Bank and Gaza Strip is used to estimate elasticities of demand and to evaluate the possible economic impact of changes in policies governing Palestinian access to the Israeli labor market.

I. INTRODUCTION

Since October 1970, changes in access to the Israeli labor market have constituted the major field for changes and policy innovations in the economic relationship between Israel and the occupied territories. An important recent example is the Palestinian uprising, which has periodically restricted access to the Israeli labor market because of actions taken on both sides. On one hand, strikes and curfews restrict mobility and employment opportunities for workers from the territories. On the other, beginning in 1988, and especially since the 1991 Gulf War, the Israeli authorities stepped up the enforcement of laws against employing Palestinian workers who are not registered with the Israeli Employment Service. Registration for employment has also become more difficult (*The Jerusalem Post*, 1988, Jerusalem Media and Communications Center, 1991).

Recent changes in Palestinian employment patterns have been widely noted (see, e.g., Kleiman 1992). In Angrist (1992), I also document a number of significant changes in the wage distribution of workers from the West Bank and the Gaza Strip over the period 1981 – 1990. One of the most important changes is the virtual elimination of the wage premium paid to Palestinians for working in Israel in the mid-1980s, a period of inflation and economic crisis that included a severe contraction in construction.[1] Following Israeli stabilization, however, the daily wage premium paid for work in Israel climbed to a new high, reaching 40 percent by 1989.

Since December 1987, changes in the Israel wage premium have roughly paralleled the pattern of absences from work by Palestinians employed in Israel. Such a correlation suggests that recent wage increases may reflect movements along a short-run Israeli demand curve in response to the sudden withdrawal of labor from the territories. This paper develops a model of the Palestinian labor market that is used to estimate parameters affecting short-run Israeli demand for Palestinian labor. An understanding of this issue is essential for developing effective policies governing the evolving relationship between the Palestinian and Israeli labor markets. Suppose, for example, that the Palestinian Authority is able to tax the wages of Palestinians employed in Israel or to impose payroll taxes on their employers. How much revenue are such taxes likely to generate? Might the Palestinian Authority rationally choose to restrict exported labor supply so as to maximize repatriated earnings or tax revenue? Of more immediate relevance, to what extent do higher wages offset the earnings costs of periodic restrictions on Palestinian labor mobility? Answers to such questions turn

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[1] Wage differentials between Palestinians working in Israel and Palestinians employed locally generally declined throughout most of the 1970s (Zakai, 1988).

partly on the elasticity of demand for labor services exported by Palestinians to Israel.

The paper is organized as follows. Section II provides background information on the Israeli-Palestinian employment relationship, describes data from the Territories Labor Force Survey (TLFS) and provides a brief empirical description of Palestinian labor market outcomes in recent years. Section III outlines a simple equilibrium model that describes how supply and demand for labor might interact to determine Palestinian wages and employment. Section IV presents estimates of key parameters in the model and Section V discusses policy implications of the estimates. Section VI offers a summary and some conclusions.

II. BACKGROUND, DATA, AND DESCRIPTIVE ANALYSIS

Official Israeli employment policy requires workers from the territories to apply for work in Israel through the Israeli Employment Service (ES), which then channels workers to Israeli employers (Israel Employment Service, 1991). The ES is the only legal avenue through which Israelis may employ Palestinians, and the Palestinian payrolls of Israeli employers' are supposed to be disbursed by the ES. The ES also deducts taxes, social insurance contributions, and union dues from these payrolls. Until recently, the ES was also the only legal employment agency for most non-college educated Israeli citizens, and most job openings in Israel were posted through this agency (Berman 1994).

Legal restrictions notwithstanding, until the 1991 Gulf War, the vast majority of Palestinians employed in Israel did not actually reach their employers through the ES. Rather, most Palestinians were contacted directly by Israeli employers or through a Palestinian labor contractor. ES data typically record between 30 and 40 thousand registered Palestinians working for Israeli employers in the 1980s, while data from the Israel Central Bureau of Statistics' (CBS) quarterly TLFS (e.g., CBS, 1991) show that 100-110 thousand Palestinians were employed in Israel, including Jerusalem.[2]

1. The Territories Labor Force Survey

This study is based on TLFS micro data.[3] TLFS interviews are conducted by local Palestinian

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[2]Since early 1991, enforcement of the official work registration requirements has become stricter. From the Gulf War until March 1993, roughly 70,000 Palestinians were registered as working for Israeli employers each month.

[3]Wage and employment data from the TLFS are compared to wage and employment data from ES administrative records in the appendix to Angrist (1994).

enumerators employed by the Israeli Civil Administration in the territories. The TLFS sampling frame includes most households in the West Bank and Gaza Strip, regardless of the employment status or work location of the head of household. The TLFS extract used to prepare this paper contains observations on men aged 18-64, interviewed in the years 1981-91. Men constitute the bulk of the Palestinian labor force because labor force participation rates for women are very low (6-9 percent in the sample period; CBS, 1991).

Table 1 provides descriptive statistics for the sample of men aged 18-64 by region of residence. Some 8-10 thousand interviews were conducted each year in the Gaza Strip and between 22 and 30 thousand interviews were conducted each year in the West Bank. Because of the sample rotation scheme, only one-quarter of these observations are independent in any given year. The sample sizes show that the number of completed interviews fell with the onset of the Palestinian uprising in 1988, especially in the Gaza Strip, where the uprising started earliest and was most intense.

The average age of men in the sample is 33 and the proportion married rose from 67 to 75 percent in the Gaza Strip and from 64 to 67 percent in the West Bank. Married men are probably over-represented in the sample because the interviews of employed men are often completed by proxy respondents. The average level of schooling rose considerably over the sample period, from 7.6 years to 8.8 years in the Gaza Strip and from 7.7 years to 8.6 years in the West bank. This is partly attributable to the large number of new college graduates who entered the labor force in the 1980s (Angrist, 1992; Simon, 1988). The descriptive statistics also show a substantial increase in labor force participation, which is primarily a consequence of increased participation by men aged 18-24.

2. Employment patterns

Table 1 shows that the fraction of the Palestinian labor force employed as wage-earners was stable at roughly one-half. Members of the labor force who were not employed as wage-earners are either self-employed or unemployed. The data analyzed below are for wage-earners only.

The last column of Table 1 show that 41-50 percent of Gazans were employed in Israel and 35-41 percent of West Bank residents were employed in either Israel or Jerusalem.[4] The proportion

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[4]These rates are based on weighted counts from the TLFS. In 1991, there were an estimated 166,000 West Bank and 102,000 Gazan men aged 18-64 working as wage laborers. In addition to the work locations mentioned in the text, a few men are employed in Jewish settlements in the territories and a few were probably working abroad in the reference week. Work abroad was an important source of employment for residents of

of the Gaza labor force working in Israel was stable until 1987; after 1987 this proportion declined from 48 percent to 41 percent. The proportion of the West Bank labor force employed in Israel increased from 22 to 27 percent between 1981 and 1987, and reached 29 percent by 1991. Between 1987 and 1991 the proportion of the West Bank labor force employed in Jerusalem declined from 13 to 10 percent.

Palestinian workers, especially those employed in Israel, have been concentrated in a number of industries. In 1981, half of the Palestinians employed in Israel worked in construction; by 1991 this proportion had risen to 70 percent. Most Palestinians working in Jerusalem were also employed in the construction sector. Agriculture was the second most important source of employment for Palestinians working in Israel, accounting for 13–17 percent of total employment. Roughly 20 percent of the Palestinians who were employed in their region of residence worked in the agricultural sector. The importance of employment in manufacturing, mining, other types of industries, and the service sector has declined as the proportion employed in construction has risen. Workers employed in construction and industry account for a larger share of local employment in the West Bank than in the Gaza Strip.[5]

This study focuses on recent changes in Palestinian employment patterns. The data on average days worked per month in Table 1 show a sharp drop in 1988, from 22 to 17 days for residents of the Gaza Strip and from 23 to 18 days for residents of the West bank, again a consequence of the Palestinian uprising. An important component of this change comes from work absences and difficulties in getting to work. Figure 1 shows the fraction of the labor force absent from work by work-place location.[6] Data on absences exhibit a seasonal pattern across quarters and a large increase in absences beginning in 1988 and during the Gulf War in the first quarter of 1991.

A related aspect of the changing work environment for migrants is documented in Figure 2, which plots the difference between daily hours worked in Israel and locally by region of residence. Until 1988, both Gazans and residents of the West Bank who were employed in Israel worked

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the territories over some of the sample period (Gabriel and Sabatello, 1986).

[5]Statistics in this paragraph are from Angrist (1994). For other analyses of the occupational mix of Palestinians employed in Israel see Kleiman (1992) and Semyonov and Lewin-Epstein (1987).

[6]Absentees are defined as labor-force participants who did not work, assist on a farm or family business, or actively seek work during the reference week but reported that they had a job or farm or other agricultural job from which they were absent for any reason.

roughly one hour longer per day than men employed locally. Beginning in 1988, however, the gap in length of workday grows to almost 4.5 hours for Gazans and almost 2.5 hours for residents of the West Bank. It seems likely that the many proxy responses to the TLFS question on hours worked record the time elapsed between leaving home and returning. Significant changes in hours worked are therefore most likely due to changes in travel time rather than hours on the job.[7] The gap has grown larger for residents of the Gaza Strip because time-consuming security measures at the Gaza border are relatively easy to enforce.

3. Wages and work location

Figure 3 plots survey data on average real daily wages by work location for the period 1981-91. The TLFS wage series was computed from the monthly wages of men employed in either Jerusalem, Israel, the Gaza Strip, or the West Bank, who reported real monthly wages under NIS10,000 (in 4th quarter 1991 shekels). Daily wages were computed by dividing monthly wages by days worked. Figure 3 shows a decline in real wages at all work locations in 1984-85, with subsequent strong real wage growth until early 1987. The real wages of Palestinian men employed in Jerusalem continued to grow into 1988 and the real wages of men employed in Israel continued to grow into 1989. Subsequently, real wages fall sharply for men employed at these locations. Real wages in Gaza were flat for the period 1987-89 and fell thereafter; real wages in the West Bank fall sharply beginning in early 1988. Note that the period 1985-1989 was generally one of strong real wage growth for Israeli citizens as well as for residents of the territories (CBS, 1992).

Regression estimates are used to describe changes in average Palestinian wages conditional on demographic characteristics. Table 2 reports parameter estimates from the following equation (computed by weighted least squares using the CBS sampling weights):

(1) $\log(w_{it}) = \delta_{qt} + \Sigma_c \, a_{ic}\beta_{ct} + \Sigma_g \, b_{ig}\gamma_{gt} + f_i\theta_t + \Sigma_s \, c_{is}\mu_{st} + J_i\psi + v_{it},$

where δ_{qt} is a quarter effect in year t, a_{ic} is a dummy variable that indicates if i is in age group c and β_{ct} is an age effect in year t, b_{ig} is a dummy variable indicating if i is in schooling group g and γ_{gt} is a schooling effect in year t, c_{is} a dummy variable indicating if i is employed in industrial

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[7] The TLFS question on hours worked asks "How many hours did the household member work at all jobs last week?" To estimate hours worked per day, I multiplied this number by 4.35 weeks per month, and then divided by the number of reported workdays in the month.

sector s and μ_{st} is an industry wage effect in year t, f_i is a dummy variable indicating if i works in Israel in year and θ_t is a work-in-Israel effect in year t, J_i is a dummy variable indicating if i works in Jerusalem and ψ is a work-in-Jerusalem effect.[8]

Column (1) of Table 2 reports estimates of the daily wage premium for working in Israel. The premium falls from 17 (log) percent in 1981 to zero in 1984 and 1985, then rises to an all-time high of 36 percent in 1991. Columns (2)–(3) report schooling coefficients, which decline monotonically until 1989 and then increase slightly. The wage gap in favor of men who completed 13–15 years of schooling is less than 6 percent for the period 1987–91. Elsewhere (Angrist 1992) I discuss the possibility that shifts in the supply of educated workers were a major contributing factor in the decline in returns to schooling. Angrist (1992) also shows that different types of workers were employed in Israel at different times, which suggests that changes in the Israel wage premium (and schooling coefficients) may reflect worker heterogeneity. But estimates using panel data show that these changes are apparent even after allowing for individual heterogeneity.

The industry wage effects in columns (4)–(7) indicate that in the beginning of the sample period agricultural workers earned least while construction workers earned most. By 1989, however, workers in agriculture were no longer paid less than those in the reference group (public and community services), earned more than those in the general service sector, and almost as much as those in the manufacturing sector. The premium paid to construction workers also grew — to 20 percent by 1988. The wage gap between construction and agriculture, however, shrinks from roughly 30 percent to 15 percent. The wage gap between manufacturing and construction has been fairly stable, at roughly 15 percent. The growth in construction and agricultural wages, relative to wages in the service sector, would seem to reflect upward pressure on wages in labor markets where Palestinians have the most employment opportunities in Israel.

4. The relationship between wages and days worked

This subsection describes OLS estimates from a simple regression of wages earned by men employed in Israel on the average days worked by Palestinians employed in Israel, for the years 1987–1991.

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[8] The age groups indexed by c are: 25–34, 35–44, 45–54, 55–64. The schooling groups indexed by g are: 13–15 years, 16 or more years. The industries indexed by s are: agriculture, manufacturing and related, construction, and services. The omitted industry group is public and community services.

Some of these regressions also include controls for average daily wages of Israeli citizens in Israel (derived from National Insurance Institute (NII) data; see Angrist 1994.) Although these OLS estimates do not have a structural interpretation, they document the fact that wages paid to Palestinians working in Israel are negatively correlated with days worked by Palestinians in Israel, even after controlling for Israeli wage trends.

Column (1) in the top half of Table 3 reports OLS estimates from a regression of wages on days worked, quarter dummies, and 2 Gulf War dummies for the first two quarters of 1991. Column (2) reports the results of adding NII data on the average daily wage of Israeli citizens to this basic equation. Adding the average wage of Israelis employed in construction and the average wage of Israelis employed in agriculture reduces the coefficient on average days worked by Palestinians in Israel slightly, from -0.17 to -0.14.

Separate regression results by industry for men employed in agriculture, construction, and manufacturing also show a negative covariance between days worked and average daily wages, even after controlling for wages earned by Israeli citizens (except for manufacturing workers). For example, the estimate of the coefficient on days worked in the construction section in a regression of log average daily wages paid to construction workers on days of work is -0.16. Note that for each industry group, wages paid to Palestinians working in Israel are strongly positively correlated with the wages paid to Israeli citizens working in those industries. This suggests that some of the movement in Palestinian wages reflects an Israeli trend or demand shock, and highlights the importance of isolating a source of exogenous variation in labor supply that can be used to identify structural demand parameters.

III. THEORETICAL FRAMEWORK

This section develops a theoretical framework that can be used to interpret the impact of exogenous supply shocks on Palestinian wages and employment. The days worked and daily wages of workers from the territories could be affected by work opportunities in Israel in at least two ways. First, the possibility of employment in Israel should act to close the gap between wages paid locally and in Israel. This means an increase in wages paid to workers employed locally and a reduction in labor costs for Israeli employers. Second, higher Israeli wages may stimulate local demand for products and services produced in the territories. A comparative advantage in labor services may also have worked to slow the growth of an industrial base in the West Bank and the Gaza Strip (Metzer, 1992).

However, the analysis presented here takes the industrial structure of Israel and the territories as given.

The following model describes key features of the Palestinian labor market.[9] Workers in the territories are assumed to supply working days per month according to the following labor supply equations:

(2) $N \cdot \hat{L}_j(w_\ell, w_m, z_j);$ $j = \ell$, for local supply in the territories,

                                          $j = m$, for migrants working in Israel,

where $\hat{L}_j$ is a per capita supply function, w_ℓ is the wage paid in the territories, w_m is the wage paid in Israel, z_ℓ and z_m are variables that shift the per capita functions, and N is the size of the working-age population in the territories.

Workers employed locally produce y_ℓ, and workers employed in Israel produce y_m. In both cases, the production function is assumed to exhibit constant returns to scale, with the following unit cost functions:

(3) $c_j(w_j, x_j);$ $j = \ell, m$

where x_j is the price of a second Hicks composite input in each production function.

Local demand for the local product, y_ℓ, is assumed to be a function of the wages paid in Israel and in the territories, and the price of the local good, p_ℓ:

(4) $N \cdot \hat{d}_\ell(E, p_\ell)$,

where $E = w_\ell \hat{L}_\ell + w_m \hat{L}_m$ is the per capita earnings of Palestinian workers, and $\hat{d}_\ell(\cdot)$ is a per capita demand function. This function can include a component of "export demand" by Israel for the local Palestinian good without introducing substantive changes in what follows. Aggregate demand for the Israeli good is assumed to be a function of price, $d_m(p_m)$. Equilibrium in the product market requires

(5)
$$y_\ell = d_\ell(E, p_\ell)$$
$$y_m = d_m(p_m) ,$$

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[9] This model is similar to a model of the labor market for immigrants outlined by Altonji and Card (1991).

where $d_\ell = N \cdot d_\ell(E, p_\ell)$.

Producers are assumed to be cost-minimizers in the factor market, so that conditional factor demands can be obtained from cost functions by Shepherd's Lemma. In factor market equilibrium, we therefore have:

$$(6) \qquad y_j \cdot c_{j1}(w_j, x_j) = \ell_j(w_\ell, w_m, z_j); \qquad j = \ell, m$$

where $c_{j1}(\cdot)$ denotes the partial derivatives of the unit cost function with respect to wage rates, and where $\ell_j = N \cdot \hat{L}_j$.

Finally, firms are assumed to choose a level of output by equating marginal cost to price, where each firm takes the product price as given. Therefore, product prices are set by

$$(7) \qquad p_j = c_j(w_j, x_j); \qquad j = \ell, m.$$

Equations (5), (6), and (7) determine the equilibrium level of Palestinians' wages paid locally and in Israel, and the prices of goods produced using Palestinian labor locally and in Israel. The exogenous variables that affect equilibrium are the prices of other inputs, x_ℓ and x_m, and shifts in the labor supply functions, z_ℓ and z_m.

The effect of shifts in exogenous variables on equilibrium wage rates can be obtained by substituting (7) into (5), and (5) into (6) to give

$$(8) \quad \begin{aligned} d_\ell[E, c_\ell(w_\ell, x_\ell)] \cdot c_{\ell 1}(w_\ell, x_\ell) &= \ell_\ell(w_\ell, w_m, z_\ell) \\ d_m[c_m(w_m, x_m)] \cdot c_{m1}(w_m, x_m) &= \ell_m(w_\ell, w_m, z_m) . \end{aligned}$$

This substitution eliminates the endogenous product prices and leaves a pair of equations that jointly determine the wage rates, w_ℓ and w_m.

Taking logarithms and differentiating, the proportional changes in wage rates can be shown to satisfy the following two equations:

$$[\xi\lambda_\ell + \eta_{\ell\ell} - \epsilon_{\ell\ell}]\mathrm{d}\ln w_\ell + [\xi\lambda_m - \epsilon_{\ell m}]\mathrm{d}\ln w_m$$

(9)
$$= \epsilon_{\ell z}(1 - \phi\xi)\mathrm{d}\ln z_\ell - \epsilon_{mx}(1 - \phi)\xi\mathrm{d}\ln z_m - \eta_{\ell x}\mathrm{d}\ln x_\ell$$

$$- \epsilon_{m\ell}\mathrm{d}\ln w_\ell + [\eta_{mm} - \epsilon_{mm}]\mathrm{d}\ln w_m$$

$$= \epsilon_{mz}\mathrm{d}\ln z_m - \eta_{mx}\mathrm{d}\ln x_m \,,$$

where ϵ_{jk} is the elasticity of labor supply to location j with respect to argument k ($k = m$ for w_m, $k = \ell$ for w_ℓ; and $k = z$ for z_m or z_ℓ). Similarly, η_{jk} is the elasticity of factor demand at location j with respect to factor price k.[10] ξ is the income elasticity of demand for the local product, y_ℓ, $\phi = w_\ell\ell_\ell/E$ is the share of local earnings in total labor earnings, and $\lambda_\ell = \mathrm{d}\ln E/\mathrm{d}\ln w_\ell$ and $\lambda_m = \mathrm{d}\ln E/\mathrm{d}\ln w_m$ characterize the impact of wages on earnings.[11]

Given estimates or assumptions about the underlying structural parameters, system (9) can be used to predict the impact of exogenous demand shocks (components of $\mathrm{d}\ln x_\ell$, $\mathrm{d}\ln x_m$) and supply shocks (components of $\mathrm{d}\ln z_\ell$, $\mathrm{d}\ln zx_m$) on Palestinian wages and employment. This system also provides a framework for estimation. Note that the terms in (9) can be re-arranged and simplified as follows:

(10)
$$\mathrm{d}\ln w_\ell = (1/\eta_{\ell\ell})\mathrm{d}\ln\ell_\ell - (\xi/\eta_{\ell\ell})\mathrm{d}\ln E - (\eta_{\ell x}/\eta_{\ell\ell})\mathrm{d}\ln x_\ell,$$

$$\mathrm{d}\ln w_m = (1/\eta_{mm})\mathrm{d}\ln\ell_m - (\eta_{mx}/\eta_{mm})\mathrm{d}\ln x_m \,.$$

At this point, the definitions of $\mathrm{d}\ln x_m$ and $\mathrm{d}\ln x_\ell$ are expanded to include labor demand shocks of any sort, as well as shifts in the prices of other factor inputs.[12] $\mathrm{d}\ln x_m$ and $\mathrm{d}\ln x_\ell$ can therefore be interpreted as error terms for the purposes of structural estimation. Supply shocks that are uncorrelated with these error terms (or transformations of the error terms) can be used as instrumental variables to identify the parameters in (10).

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[10] This is the total elasticity of demand (including scale effects), derived from the Hicks-Marshall formulas and elasticities of factor substitution (see, e.g., Hammermesh, 1986).

[11] These parameters are $\lambda_\ell = \phi(1 + \epsilon_{\ell\ell}) + \epsilon_{m\ell}(1 - \phi)$ and $\lambda_m = (1 - \phi)(1 + \epsilon_{mm}) + \epsilon_{\ell m}\phi$.

[12] The role of x_ℓ and x_m in the theoretical product demand equations can be generalized so that these components are interpreted as a vectors of variables that include prices of other factor inputs and a generic demand shock. The product demand equations then become:

$$y_\ell = d_\ell[E, c_\ell(w_\ell, x_\ell), x_\ell] \,; \qquad y_m = d_m[c_m(w_m, x_m), x_m] \,.$$

The only implication of this change for equation (9) is that $\eta_{\ell x}$ and η_{mx} must be redefined.

IV. STRUCTURAL ESTIMATION

The supply shocks to be used for instrumental variables (IV) estimation consist of a quarterly time series data on person-days under curfew in the West Bank and Gaza Strip, combined with Israeli Army data on civil disturbances. Figure 4 plots the Palestinian curfew data along with the Israel Defense Forces (IDF) data on civil disturbances in the territories. Both series are described in the data appendix. The most prominent feature of Figure 4 is the extended curfew during the Gulf War. Figure 4 also shows that, with the exception of the Gulf War period, the Palestinian series on person-days under curfew is positively correlated with the IDF series on civil disturbances. The curfew data are useful here because curfews and closures of the territories have a major impact on the number of Palestinians working in Israel. It should be noted, however, that curfews are often imposed in response to disruptive incidents or personal attacks that can directly or indirectly shift local labor or product demand as well as labor supply to Israel. The value of having both the curfew and disturbance data is that the IDF data on disturbances can provide a partial control for the local disruptions associated with incidents leading to curfews.

1. Measurement framework

In addition to using the IDF disturbances data as a control variable, a variance components structure is introduced to allow for the fact that supply shocks like curfews and closures can appear in the demand equation or be associated with variables that have an impact on labor demand. Let Z_t denote a vector of candidate instruments that might shift labor supply at either location (Z_t includes z_m and z_ℓ in the notation of the previous section). The candidate instruments are connected to demand shocks in period t as follows:

(11)
$$-(\eta_{mx}/\eta_{mm})d\ln x_{mt} = Z_t \pi_m + u_{mt}$$
$$-(\eta_{\ell x}/\eta_{mm})d\ln x_{\ell t} = Z_t \pi_\ell + u_{\ell t} ,$$

where π_m and π_ℓ are population regression coefficients and u_{mt} and $u_{\ell t}$ are random components uncorrelated with Z_t by construction. As an identifying assumption, the relationship between π_m and π_ℓ is restricted to be proportional:

Assumption 1. $\pi_m = \kappa \pi_\ell$ for some constant, κ.

In other words, the elements of Z_t can be bundled in a linear combination that captures all the demand shocks generated by Z_t up to a factor of proportionality. Note that if Z_t itself is a scalar, Assumption 1 is not really a restriction. In practice, however, identification of structural parameters in the demand equations requires more than a single instrument.

To generate an estimating equation, the demand functions are assumed to be approximately log-linear, so that when equation (10) is quasi-differenced across locations in period t, we have:

$$(12) \qquad ln\mathrm{w}_{mt} = \kappa ln\mathrm{w}_{ft} + (1/\eta_{mm})ln\ell_{mt} - (\kappa/\eta_{ff})ln\ell_{ft} + (\kappa\xi/\eta_{ff})ln\mathrm{E}_t + (\mathrm{u}_{mt} - \kappa\mathrm{u}_{ft}) .$$

Quasi-differencing removes supply shocks other than $(\mathrm{u}_{mt} - \kappa\mathrm{u}_{ft})$ from the demand equation. The error term in equation (12) is therefore uncorrelated with Z_t, and elements of Z_t are available as instruments.

Finally, an estimating equation for individual observations is derived by assuming that equation (12) holds for average log wages in period t for workers employed in Israel. But to allow for the possibility of composition effects as workers move in and out of the labor force, a set of individual-level regressors, X_{it}, is also included. In particular, I assume the wages of worker i employed in Israel can be written:

$$ln\mathrm{w}_{mt}(i) = ln\mathrm{w}_{mt} + X_{it}\beta + \nu_t(i) ,$$

or

$$(13) \qquad ln\mathrm{w}_{mt}(i) = \kappa ln\mathrm{w}_{ft} + (1/\eta_{mm})ln\ell_{mt} - (\kappa/\eta_{ff})ln\ell_{ft} + (\kappa\xi/\eta_{ff})ln\mathrm{E}_t$$
$$+ X_{it}\beta + \{(\mathrm{u}_{mt} - \kappa\mathrm{u}_{ft}) + \nu_t(i)\} ,$$

where $\nu_t(i)$ is an error term that has mean zero each year by construction (because X_{it} includes year dummies). The individual-level regressors should help control for the fact that Israeli curfew policies can affect the demographic mix (e.g., by favoring married and skilled workers) as well as the number of Palestinian workers coming to Israel.

To illustrate how instrumental variables can be used in this model, suppose $\kappa=0$ and $\beta=0$. IV estimates using curfew data in such a specification correspond directly to the OLS estimates reported in the top half of Table 3 and are reported in the bottom half of Table 3. The instruments consist of linear and quadratic terms in person-days under curfew in the West Bank and Gaza Strip, for a total of 4 instruments. Estimates of the coefficient on days worked can be interpreted as estimates

of $(1/\eta_{mm})$ in the restricted model. The resulting estimates range from -.23 to -.28 when all industries are pooled, suggesting an aggregate demand elasticity on the order of -3.5 to -4.5. These estimates are a consequence of the fact that work days fall and wages go up when the number of person-days under curfew rises. The IV estimates decline somewhat but remain negative when the average wages of Israeli citizens are added to the model as a partial control for demand shifts. The over-identification test statistics reported at the bottom of Table 3 indicate that the fit improves considerably when data on the wages of Israeli citizens are added, but the test statistics consistently suggest that this highly restricted specification is also highly at odds with the data.

An alternative illustration of how the curfew data can be used is given in Figures 5-7, which present a graphical depiction of IV estimates of equation (13) when κ is set equal to 1 and $\eta_{mm} = \eta_{tt}$. In this case, (13) simplifies to an equation relating the difference in wages by work location to the difference in days worked by work location. Figure 5 plots the relationship between the Israel/West Bank wage difference and person-days under curfew in the West Bank, after regression-adjusting for quarter effects. A positive relationship is apparent in the figure. The second reduced-form equation in this IV problem relates days worked to the number of person-days under curfew. Figure 6 shows the relationship between West Bank curfews and the difference between days worked in Israel and days worked in the West Bank (after partialing out quarter effects). The slope of the line in Figure 6 suggests a clear negative relationship.

Finally, Figure 7 plots the two Y-axes in Figures 5 and 6 against one another. Figure 7 is therefore a picture of the IV estimate of a labor demand curve in this restricted model. The slope of the line in the figure is approximately -1.3. The slope of the same line computed using person days under curfew in the Gaza Strip and using the Gaza Strip is as the comparison region is approximately -1.4. In the context of equation (13), these relationships imply that short-run Israeli demand for Palestinian labor is not very elastic.

2. Parameter Estimates

When estimating equation (13) without κ restricted to be zero, a local region for quasi-differencing has to be chosen to control for demand shocks correlated with the instruments. Empirical results are reported here for comparisons to both the West Bank and the Gaza Strip. The dependent variable is the log of positive real daily wages for the sample of men employed in Israel. Men employed in Jerusalem are excluded from the analysis. The regressors include the quarterly

average log local wage in the comparison region (West Bank or Gaza Strip) by industrial sector (agriculture, construction, or other), the quarterly average log days worked in Israel by sector, the quarterly average log days worked in the comparison region by sector, and the log of total per capita real monthly wages (over all sectors) in the comparison region. Averages were computed using the CBS sampling weight and excluding outliers. The estimation pools men from different industries but allows for an industry-specific constant.[13] This procedure is equivalent to estimation of (13) separately by sector, with the restriction that the parameters of interest are the same across industries.

Table 4 reports OLS and IV estimates. To compute the IV estimates, four variables were treated as endogenous: days worked in Israel, days worked in the comparison region, wages in the comparison region, and average total earnings in the comparison region.[14] The four excluded instruments include linear and quadratic terms in person-days under curfew in the West Bank and person-days under curfew in the Gaza Strip. Other regressors included in the equation and instrument list are: linear and quadratic terms in the number of civil disturbances in the comparison region, 3 quarter dummies, 4 year dummies, 2 Gulf-war quarter dummies, 2 industry dummies, and individual-level regressors including dummies for marital status, and age and schooling dummies as in equation (1), without time-varying coefficients. The year dummies control for annual macroeconomic shocks in Israel, as well as changes related to the wave of immigrants that began to arrive in 1990, although dramatic changes in the size of the labor force do not come until 1991.

If no additional restrictions are imposed or instruments added, the parameters in equation (13) are just-identified. Part of the identification therefore comes from the fact that quadratic functions are used as instruments while the regressors are log-linear. If there is an omitted nonlinear term in one of the regressors, identification breaks down. To provide some evidence on the validity of the orthogonality restrictions, and to see whether the estimates are sensitive to alternative identifying assumptions, additional restrictions were imposed one at a time:

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[13]In principle the model applies industry by industry but results from models disaggregated by industry are qualitatively similar. Only pooled estimates are reported to save space.

[14] Average earnings are not linked by an identity to local and Israeli wages and days worked because the latter variables calculated for a work location while average earnings are calculated for a region of residence. Average earnings by region includes counts of zero earners in the denominator. No data on non-wage income are available for this sample.

Assumption 2a (the income elasticity of local product demand is zero); $\xi = 0$.

Assumption 2b (demand elasticities and demand shocks are related by the same factor of proportionality); $\eta_{tt} = \kappa\eta_{mm}$.

Assumption 2c (local and Israeli demand shocks induced by Z_t are the same); $\kappa = 1$.

Given one or more of Assumptions 2a, 2b, or 2c, equation (13) is over-identified and subject to partial validation using data.

Results using the Gaza Strip as a comparison region appear in the first 5 columns of Table 4 and results using the West Bank as a comparison region are reported in columns (6-10). The results are reported as coefficients on the regressors in equation (13). The coefficient on log wages in the comparison region is an estimate of κ, the coefficient on log days worked in Israel is an estimate of $1/\eta_{mm}$, the coefficient on days worked in the comparison region is an estimate of $-\kappa/\eta_{tt}$, and the coefficient on log total per-capita earnings is an estimate of $\kappa\xi/\eta_{tt}$. Below the estimates reported in each column, the implied elasticities (η_{mm}, η_{tt}, and ξ) are also reported.[15]

Columns (1-2) report OLS and IV estimates for the Gaza Strip comparison under assumption 2a (that the income elasticity of agricultural product demand in the comparison region is zero.) The OLS estimates are unlikely to have a structural interpretation, but they are reported for comparison purposes. In this case, the OLS estimate of the Israeli demand elasticity is positive but the IV estimate is negative, though imprecisely estimated. Other IV estimates based on models using the Gaza Strip as a comparison region generate estimated Israeli demand elasticities between -.76 and -2.2, with local demand elasticities in a similar range. Estimates of the income elasticity of product demand suggest that declines in income do not generate large changes in product demand for the industries employing wage-earners. Finally, the chi-square goodness-of-fit statistics suggest that these models fit the data well.

As in columns (1-2), OLS estimates of $1/\eta_{mm}$ using the West Bank as a comparison region (column 6) are positive while IV estimates (column 7) are negative. Most of the IV results in columns (7-10) support the notion that negative demand elasticities explain wage increases and two out of four of the estimates of $1/\eta_{mm}$ are in the same range as those in columns (2-5). The results

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[15]Coefficients on the individual-level regressors are not reported. The marriage coefficients suggest a 5 percent wage premium for married men. The age coefficients imply a concave earnings profile.

in column 9 corresponds most closely to the graphical representation in figure 7. But some results (such as those in column 10) clearly cannot be rationalized in the context of the model outlined here. On the other hand, estimates using the West Bank as a comparison region are associated with much larger values of the goodness-of-fit statistic than estimates using the Gaza Strip as a comparison region. This suggests that the restriction motivating IV estimation are more likely to be satisfied for the Gaza Strip comparison used in the models underlying columns (2-5).[16]

V. Policy Analysis

Empirical results from the previous section can be combined with the theoretical framework from Section III to evaluate the possible impact of policies that reduce Palestinian access to the Israeli labor market. To illustrate the potential labor market impact of supply shifts, I use the general comparative statics relationship, (9), and a simple numerical example. Suppose that half of the roughly 105,000 Palestinians who were regularly employed in Israel (including Jerusalem) before 1991 were unwilling or unable to come to work at current wage rates. This shift might be the consequence of stricter enforcement of access rules, the sale of Israeli work permits to workers or employers, or both. Suppose also that local (in the territories') labor supply shifts to partly offset this reduction, so almost half the workers who used to work in Israel are willing to work locally at current wage rates. This means about 26,000 new local workers, implying an increase of a little over 15 percent in local labor supply.

The possible consequences of such a scenario are described in Figure 8, which shows a range of solutions to equation (9) when $\epsilon_{mz}dlnz_m = -0.50$ and $\epsilon_{lz}dlnz_l = +0.15$. The solutions are presented in terms of the impact on labor earnings. The upper part of the figure was calculated assuming an income elasticity of demand of 1 for the local product; the lower part was calculated assuming an income elasticity of demand equal to 0. In both halves, the local elasticity of labor demand is assumed to be -1. These parameter choices are in the range of estimates reported in Table 4 because the table shows no evidence of a highly elastic local demand for labor or a highly price-elastic local product demand that feeds back into local labor demand.

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[16]The notion that Gaza is a better comparison region is supported by Razin and Sadka (1993, p. 86), who note that, ". . . the Intifada (in Gaza) disturbed mostly the work of Gaza's residents in Israel." They also note that non-agricultural sectors in Gaza economy were hardest hit during the uprising. Estimates of equation (13) by industry fit the data on Gazan agricultural well.

Four lines are graphed in each half of figure 8, corresponding to four different assumptions about supply elasticities.[17] The median estimate of the elasticity of Israeli demand for Palestinian labor in Table 4 is between -1.1 and -2.2. Figure 8 suggests that for elasticities in this range, a 50 percent negative shift in labor supply to Israel, offset by a 15 percent positive local shift, is unlikely to reduce total Palestinian earnings by more than 20 percent. If Israeli demand for Palestinian labor is sufficiently inelastic, total earnings may even rise. Although the latter possibility (less than unit-elastic demand) seems unlikely, both the theoretical and empirical analysis suggest that past Israeli wage responses have worked to dampen the aggregate earnings impact of reduced access to the Israeli labor market considerably.

Finally, note that unless local product demand is highly income elastic, these conclusions hold for demand elasticities much larger in magnitude than -2 as well. On the other hand, the magnitude of any behavioral response depends partly on whether the shock is viewed by workers and employers as permanent or temporary. The example in this section takes all elasticities as fixed, whereas economic theory suggests that the product market response to permanent income shocks should be larger than the response to transitory shocks. Similarly, long-run elasticities of labor demand are likely to be larger than short-run elasticities of labor demand.

VI. SUMMARY AND CONCLUSIONS

A range of graphical and statistical evidence supports the claim that exogenous decreases in Palestinian labor supply are associated with an increase in the wages Israeli employers pay Palestinian workers.   IV estimates of demand equations are somewhat sensitive to the details of model specification, but the best-fitting models consistently suggest that the observed covariance between Palestinian wages and days worked can be rationalized by a short-run Israeli elasticity of demand for Palestinian labor ranging between -1 and -2. Even simple IV estimates that do not control for demand shocks by quasi-differencing imply a short-run elasticity of between -3 and -4.[18]

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[17]Supply elasticities are assumed to be equal for both locations, and cross-elasticities equal to *minus* the own-location elasticity. Another assumption used to construct the figure is that the share of local earnings in total labor earnings (ϕ) is fixed at 60 percent.

[18]This finding contradicts those in Fishelson (1992), who reports a positive coefficient from a regression of log wages on the number of Palestinians employed in Israel. But his estimates are from a large multi-equation macro model for a long time period that ends in 1986. The Fishelson results therefore do not seem directly

More and better data on the Palestinian labor market may lead to more robust results in future work. In the meantime, the results presented here suggest that labor market policies in the territories should be analyzed with a number of possibilities in mind. First, and most important, short-run Israeli demand for Palestinian labor may be inelastic enough to considerably dampen the earnings loss from reduced access to the Israeli labor market, at least for a while. A Palestinian social planner might even choose to exploit the resulting monopoly power by deliberately restricting supply. Of course, social planners would also consider factors like the distribution of unemployment and the loss of skills among the unemployed. Such consideration might well outweigh simple calculations designed to maximize earnings or income tax revenues.

Finally, the use of a model and associated empirical results for forecasting is most helpful when future economic circumstances are likely to be similar to past circumstances. It is important to emphasize this in a study of Palestinian-Israeli labor relations because behavioral responses in this setting depend partly on whether local residents and Israeli employers perceive shocks as transient or permanent. Since the strong transitory shocks studied here are probably unusual, changes in access policy that come about as part of a deliberate regime shift could have labor market consequences very different from those of past shocks.

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comparable to those reported here.

Table 1. Descriptive Statistics[a]

	Sample Size	Years of Schooling[b]	Age	LFP	Wage earner	Days worked	Married	Work in Israel
A. Residents of the Gaza Strip								
1981	7,854	7.61	33.0	0.78	0.50	22.2	0.67	0.47
1982	8,223	7.92	32.6	0.77	0.51	21.9	0.68	0.48
1983	8,228	8.18	32.7	0.76	0.50	21.6	0.66	0.50
1984	8,930	8.33	32.9	0.76	0.50	21.9	0.66	0.49
1985	9,271	8.40	32.7	0.77	0.51	21.7	0.67	0.50
1986	9,743	8.69	32.4	0.77	0.51	22.3	0.66	0.49
1987	9,692	8.62	32.7	0.80	0.52	22.0	0.69	0.49
1988	6,932	8.48	32.9	0.79	0.49	16.9	0.70	0.48
1989	7,830	8.52	33.3	0.77	0.45	15.6	0.71	0.42
1990	8,892	8.63	33.2	0.80	0.47	16.5	0.73	0.44
1991	8,011	8.80	33.2	0.80	0.48	17.2	0.75	0.41
B. Residents of the West Bank								
1981	21,768	7.66	33.2	0.70	0.47	21.9	0.64	0.36
1982	21,992	7.82	33.3	0.72	0.47	22.4	0.63	0.36
1983	22,734	7.90	33.3	0.74	0.47	22.1	0.64	0.38
1984	23,807	7.98	33.3	0.76	0.48	22.1	0.63	0.38
1985	25,038	8.11	33.1	0.76	0.47	21.8	0.62	0.36
1986	26,394	8.26	32.9	0.79	0.48	22.2	0.62	0.35
1987	29,530	8.27	32.8	0.81	0.52	22.5	0.63	0.40
1988	27,593	8.36	32.7	0.83	0.52	18.1	0.63	0.40
1989	27,462	8.48	32.6	0.83	0.53	18.9	0.64	0.41
1990	27,773	8.49	32.8	0.82	0.52	19.5	0.66	0.39
1991	26,128	8.60	32.7	0.80	0.51	17.4	0.67	0.39

[a] Statistics are unweighted, except for the last two columns which are based on weighted counts.

[b] Sample size: 373,825 men aged 18–64 in the sample period; one-quarter of these are independent observations.

Table 2. Daily Wage Equations (Selected parameter estimates)[a,b]

	Work in Israel (1)	Education 13–15 (2)	Education 16+ (3)	Industry wage effects			
				0 Agriculture (4)	1 Manufacturing (5)	4 Construction (6)	5 Services (7)
1981	0.166 (0.007)	0.229 (0.007)	0.392 (0.018)	−0.214 (0.011)	−0.076 (0.011)	0.095 (0.012)	−0.118 (0.012)
1982	0.167 (0.007)	0.191 (0.015)	0.346 (0.017)	−0.215 (0.014)	−0.077 (0.01231)	0.066 (0.011)	−0.136 (0.012)
1983	0.150 (0.007)	0.156 (0.014)	0.340 (0.016)	−0.133 (0.013)	−0.039 (0.011)	0.094 (0.010)	−0.100 (0.012)
1984	−0.003 (0.007)	0.127 (0.012)	0.308 (0.015)	−0.321 (0.013)	−0.121 (0.011)	−0.005 (0.010)	−0.139 (0.012)
1985	0.006 (0.007)	0.117 (0.012)	0.250 (0.014)	−0.246 (0.012)	−0.087 (0.011)	0.014 (0.010)	−0.105 (0.011)
1986	0.123 (0.006)	0.086 (0.011)	0.222 (0.014)	−0.148 (0.012)	−0.038 (0.010)	0.097 (0.010)	−0.038 (0.011)
1987	0.189 (0.006)	0.055 (0.011)	0.225 (0.013)	−0.056 (0.012)	0.029 (0.010)	0.126 (0.010)	−0.006 (0.010)
1988	0.248 (0.006)	0.009 (0.010)	0.145 (0.013)	0.006 (0.012)	0.050 (0.010)	0.190 (0.010)	0.022 (0.011)
1989	0.336 (0.006)	−0.001 (0.010)	0.116 (0.012)	0.087 (0.012)	0.063 (0.010)	0.216 (0.010)	0.047 (0.011)
1990	0.312 (0.007)	0.055 (0.010)	0.156 (0.012)	0.089 (0.012)	0.058 (0.010)	0.215 (0.009)	0.038 (0.011)
1991	0.357 (0.007)	0.041 (0.010)	0.164 (0.012)	0.046 (0.012)	0.049 (0.011)	0.201 (0.010)	−0.022 (0.012)

[a]Estimates of equation (1) in the text. Sample size for all years combined = 173,588. The omitted industry is public and community services. Sample weighted by CBS sampling weights.

[b]Standard errors in parentheses.

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Table 3. Relationship Between Daily Wages and Days Worked by Industry (undifferenced equations)[a,b]

	All		Agric.		Construct.		Manufact.	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A. OLS Estimates								
Days worked	-0.17	−0.14	−0.11	−0.08	−0.16	−0.11	−0.13	0.02
	(0.01)	(0.01)	(0.07)	(0.02)	(0.01)	(0.01)	(0.02)	(0.06)
Log average daily wage of Israeli citizens employed in:								
Construction		0.19				0.75		
		(0.07)				(0.03)		
Agriculture		0.35		0.72				
		(0.07)		(0.06)				
Manufacturing								1.0
								(0.15)
B. IV Estimates								
Days worked	-0.28	−0.23	−0.22	−0.15	−0.30	−0.22	−0.21	-0.10
	(0.01)	(0.01)	(0.03)	(0.03)	(0.02)	(0.02)	(0.02)	(0.04)
Log average daily wage of Israeli citizens employed in:								
Construction		0.43				0.73		
		(0.07)				(0.03)		
Agriculture		0.09		0.70				
		(0.07)		(0.06)				
Manufacturing								.60
								(0.16)
Over-id $\chi^2(3)$	173	41	48	11	199	32	39	35

[a]The top panel reports OLS estimates from regressions of the log of real daily wages for Palestinian men employed in Israel on quarter dummies, two Gulf War dummies, average log days worked in Israel, and log real wages of Israeli citizens by industry. The Israeli wage series are quarterly by major industrial sector, from the National Insurance Institute. The bottom panel reports IV estimates from the same specification using linear and quadratic terms in person-days under curfew in the West Bank and Gaza Strip as instruments. The sample includes 39,806 observations on Palestinian men employed in Israel: 5,603 employed in agriculture, 22,282 employed in construction, and 11,921 employed in manufacturing.

[b]Standard errors in parentheses.

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Table 4. OLS and IV Estimates of the Demand Equation

Param.	Contrast to Gaza Strip					Contrast to West Bank				
	(1) OLS	(2) IV $\xi=0$	(3) IV $\eta_{\ell\ell}=\kappa\eta_{mm}$	(4) IV $\kappa=1$	(5) IV None	(6) OLS	(7) IV $\xi=0$	(8) IV $\eta_{\ell\ell}=\kappa\eta_{mm}$	(9) IV $\kappa=1$	(10) IV None
κ	0.19 (0.02)	0.62 (0.12)	0.71 (0.36)	1.	0.89 (0.38)	0.27 (0.03)	0.22 (0.07)	0.35 (0.07)	1.	-1.20 (0.46)
$1/\eta_{mm}$	0.30 (0.05)	-0.45 (0.40)	-0.45 (0.80)	-1.31 (0.17)	-1.05 (0.90)	0.11 (0.04)	-0.14 (0.06)	-0.39 (0.06)	-0.94 (0.17)	2.59 (0.83)
$-\kappa/\eta_{\ell\ell}$	-0.11 (0.02)	0.26 (0.29)	0.45	1.10 (0.11)	0.85 (0.85)	0.19 (0.03)	1.50 (0.12)	0.39	-2.51 (0.59)	13.5 (3.58)
$\kappa\xi/\eta_{\ell\ell}$			-0.17 (0.24)	-0.25 (0.08)	-.18 (0.25)			0.40 (0.04)	1.46 (0.24)	-4.62 (1.37)
Over-id $\chi^2(1)$		.57	2.3	.09			73	89	117	
Implied elasticity estimate										
η_{mm}		-2.2	-2.2	-.76	-.95		-7.1	-2.6	-1.1	.39
$\eta_{\ell\ell}$		-2.4	-1.6	-.91	-1.05		-.15	-.90	0.40	-0.09
ξ			.38	.23	0.21			-1.03	0.58	0.34

Notes: Estimates of equation (13) in text. Aggregate regressors are annual averages by year and 3 coarse industry groups. The estimating equation includes industry-group dummies and the key parameters of interest are restricted to be the same across industries. Standard errors in parentheses. Other regressors are listed in the text. The sample includes 39,806 observations on Palestinian men employed in Israel and is the same as that underlying Table 3.
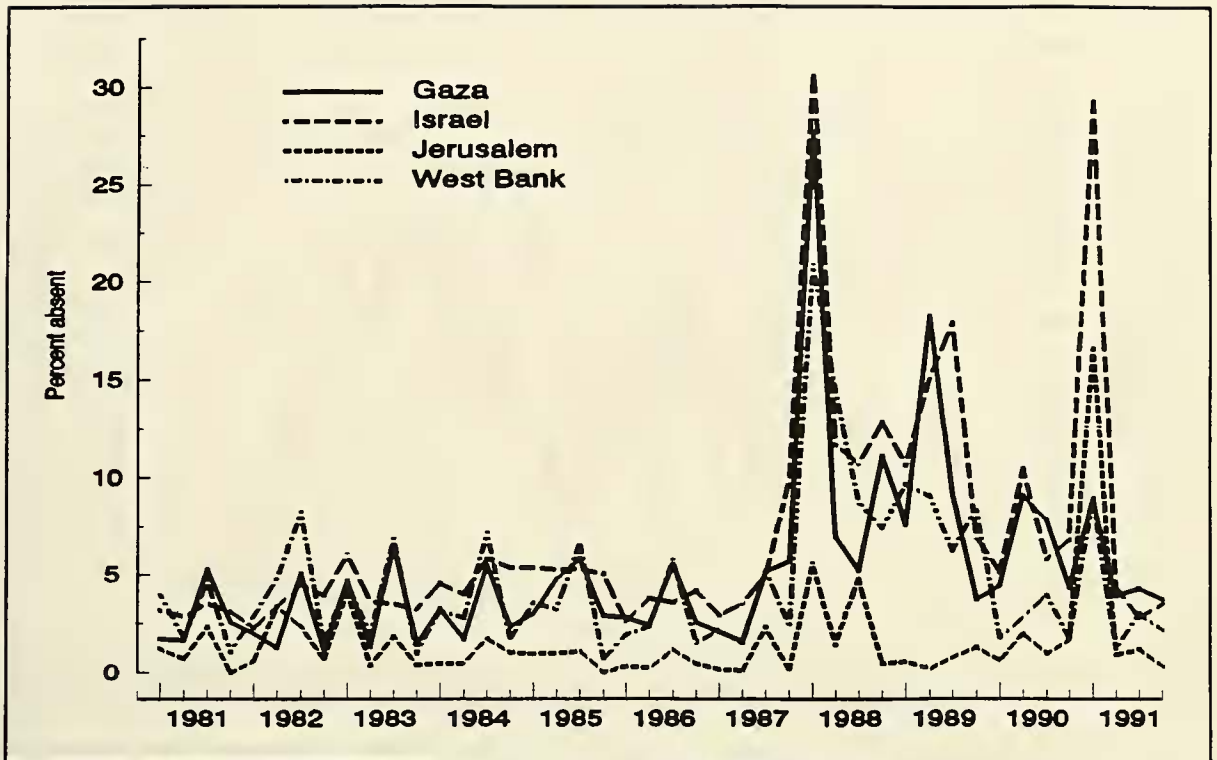
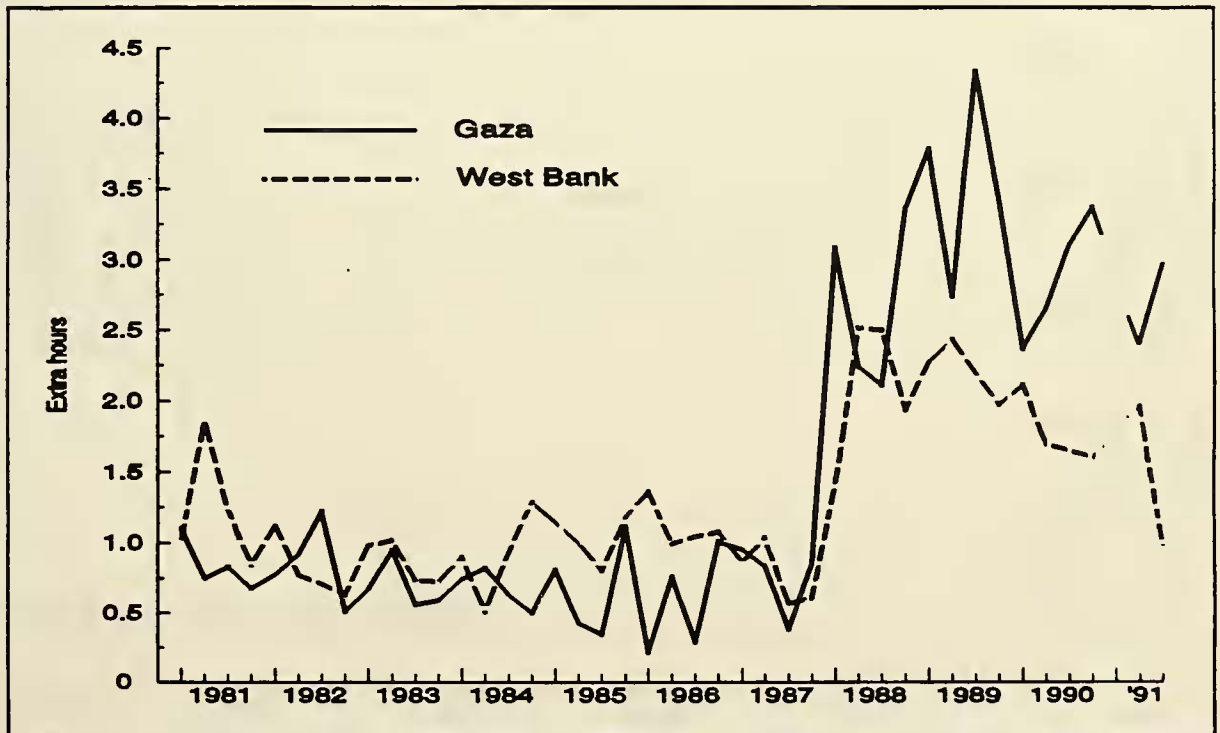**Figure 1.** *Absences from Work by Men Aged 18–64 in the Labor Force.*

Figure 2. *Extra Hours to Get to Work in Israel, by Region.*
Tabulated from reported hours of work by region and work location; excludes Gulf-War quarters.
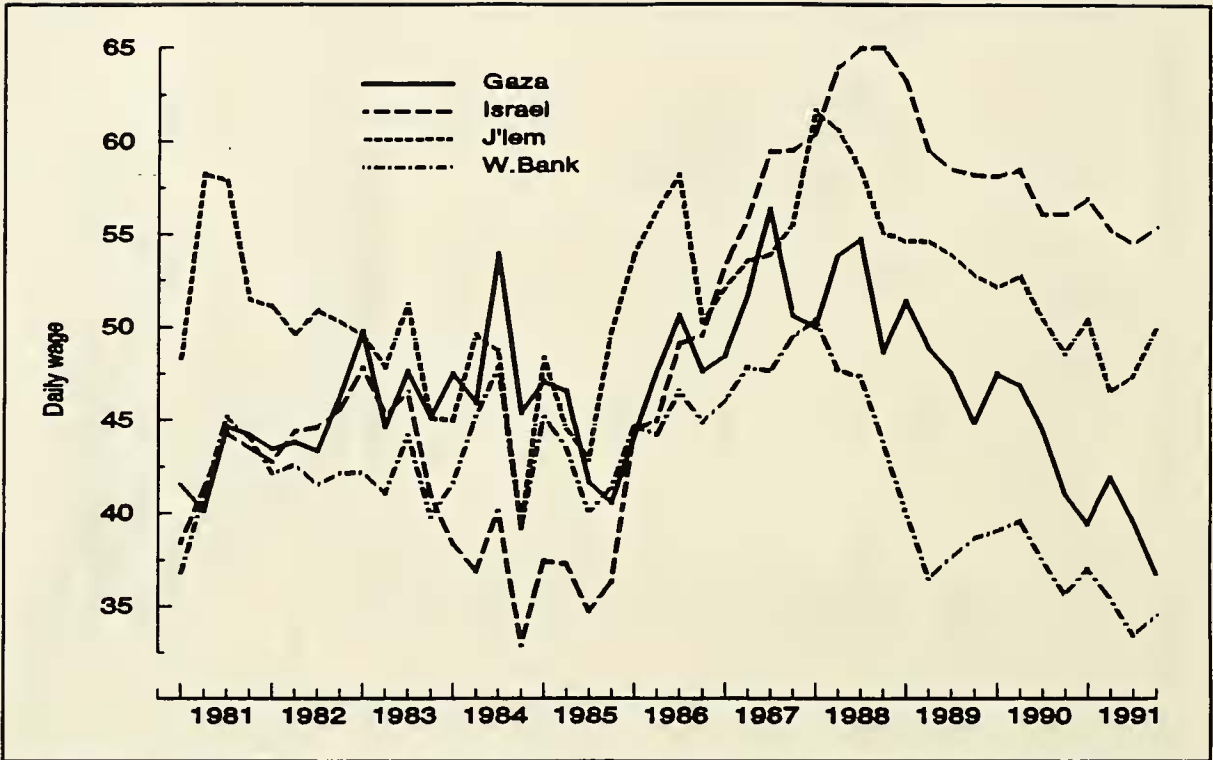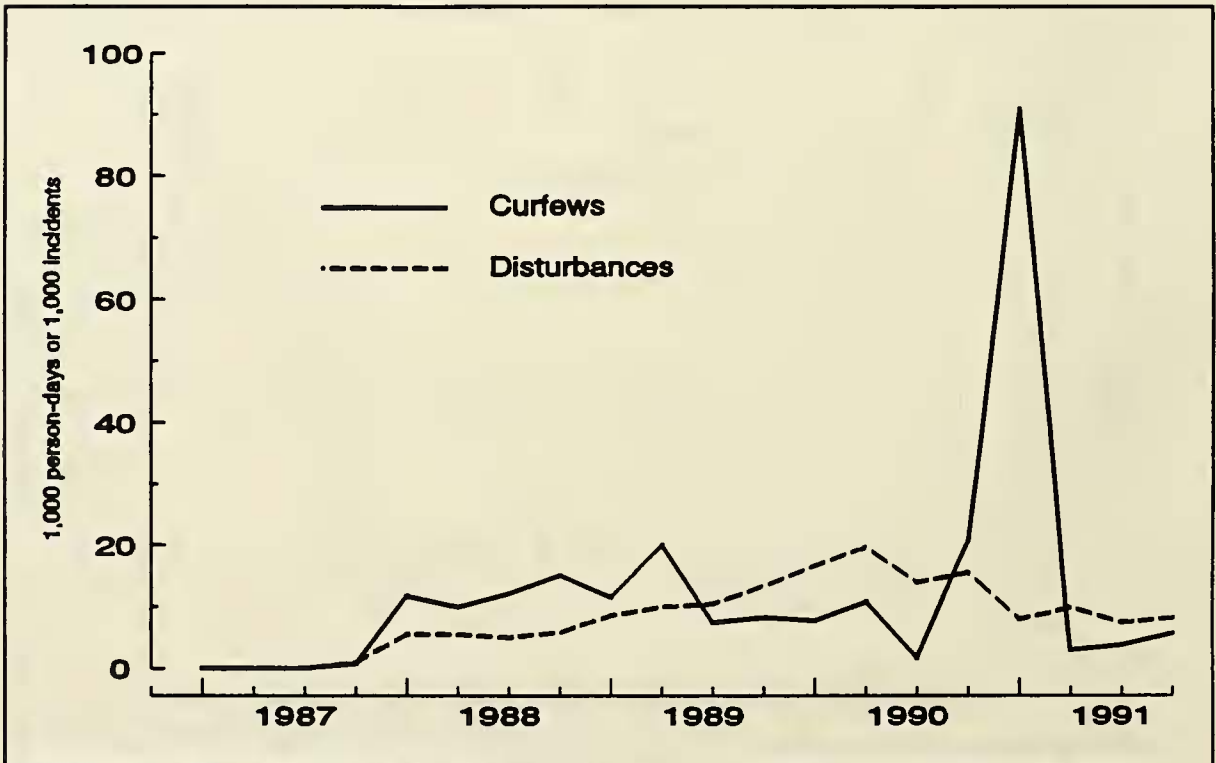
Figure 3. Real Daily Wages by Work Location.

Figure 4. Disturbances and Curfews in the Territories.
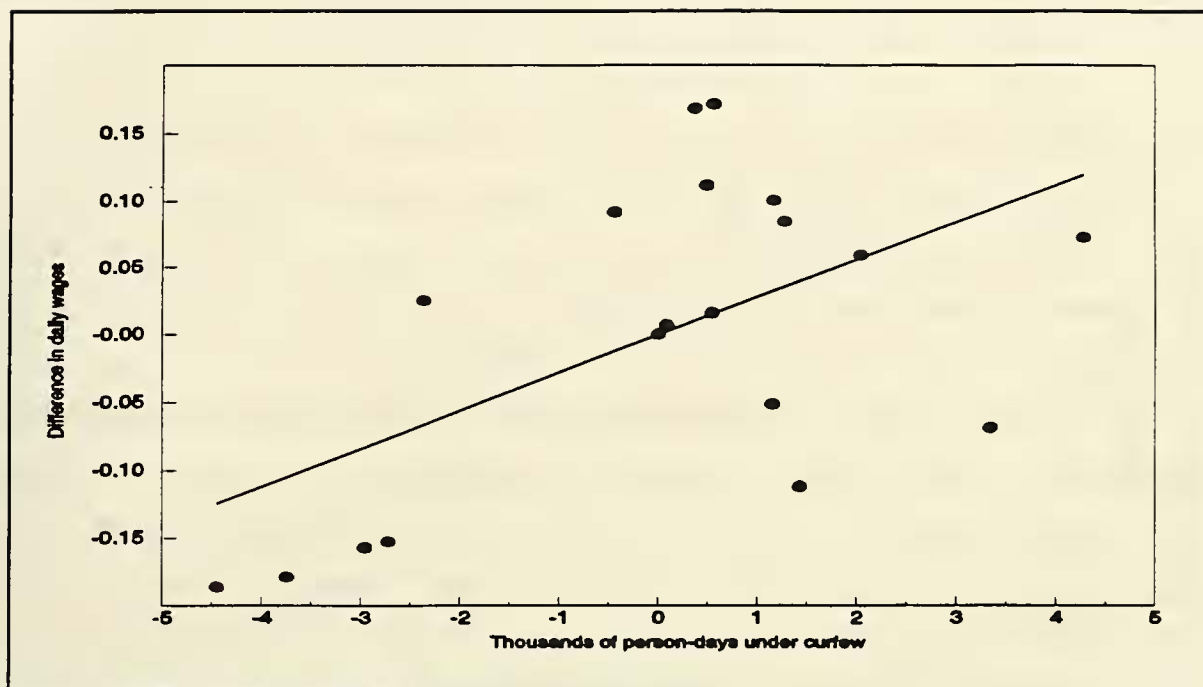Data from Palestinian and IDF sources.

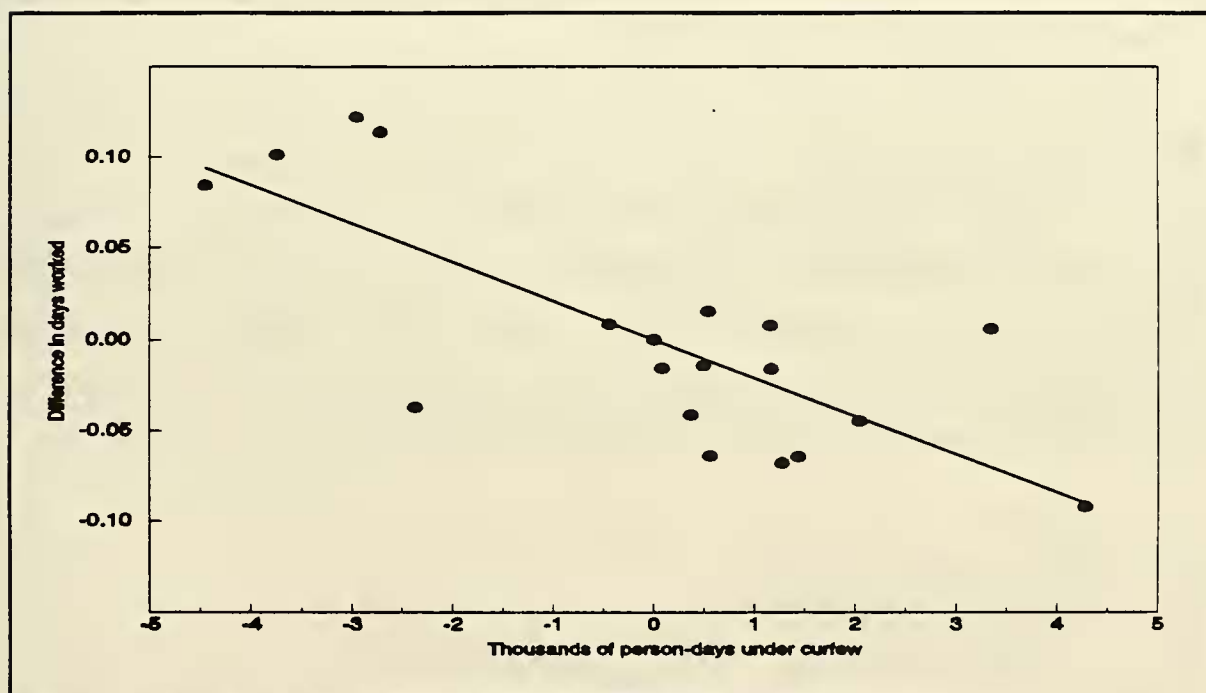*Figure 5. Curfews and Israel/Local Differences in Daily Wages.*

Figure 6. Curfews and Israel/Local Difference in Days Worked.
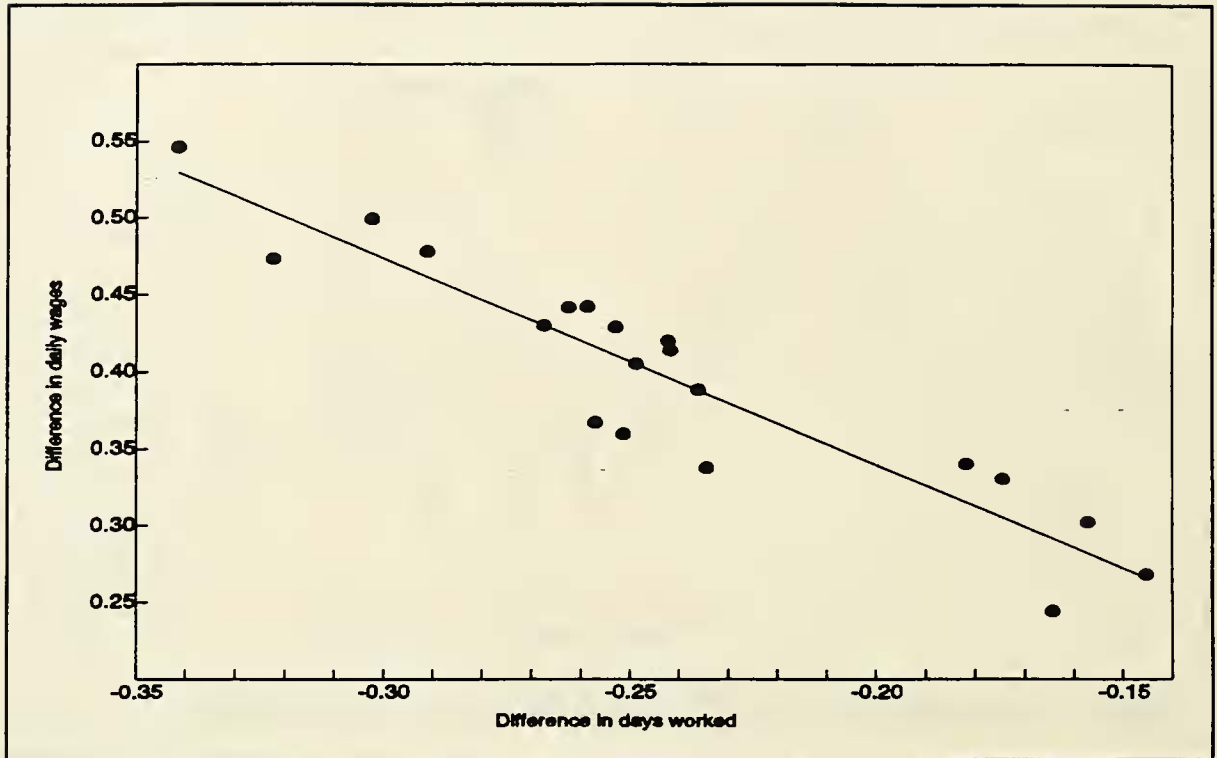
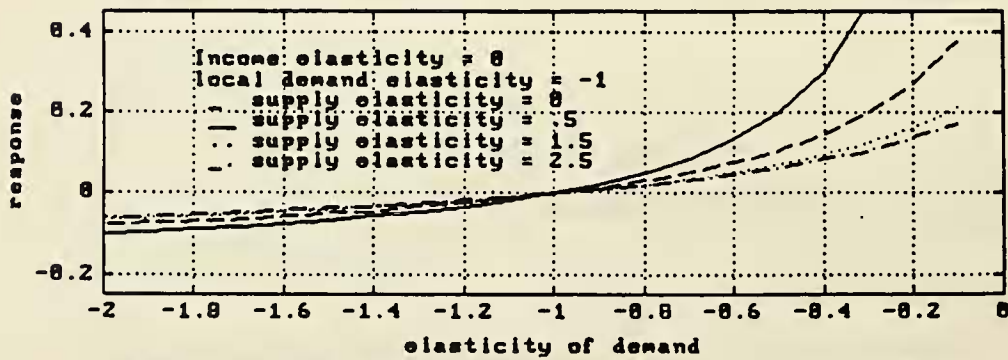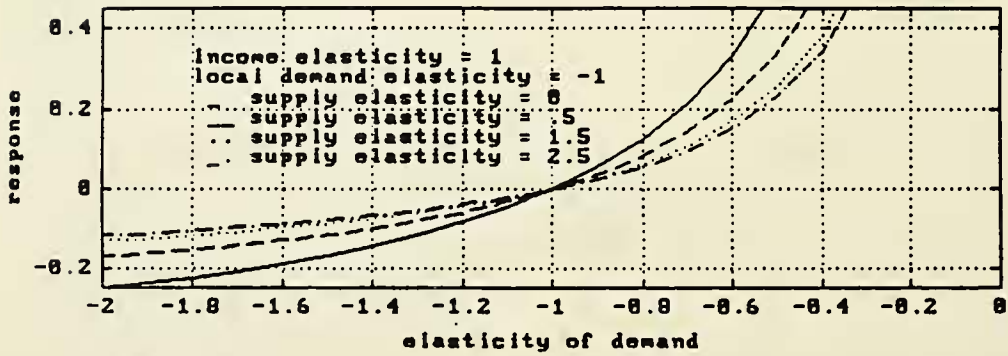*Figure 7. IV Estimates of a Labor Demand Curve.*

Figure 8. Earnings Impact of +15% Local and −50% Israel Supply Shocks

Data Appendix: Curfew and disturbance data

a. Curfews

The Jerusalem Media and Communications Center (JMCC) compiles press releases and monographs in an effort to represent Palestinian positions to members of the press. As part of this effort, the JMCC collects data on the number of days under curfew by locality, and uses population data to inflate these data into statistics on person-days under curfew. The curfew-incidents data used here were taken from a JMCC data set listing curfew incidents by month and locality between December 1987 and December 1991. The JMCC data on curfew incidents were compiled primarily from reports by local observers, from press reports and from UNWRA records (JMCC, 1991). Local population data used to inflate the incidents data were taken from Benvenesti and Khayat (1988). These two series were then combined to construct aggregate time series on person-days under curfew. Unpublished data on curfews from a second Palestinian source for the period December 1987 to November 1988 (Al-Haq in Ramallah, West Bank) are highly correlated with the JMCC figures, as are the IDF data on civil disturbances in the territories.

b. Disturbances

The IDF compiles data on the number of Israeli citizens, local residents, and soldiers injured or killed each month in the territories, on the number of attacks by local residents on Israeli citizens and soldiers (with and without use of firearms), incidents of arson, Molotov cocktails thrown, grenade attacks, and the number of civil disturbances. These series were provided to me by the IDF spokesman's office. The civil disturbances series includes a count of incidents of stone-throwings, road blockades, tires set ablaze, and unruliness. The data do not include incidents involving firearms.

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29

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