THE PINHAS SAPIR   CENTER FOR DEVELOPMENT
TEL AVIV UNIVERSITY

"Measuring the Impact of Temporary Foreign Workers and Cross-Border Palestinian Workers on Labor market Transitions of Native Israelis"

Sarit Cohen Goldner[1]

Discussion Paper No. 8-15

June 2015

[1] Sarit Cohen-Goldner – Department of Economics, Bar Ilan University, Ramat-Gan, Israel.
 Email: sarit.cohen-goldner@biu.ac.il

Abstract

This paper studies the effect of temporary foreign workers and cross border Palestinian workers on the probability of male Israeli natives to enter or exit employment. The employment of Palestinians in Israel has been concentrated in construction and agriculture since the early 1970s. The deterioration of the security situation and the frequent border closures since the break of the first Intifada in 1987 led to a severe labor shortage in these sectors and to the introduction of foreign workers in 1991.

Our empirical analysis is based on micro data from the Israeli Labor Force Survey from 1998 to 2006 and covers the break of the second Intifada in September 2000. The correlation between the security situation and the employment of both Palestinians and foreigners motivates us to use data on border closures from Gaza, and separately from the West Bank as instruments (IV) for accessing the impact of Palestinians and foreigners on labor market transitions of natives. We distinguish between the impact on native Jews and non-Jews, mainly Arab Israelis.

 The IV estimates suggest that the high turnover rate in construction among male Israeli non-Jews is significantly affected by the shares of Palestinians and of foreign workers such that these shares increase the likelihood of non-Jew Israelis to exit employment in construction and decrease the likelihood of non-Jews to enter employment in construction. Among male Israeli Jews, we do not find a sectorial impact of Palestinians and foreign workers on the transitions to and out of employment, except for a negative impact of foreigners on the likelihood of male Jews to enter employment in agriculture. However, we do find a macro effect of foreigners on the probability of male Jews with different level of schooling to lose their job. Foreigners increase the likelihood of high-school dropout Jews and decrease the likelihood of high-school graduate Jews to move from employment to non-employment, suggesting that foreigners are substitutes to high school dropouts and complements to high school graduate male Jews. The findings that a large fraction of Israeli non-Jews who work in construction, are adversely affected by the shares of non-Israeli workers and that low educated Jews are also adversely affected by foreign workers calls re-examination of government policies and their (lack of) implementation towards non-Israeli workers.

Key words: foreign workers, immigration, instrumental variable

JEL codes: J61, F22, C26

1. Introduction

This paper attempts to assess the impact of non-Israeli workers on labor market transitions of Israeli male workers, using instrumental variable (IV) approach. Due to substantial differences in wages and living standards, many developed countries attract low-skilled foreign workers from developing countries.

Non-Israeli workers can be classified into two major groups: Palestinian cross-border workers (*PW*) from the West Bank and Gaza and temporary Foreign Workers (*FW*) mainly from the Far East (Philippines, Thailand, China and India) and from Eastern Europe.[1] Palestinians first entered the Israeli labor market following the 'Six-Day' war in 1967. By the late 1980s, these cross-border workers had become an important part of the Israeli labor force, reaching about 7% of total employment. In 1987, Palestinian workers constituted 49% of all employees in construction, and 45% in agriculture. The number of cross-border workers authorized to work in Israel peaked in 1992 at 72,000 (OECD, 2010) and began to decline in 1993. The decline reflects both the imposed quota on cross-border workers and employers' successful lobby to recruit workers from abroad. With the second uprising ('Intifada') in 2000, the quotas for cross-border Palestinian workers were drastically cut for security reasons.[2]

The employment of foreign workers in Israel started in 1991 and was triggered by the deterioration of the security situation in Israel. Border closures led to a severe labor shortage in the construction and agriculture sectors. As the security situation got worse, employers became interested in temporary workers from abroad who are not affected by closures of the border, and hence, are more reliable. The demand for labor in the construction industry was particularly acute due to the need to build housing for the enormous numbers of new immigrants arriving from the former Soviet Union (FSU) in 1990-92. Similarly, farmers' lobbying also acted to replace Palestinians with foreign workers in agriculture as the new immigrants from the FSU did not work in either construction or agriculture under the existing conditions (Weiss *et al.,* 2003; and Boroski and Yanay, 1997).

Despite the fact that foreign workers in Israel work only in a small number of sectors, their number of grew dramatically. For example, according to Bank of Israel there were 2,500 FW in 1991 in Israel and in 2008 their number was approximated by 211,000. In international perspective, FW employment in Israel is relatively high and the share of FW in the Israeli labor force is twice the share in most western counties (OECD (2010)).

---

[1] In the last few years there is another dominant group of foreigners in Israel: refugees from Ethiopia and Sudan who enter Israel mainly through the border with Egypt. However since we focus on the period 1998-2006 we ignore this group.

[2] Palestinian workers must receive security clearance in order to work in Israel. They are dependent on their employers for their work permit, since they must demonstrate a full-time job offer prior to applying for security clearance. Currently, most workers must be over 30 and married with children to receive clearance, after which they are issued a work permit, which must be renewed every a few months.

In the immigration literature, the main difficulty in the estimation of the effect of immigrants on natives' labor market outcomes stems from the self-selection of migrants across occupations and local labor markets. In our case, the likelihood of selection bias due to the endogenous selection of sectors by foreigners is very low due to the heavy restrictions on the movements of foreigners between sectors. Specifically, the majority of foreign workers in Israel are employed in three major sectors: construction, agriculture and home-care for the elderly.[3] The latter has become the largest and fastest-growing sector employing foreign workers, mainly women.[4] Each sector is subject to its own regulations and transfer among sectors is not generally allowed. The sector and occupational restrictions and quotas are set through informal negotiations between different ministries, and are often strongly influenced by requests from employer organizations.[5]

While there is no concern for self-selection of foreigners across sectors in our case study, as explained above, the setting of foreigners' employment in Israel raises a concern of reverse causality between foreigners' employment and Israeli natives' labor market outcomes. That is, if native labor shortages in a particular sector increase the number of foreign workers as a response (and not the opposite), estimating the effect of Palestinians and foreign workers on natives' labor market outcomes using simple OLS regressions might not be appropriate and would yield biased and inconsistent estimates.

To overcome the potential reverse causality problem and establish a causal relationship from Palestinians and foreign workers to the probabilities of Israeli natives to enter or exit employment we take an Instrumental Variable (IV) approach. Specifically, we instrument the shares of Palestinians and foreigners in the Israeli economy using data on border closures from the West Bank and, separately, from Gaza. Our sample covers the period 1998-2006 and includes the pre- and post- second Intifada which took place in 2000. Thus, during this period the number of days of closures from the West Bank and, separately, from Gaza varied significantly and it is assumed that the decisions on closures where governed by security conditions rather than economic conditions in Israel.

We distinguish between the impact of Palestinians and foreign workers on native Jews and non-Jews, mainly Arab Israelis. This distinction is important since 24% of non-Jewish Israeli males work in construction in comparison to less than 7% among male Jews, making non-Jews more exposed to competition with Palestinians and foreign workers.[6]

---

[3] In addition to the above sectors, there are two other channels for (high-skill) temporary labor migration in Israel. The first is specialists or experts and the second is specialty industrial workers (*e.g*., metalworkers) and "ethnic chefs".
[4] Since there is a correlation between the employment sector and the country of origin and gender of the FW, the re-distribution of permits per employment sector has led to changes in the ethnic and gender composition of the FW. While in construction and agriculture FW oriented mainly from Eastern Europe, Turkey and China, female FW in the home care sector are mainly Filipino women.

[5] In order to regulate the access of employers to foreign workers, Israel imposed quotas on certain sectors. Quotas for foreign workers were introduced in September 1993 for agriculture and in May 1994 for the construction sector, based on estimates of demand by employers. By the end of 1994, the quota was over 50 000. The frequent closures of the Israeli labor market to Palestinians, mainly from mid-1994 to mid-1996, further contributed to the boom in employment of foreign workers.
[6] For detailed information on native Israeli Arabs' employment, see Yashiv and Kasir (2011).

The IV estimates suggest that the high turnover rate in construction among male Israeli non-Jews is significantly affected by the shares of Palestinians and of foreign workers; these shares increase the likelihood that non-Jewish Israelis exit employment in construction and decrease the likelihood that non-Jews enter employment in construction.

Among male Israeli Jews, we do not find a significant sectorial impact of Palestinians and foreign workers on the transitions into and out of employment, except for a negative impact of foreigners on the likelihood of male Jews to enter employment in agriculture. However, we do find a macro effect of foreigners on the probability of male Jews with different level of schooling to lose their job. Foreigners both increase the likelihood that Jewish high-school dropouts and decrease the likelihood that Jewish high-school graduates move from employment to non-employment, suggesting that foreigners are substitutes to high school dropouts and complements to male Jewish high school graduate.

The findings that a large fraction of Israeli non-Jews who work in the construction sector are adversely affected by the shares of non-Israeli workers and that low educated Jews are also adversely affected by foreign workers calls re-examination of government policies and their (lack of) implementation towards non Israeli workers.

2. Literature Review

There is little information on the demographic characteristics of the temporary foreign workers in Israel, whether legal or illegal. However, the common knowledge is that foreigners are largely low-educated (e.g., Thai farmers in agriculture, Chinese villagers in construction) except, perhaps, for the Filipina care workers who are considered to be more skilled.[7] Despite the lack of data on socio-demographic characteristics of FW, a few papers attempted to measure the impact of foreign workers on various labor market outcomes of Israelis and several official committees tried to address this issue.[8,9] Gottlieb (2002) used the Israeli cross-sectional Income Survey to study the effect of foreigners on wages and on the wage structure of Israeli workers during 1995-2000. He finds that the ratio of non-Israeli workers to Israeli workers in the sector had a negative effect on wages of low

---

[7] The Brookdale Institute conducted a survey in 2002 among Filipina women. About 76% of the women in this survey reported their occupation prior to their arrival in Israel: 44% worked in sales, 16% in nursing, 8% in school teaching and 8% in other professions.

[8] The report of the Eckstein committee (Eckstein, 2007) recommended to limit employment of FW in agriculture only to distanced areas in the south of Israel where they would have minor effect on employment of Israelis and to gradually eliminate employment of FW in construction. In the home-care sector the committee recommended to continue hiring FW since it enables elderly to stay in their home and this is a better treatment than institutional-care for the elderly.
In a more recent committee, Eckstein (2010) also suggested recruitment of seasonal FW in agriculture through the International Organization for Migration (IOM) and expansion of loans for farmers. The committee also recommended investment in 'hand-replacement' technology and subsidies for farmers who employ permanent Israeli workers. The aims of these reforms are to reduce the dependency of the Agriculture sector on FW employment and to facilitate the ability of Israel to stand in International standards of FW employment like in other OECD countries.

[9] For a comprehensive survey on reforming policies regarding foreign workers in Israel, see Kemp (2010).

educated (0-11 years of schooling) Israelis in industry, agriculture and business services and a positive effect on wages of Israelis with 12+ years of schooling in these sectors. The finding that non Israeli workers did not affect low-educated Israeli workers in construction (the main intensive sector for FW employment) is explained by the high cross-sector elasticity among low educated Israelis that led them out of this sector.

Gottlieb and Amir (2005) used the panel structure of the Israeli Labor Force Survey to study the impact of non-Israeli workers on the transitions of Israeli workers from employment to unemployment or out of the labor force. They report that the main impact was in the business sector, while the public sector was not affected at all. They also found that in 1990-2000, the probability of Israelis to move from employment to unemployment or out of the labor force in construction and agriculture was much higher than other groups. No impact was found on Israeli women, maybe because most workers during the period of study were males (the home care sector started developing only at the end of the period). They argue that beyond the direct positive effect of non-Israeli workers on the likelihood of Israeli workers to exit employment, there is an additional indirect effect though the impact of foreigners on the wage structure of Israelis. That is, an increase in the labor supply of non-Israelis lowered the demand for Israeli workers, pushing their wages down and hence increasing their tendency to exit employment. Zussman and Romanov (2003) simulated the effect of substituting 30,000 foreign workers in construction with Israeli workers over a period of three years. They found that with a small governmental subsidization, housing prices would not increase dramatically. In addition, they showed that while the wage of blue-collar Israeli workers (who substituted FW) declined, wages of white-collar Israeli workers increased. The substitution effect of foreign workers on employment and their spillover effect on Israeli wages, in the above studies, are attributed to the low real wages and poor working conditions of many foreign workers, which are enabled by insufficient inspection and a system that also makes them vulnerable to exploitation.[10]

While the previous studies used standard OLS estimation, this study uses IV estimation to address the impact of foreign workers and Palestinians on native Israelis. In addition, it distinguishes between the impact on native Jews and non-Jews (mainly Arab Israelis).

3. Data

The data on native-Israeli individuals is based on the Israeli Labor Force Surveys (LFS) of 1998-2006. The special rotating panel structure of the LFS during this period allows us to follow natives over a period of eighteen months: each household is interviewed for two consecutive quarters, followed by a

---

[10] While the focus of this paper is to estimate the impact of non-Israeli workers on labor market transitions of native Israelis, there are also papers that studied the impact of foreign workers on Palestinians' outcomes. Miaari and Sauer (2006) found that FW depressed employment opportunities for Palestinians in Israel, while Aranki and Daoud (2008) found that border closures had a stronger effect on Palestinian employment in Israel, while foreign workers depressed the wages of Palestinians working in Israel.

break for two quarters, and is interviewed again for two consecutive quarters.[11] We restrict our sample to Jewish and non-Jewish male natives aged 22-64 who were interviewed in the first two LFS interviews between 1998 and 2006.[12] Overall we have 35,405 observations on Jewish males and 9,181 observations on non-Jewish males.

Table 1 presents summary statistics of our data by religion. The average age of Jewish males is 42 and the average number of years of schooling is 13.3. Non-Jewish males are, on average, 4 years younger than Jewish males and possess 2.6 years of schooling less than male Jews. The average participation rate during 1998-2006 among Jews was 77% and 66% among non-Jews, while the employment rate was 93% and 89%, respectively. The largest sector, in terms of native Jews' employment, is the manufacturing industry which employs about 25% of employed male Jews, while among non-Jews the dominant sector is construction which employs 23% of non-Jewish male workers. [13]

Conditional on employment, the average quarterly rate of transition from employment to non-employment among native males during 1998-2006 is 5.3% for Jews and 9% for non-Jews. These rates vary across sectors as illustrated in Table 2.[14] The average quarterly rate of transition from non-employment to employment, conditional on non-employment is 17.5% among Jews, and 16.4% among non-Jews and it also differ across sectors (Table 2). Table 2 illustrates that some sectors like manufacturing, are characterized by low rate of transitions from employment to non-employment and high rate of transitions from non-employment to employment, while other sectors, like accommodation and construction are characterized by high turnover rates (i.e. high rate of transitions from employment to non-employment and high rate of transitions from non-employment to employment).

Data on the total number of foreign workers and Palestinians in the business sector by quarter is also taken from the Israeli Central bureau of Statistics (CBS). In order to get some magnitude on the reliance of the Israeli labor market on foreign (Palestinian) workers we calculate the shares of foreigners (Palestinians) in the economy as the number of foreign workers (Palestinians) to the number of Israeli workers in 1990.[15] These shares are presented in Figure 1. At the beginning of 1995 foreign workers consisted about 5% of the Israeli labor market in 1990 and this share grew to 18% by 2002. Since mid-2002 the share of foreign workers has declined, such that by 2006 foreigners consisted of

---

[11] Since the third quarter of 2011 the Israeli LFS is conducted on a monthly basis rather a quarterly basis and the rotating panel structure was changed.

[12] While we could use also individuals who were interviewed in the 3rd and 4th interviews, we chose to use only the first two interviews in order to limit potential problems associated with non-random attrition. The attrition rate of households between the first and second interview of the LFS is about 20%. The attrition rate of households between the 2nd and the 3rd interview is significantly higher.

[13] Table Appendix A (Table A1) replicates Table 1 and presents also summary statistics of individuals who were interviewed only in the first interview of the LFS. This table shows that except for the share of married males, there are only minor differences between the attributes of those who were sampled once to those who were sampled twice. Hence, conditional on observables we assume the attrition between the first and second interviews is random.

[14] Of those who stayed employed, above 80% continued to work in the same sector, both among Jews and Non-Jews.

[15] The number of Israeli workers in 1990 was 1491.9 thousands. We chose to define the share of foreign and Palestinian workers relative to the employment of Israelis in 1990 since legally foreign workers entered the Israeli labor market only after 1990.

12% of total employment in 1990. The share of Palestinian workers in the Israeli economy was greatly influenced by security events during the investigated period. From 1995 to mid-2000, the share of Palestinians in the Israeli economy has doubled from 4% to 8%. The second "intifada" in 2000 drastically cut this share to 3% ; and during 2001-2006 this share ranged between 1% and 3.5%.[16]

In the empirical analysis we instrument the shares of Palestinians and foreign workers with the number of days of closures in each quarter from Gaza and separately from the West-Bank which are presented in Figure 2.[17]

4. Methodology

This section describes the estimation equations for assessing the impact of non-Israeli workers on Israeli natives' transition to and from employment. A-priori it is unclear whether the shares of foreign and Palestinian workers affect the transitions of all Israelis or only the transitions of Israelis to and out of employment in the main sectors that employ these non -Israeli workers. The basic intuition is that the employment of FW mainly affects local workers with similar characteristics such as low education, and that the effect should be found, if at all, in sectors that employ FW. However, in the Israeli case, it is important to note that while low skilled foreign and Palestinian workers are concentrated in a small number of sectors and hold specific jobs within these sectors, low educated Israeli workers (mainly Jews) are distributed across all sectors and perform a variety of jobs. In fact, most of the low educated Israeli Jews work in industry, trade, transportation and other services and only a small fraction work in construction and agriculture. In addition, one has to bear in mind that low educated workers tend to have a low level of specialization, which allows them to move across sectors and jobs rather easily. This mobility can create a spillover effect of foreign and Palestinian workers on low educated workers in all sectors and not necessarily in the sectors that employ them.

Taking these various scenarios into account, we formulate a basic regression where the transition of an Israeli individual to or out of employment is a function of personal traits, macroeconomic conditions, sector fixed effects, year fixed effects and a random i.i.d. shock. To capture the impact of foreign and Palestinian workers on these transitions, we add this basic regression various combinations of the shares of foreign and Palestinian workers (presented in Figure 1), which are based on interaction terms of these shares with different sectors the Israeli individual entered or exit or with his the level of education.

Formally, the transition of an Israeli individual i who was employed in sector j at calendar quarter t from employment to non-employment in the subsequent quarter is given by:

$$(1) \quad Y_{ijt} = \beta_0 + \beta_1 Z_t + \beta_2 X_{it} + f(S\_FW_t; S\_PW_t) + \alpha_t + \gamma_j + u_{ijt}$$

where *Yijt* equals 1 if the individual exit employment in sector *j* and 0 if he stayed employed. Z_t is an indicator for the macroeconomic activity in quarter *t* and X_{it} is a vector of observable individual characteristics.[18] Our main variables of interest are S_FW_t and S_PW_t which represent the shares of foreign and Palestinian workers in the economy at time *t* where *f(.)* represents various combinations of these shares, and their interaction with the individual's sector and schooling dummies. To account for possible sector-level time invariant unobserved characteristics as well as for time trends that are common to all sectors we include sector fixed effects, γ_j, and year fixed effects, α_t. u_{ijt} is an *i.i.d* error term and the standard errors are clustered by year-sector interactions.

The transition of an Israeli individual *i* who was not employed at calendar quarter *t* from non-employment to employment in sector *j* in the subsequent quarter is similar to (1) only here Y_{ijt} equals 1 if the individual entered employment in sector *j* and 0 if he stayed not-employed and the set of sector dummies, γ_j, correspond to the sector the individual entered rather exit.

We estimate (1) separately for Israeli male Jews and Non-Jews using OLS regression. However, due to the possible endogeneity of the shares of foreign and Palestinian workers and the possible resulting bias of the OLS estimates, we also run IV regressions where the shares of foreign and Palestinian workers, S_FW_t and S_PW_t, are instrumented by (i) the days of border closures from the West-Bank in the previous quarter, *WB_closures_{t-1}* and; (ii) the days of border closures from Gaza by quarters, *Gaza_closures_{t-1}*.[19] Thus, our identification strategy is based on the assumption that closures from the West-Bank and Gaza affect natives' labor market transitions only through their impact on the employment of foreigners and Palestinians in Israel. To facilitate comparison between the OLS estimates and the instrumental variable estimates we estimate the regression as a linear probability model. Since our focus of interest is the marginal effect of FW and PW on the probability to be employed, the linear probability model can probably provide a fairly reasonable approximation of the true effect (Moffitt, 1999).

We should note that the IV results are based on the Limited Information Maximum Likelihood (LIML) estimator rather than on the Two Stage Least Squares (2SLS) estimator because in most of the specifications we tried for $f(S\_FW_t; S\_PW_t)$ in (1), our first-stage F-statistics suggest the possibility that our instruments are weak (see, e.g., Stock and Yogo, 2005). In so doing, we assess the relevance of

---

[18] For Israeli Jews *X*it includes age, age squared, dummy for immigration status if migrated to Israel after 1989, dummy for married and a set of dummies for having children in age groups: less than 1-year old, 2-4, 5-9 and 10-14. For non-Jew Israelis we use the same controls except for the dummy for immigration status.

[19] In specifications we used interactions of the shares of FW and PW with the individual's sector or schooling dummies in the OLS regression, we used in the IV regression the interaction of the above IVs with schooling/sector dummies as instruments for the original interaction terms in the OLS.

the first-stage regressions by using the Anderson-Rubin statistic for the joint significance of multiple endogenous regressors. While the Anderson-Rubin statistic is not a formal test of weak instruments, it tests for the significance of endogenous regressors and remains valid under weak instruments. Furthermore, to relieve any concern about the weakness of our instruments, we also report reduced-form (rf) estimates of our regressions.

5. Results

5.1 The Transition from Employment to Non-employment

Table 3 presents the main coefficients of interest from regressions of the transition of Israeli Jews and non-Jews from employment to non-employment. In all regressions the dependent variable equals 1 if the Israeli individual exit employment and 0 if he stayed employed. For each group of Israelis (Jews and non-Jews) we present the coefficients obtained from OLS (Col. (1)) and LIML (Col. (3)) regressions. In addition, we present the coefficients of the corresponding reduced-form (rf) regressions (Col. (2)).

We estimate equation (1) using two specifications of $f(S\_FW_t; S\_PW_t)$. The first is based on the notion that we should look for the impact of foreign and Palestinian workers in labor market segments which are based on the sector of employment of the Israeli worker while the second specification is based on the assumption that the effects depend on the education level of the Israeli worker.

In Panel A we report the results from the first specification that allows the impact of foreign and Palestinian workers on Israelis' transitions from employment to non-employment to depend on the sector the Israeli individual exit. Specifically, we allow the shares of foreign and Palestinian workers in quarter t to interact with dummies for the two main sectors that employ foreigners: agriculture and construction; and in additional we interact these shares with a dummy for employment in manufacturing/industry which is one of the big sectors that employ low educated Israeli males.[20] Thus, in the corresponding rf regression we interact each of the two instruments $Gaza\_closures_{t-1}$ and $WB\_closures_{t-1}$ with the three sector dummies.

The OLS and LIML estimates suggest no significant effect of foreign and Palestinian workers on the transitions of Israeli male Jews from employment in agriculture, construction and manufacturing to non-employment. In addition, all the corresponding instrument in the rf regression for Jews are not statistically different from zero. The Anderson-Rubin (AR) first stage F statistics also confirm this impression as the null hypothesis that the coefficients of the endogenous regressors in the structural equation are jointly equal to zero is not rejected.

---

[20] The notation for the interaction terms are as follows: $S\_FW\_agriiculture$, $S\_PW\_agriculture$ are interaction terms of the shares of foreign and Palestinian workers with dummies that indicate if the Israeli individual worked in agriculture in quarter t, $S\_FW\_construction$, $S\_PW\_construction$ are interaction terms of the shares of foreign and Palestinian workers with dummies that indicate if an Israeli individual worked in construction in quarter t and $S\_FW\_manufacturing$ and $S\_PW\_manufacturing$ are interaction terms of the shares of foreign and Palestinian workers with dummies that indicate if the Israeli individual worked in manufacturing.

For non-Jews, on the other hand, the OLS estimates suggest that the probability of non-Jews working in agriculture or construction to exit employment in these sectors increases with the share of Palestinians. The corresponding *rf* specification show a significant negative effect of closures from Gaza on the probability of non-Jews to move from employment in construction to non-employment. The first stage AR test also implies that the null hypothesis that coefficients of the endogenous regressors in the structural equation are jointly equal to zero is rejected. Turning to the LIML estimates we find that a non-Jewish Israeli worker in construction is facing a higher likelihood to exit employment as the shares of foreign and Palestinian workers increase. An increase of 1 percentage point in the share of foreign workers increases this probability by 3.3% while an increase of 1 percentage point in the share of Palestinians increases this probability by 4.8% (Table 3, Panel A, non-Jews Col. 3).[21]

Table 3 Panel B presents the results obtained from the second specification of $f(S\_FW_t; S\_PW_t)$ which looks for the impact of Palestinians and foreigners on Israeli workers with different levels of schooling: 0-11 (high-school dropouts), 12 (high-school graduates) and 12+ years of schooling. Using these education categories, we interact *S_PW* and *S_FW* with the dummies for 0-11 and 12 years of schooling. Thus, the comparison group consists of Israeli workers with 12+ years of education.

According to the OLS regression there is a negative association between the share of foreign workers and the likelihood of Israeli male Jews high school graduates to exit employment. This association can be interpreted as complementarity between FW and high school graduate Jews. The corresponding *rf* estimates suggest that closures from the West-Bank act to increase the likelihood of high-school dropout Jews and to reduce the likelihood of high-school graduate Jews to exit employment and the first stage AR confirm the joint impact of the endogenous regressors is statistically different from zero. Turning to the LIML estimates, we obtain that a 1 percentage point increase in the share of FW in the economy would increase the probability of a high-school dropout Jew to exit employment by 0.0033% and would decrease this probability by 0.0043% for a high-school graduate Jew (Table 3 Jews Col. 3). For non-Jews, the OLS suggest a significant negative association between the share of FW and the likelihood of non-Jews high-school dropouts to exit employment. However, the *rf* regression suggests the instruments are weak and the first stage AR is extremely low. The LIML for non-Jews also finds no significant (aggregate) effect of FW and PW on non-Jews with different levels of education.

To sum up, the above results suggest that for Jews there is a spillover effect of FW employment as the transition of Jewish high school dropouts and high school graduates from employment to

---

non-employment depends on the share of FW regardless of the sector the individual works in. In contrast, for non-Jews, we find no aggregate impact of FW and PW on non-Jewish workers with different education levels, but rather the impact is limited only to the construction sector. While this later finding seems less acute since it is concentrated in one sector- construction, in the case of Arab Israelis, which is the dominant group of native Israeli non-Jews, this finding may has severe consequences on Israeli Arabs employment stability as construction is the main sector which employs Israeli Arab workers.

5.2 The Transition from Non-employment to Employment

Table 4 is a replication of Table 3 for the opposite transition of Jewish and non-Jewish workers from non-employment to employment. That is, the dependent variable in all the regressions in this table equals 1 if the person moved from non-employment in quarter t to employment in the subsequent quarter and equals 0 if he stayed not-employed.

Using the first specification which looks for the impact of Palestinians and foreign workers on native Israelis within specific sectors (Table 4 Panel A), the OLS estimates suggest that the likelihood of Jewish males to enter employment in agriculture, construction and manufacturing is not associated with the shares of FW and PW (Table 4 panel A Col. 1). Nonetheless, the reduced form estimates show a significant positive correlation between closures from Gaza and the likelihood of a non-employed Jewish individual to enter employment in agriculture and manufacturing and a significant negative association between closures from the West Bank and the likelihood of a non-employed male Jew to enter employment in agriculture.[22] The resulting LIML estimates for Jews (Table 4 panel A Col. 3) indicate that the likelihood to enter employment in agriculture declines with the share of foreign workers, suggesting substitution between FW and Israeli Jews in agriculture.

For non-Jews, the OLS estimates suggest a significant negative association between the shares of FW and PW and the likelihood to enter employment in construction. In addition, the share of FW lowers the propensity to enter manufacturing (Table 4 panel A non-Jews, Col. 1). The LIML estimates (Table 4 Panel A, non-Jews Col. 3) implies the probability of a non-employed Jewish male to enter employment in construction declines with the shares of both Palestinians and foreign workers, such that a 1 percentage point increase in the share of FW in the economy would decrease this probability by 5% and a 1 percentage point increase in the share of Palestinians in the economy would decrease this probability by 6.2 percentage points. These estimates are greater, in absolute terms than the OLS estimates obtained in Col. 1.

The second specification which is based on the education level of Israeli workers seems not relevant in

---

[22] The Anderson Rubin first-stage p-value is .0185.

the transition of Israelis from non-employment to employment as the first stage Anderson-Rubin F statistics are extremely low both for Jews and non-Jews and the OLS and IV estimates are not statistically different from zero.

6. Conclusions

In this paper we measured the impact of Palestinian and foreign workers on the transitions of native make Israelis between non-employment and employment using IV approach.

The main conclusion that stems from the analysis is that the impact of non-Israeli workers on the likelihood of Israelis to enter or exit employment is different for Jews and Non-Jews. For Jews we find that the impact of non-Israeli workers on likelihood to exit employment depends mainly on the individual's level of schooling, while for non-Jews it depends on the sector of employment. Specifically, foreign workers increase the likelihood of high-school dropout Jews and decrease the likelihood of high-school graduate Jews to move from employment to non-employment, suggesting that foreigners are substitutes to high school dropouts and complements to high school graduate male Jews. In contrast for Israeli Jews, where certain parts of the population actually benefit from the presence of foreigners in the economy, for non-Jew Israelis we find only an adverse effect such that the likelihood of a non-Jewish Israeli to exit employment increases with both the shares of Palestinians and foreign workers if the individual works in construction.

In the opposite direction, the transition from non-employment to employment, we find that Palestinians and foreign workers do not significantly affect Jews, except for a negative impact of foreigners on the likelihood of male Jews to enter employment in agriculture; whereas the likelihood of non-Jews to enter employment in construction decrease with the shares of Palestinians and of foreign workers in the economy.

The construction sector is the most dominant sector of employment among non-Jews, making this particular group of Israelis more exposed for potential competition from non-Israeli workers in this sector. Our findings confirm that the high turnover of non-Jews in construction is due to the adverse impact of Palestinians and foreign workers both on the likelihood of non-Jews to enter and to exit employment in this sector.

The fact that a large fraction of Israeli non-Jews, mainly Arabs, are adversely affected by the shares of non-Israeli workers and that low educated Jews are also adversely affected by foreign workers calls re-examination of government policies and their (lack of) implementation towards non Israeli workers.

In addition, further work may also try to address the impact of Palestinian and foreign workers on wages of Israeli workers and on inequality.

References

Aranki, T.N. and Y. Daoud (2010), "Competition, Substitution, or Discretion: An Analysis of Palestinian and Foreign Guest Workers in the Israeli Labor Market", *Journal of Population Economics*, 23(4) pp. 1275-1300.

Borowski, A. and U. Yanay (1997), "Temporary and Illegal Labor Migration: The Israeli Experience", *International Migration*, Vol. 35, pp. 495-511.

Eckstein, Zvi (2007), "Report by the Inter-Ministerial Committee for the Formulation of Labor Migration Policy"; Bank of Israeli and Ministry of Industry, Trade and Labor, Jerusalem (in Hebrew).

Eckstein, Zvi (2010), ""Report by the Inter-Ministerial Committee for Increasing Employment of Israeli Workers and Reduction of Foreign workers in Agriculture"; Bank of Israeli and Ministry of Industry, Trade and Labor, Jerusalem (in Hebrew), .

Gottlieb, Daniel (2002), "The Effect of Migrant Workers on Employment, Real Wages and Inequality - The Case of Israel 1995 to 2000, MPRA Paper No. 3148,

http://mpra.ub.uni-muenchen.de/3148/.

Gottlieb, D. and S. Amir (2005), "Entry of Foreigners and Ejection of Locals in Employment in Israel", Economics and Planning Research Administration, MOITAL,

www.moital.gov.il/NR/rdonlyres/046863F8-7A02-4F1A-8172E496672C9257/0/knisatzarim.pdf

(in Hebrew).

Kemp, A. (2010), "Reforming Policies on Foreign Workers in Israel", *OECD Social, Employment and Migration Working Papers*, No. 103, OECD Publishing.

http://dx.doi.org/10.1787/5kmjnr8pbp6f-en

Miaari, S.H. and R.M. Sauer (2006), "The Labor Market Costs of Conflict: Closures, Foreign Workers, and Palestinian Employment and Earnings", IZA Discussion Paper No. 2282, Bonn.

Moffitt, R.A. (1999), "New Developments in Econometric Methods for Labor Market Analysis" in Orley C. Ashenfelter and David Card (Eds)., *Handbook of Labor Economics, Volume 3A*. Amsterdam: NorthHolland, pp. 1367–97.

OECD (2010), *OECD Reviews of Labor Market and Social Policies: Israel*, OECD Publishing. doi: 10.1787/9789264079267-en

Stock, J.H. and M. Yogo (2005), "Testing for Weak Instruments in Linear IV regression", in James H. Stock and Donald W.K. Andrews (Eds.), Identification and Inference for Econometric Models: Essays

in Honor of Thomas J. Rothenberg, Cambridge University Press, Cambridge UK, pp. 80-108.

Weiss, Y., R.M. Sauer and M. Gotlibovski (2003), "Immigration, Search and Loss of Skill", *Journal of Labor Economics*, Vol. 21, pp. 557-591.

Yashiv, E., and Kasir, N. (2011), "Patterns of labor force participation among Israeli Arabs", *Israel Economic Review*, *9*(1), pp. 53–101.

Zussman, N. and D. Romanov (2003), "Foreign Workers in the Construction Sector: Situation and Policy Implications", *The Economic Quarterly* 2003 (4) pp. 723-747 (Hebrew).

Table 1: Summary Statistics

Variable	Jews	Non-Jews
Age	42.44 (12.15)	38.43 (11.46)
Years of Schooling	13.28 (3.35)	10.69 (3.78)
Share of Immigrants	0.14 (0.35)	0.00
Share of Married	0.73 (0.44)	0.75 (0.43)
Participation Rate	0.77 (0.42)	0.66 (0.47)
Employment Rate	0.93 (0.26)	0.89 (0.31)
Number of Observations	35,405	9,181

Standard deviation in parentheses.

Source: Author's calculations from Labor Force Surveys 1998-2006 (CBS).

Data includes only individuals who were surveyed in the first and the second panel of the LFS.

Table 2: Natives' Rate of Transitions from Employment to Non-Employment and from Non-Employment to Employment:Total and by Selected Sectors

Variable	transitions from employment to non-employment (Percentage)		transitions from non-employment to employment (Percentage)	
	Jews	Non-Jews	Jews	Non-Jews
Total	5.33	9.03	17.5	16.43
Accommodation	12.49 (0.33)	11.04 (0.31)	36.36 (0.48)	33.33 (0.48)
Agriculture	5.07 (0.22)	15.86 (0.37)	36.36 (0.48)	22.22 (0.42)
Banking, Insurance etc.	3 (0.17)	6.9 (0.26)	13.33 (0.35)	na
Construction	7.56 (0.26)	14.33 (0.35)	38.69 (0.49)	42.68 (0.5)
Trade	6.03 (0.24)	6.65 (0.25)	34.69 (0.48)	25.49 (0.44)
Manufacturing	4.1 (0.2)	8.01 (0.27)	27.53 (0.45)	30.17 (0.46)

Standard deviation in parentheses.
Source: Author's culculations from Labor Force Surveys 1998-2006 (CBS).

Table 3: Transitions from employment to non-employment

Dependent variable in all regressions=1 if the individual entered non-employment

explanatory variables	Jews			Non-Jews		
	OLS	rf	IV	OLS	rf	IV
A. by Sector of employment						
S_FW_agriiculture	0.1171		-1.0243	3.2203		6.0324
	(0.2021)		(0.9170)	(1.9684)		(5.2551)
S_FW_construction	-0.3086		-0.2597	-0.3879		3.3039*
	(0.2147)		(0.7620)	(0.4609)		(1.4213)
S_FW_manufacturing	0.0286		-0.5352	0.2325		0.5844
	(0.1643)		(0.4523)	(0.3646)		(1.1645)
S_PW_agriiculture	0.0376		-0.6577	3.1161*		4.6141
	(0.1485)		(1.1741)	(0.8436)		(3.7361)
S_PW_construction	0.0372		0.1100	1.2963*		4.8015*
	(0.2444)		(0.7777)	(0.4193)		(1.6852)
S_PW_manufacturing	0.0884		-0.5501	0.3659		1.0174
	(0.1558)		(0.5185)	(0.4215)		(1.3145)
Gaza_Closures*agriculture		0.0223			-0.1231	
		(0.0272)			(0.1538)	
Gaza_Closures*construction		-0.0024			-0.1163*	
		(0.0233)			(0.0161)	
Gaza_Closures*manufacturing		0.0139			-0.0043	
		(0.0101)			(0.0283)	
WB_closures*agriculture		-0.0238			0.1196	
		(0.0154)			(0.1477)	
WB_closures*construction		-0.0138			-0.0045	
		(0.0110)			(0.0199)	
WB_closures*manufacturing		-0.0045			-0.0099	
		(0.0071)			(0.0162)	
Anderson-Rubin F test		F(6,125)= 1.58			F(6,116)= 9.35	
P-value			0.1589			0.0000
Number of Observations			27146			6022
B. By level of Education						
FW* 0-11education	0.0638		0.3342*	-0.3453*		-0.6965
	(0.0607)		(0.1528)	(0.1725)		(0.5182)
PW* 0-11education	0.1262		-3.1815	-0.0002		-6.2290
	(0.1336)		(3.0870)	(0.3006)		(9.0310)
FW* 12 education	-0.0741**		-0.4265*	0.0068		-0.1399
	(0.0446)		(0.1928)	(0.1476)		(0.6982)
PW* 12 education	0.2039		0.6444	-0.9068*		-4.6822
	(0.1317)		(1.7101)	(0.3872)		(5.6960)
Closures WB *0-11 education		0.0301*			-0.0210	
		(0.0137)			(0.0227)	
Closures Gaza *0-11 education		-0.0168			-0.0258	
		(0.0173)			(0.0213)	
Closures WB *12 education		-0.0226*			0.0016	
		(0.0091)			(0.0290)	
Closures Gaza *12 education		0.0076			-0.0235	
		(0.0102)			(0.0326)	
Anderson-Rubin F test		F(4,125)= 3.58			F(4,116)= 1.28	
P-value			0.0085			0.2827
Number of Observations			27146			6022

Source: Author's calculation from the Labor Force Surveys 1998-2006 (CBS).

Additional controls are: age, age squared, dummy for immigration status if migrated to Israel after 1989 (only in the regressions for Jews), dummy for married, GDP and a set of dummies for having children in age groups: less than 1-year old, 2-4, 5-9 and 10-14.

## Table 4: Transitions from non-employment to employment

Dependent variable in all regressions=1 if the individual entered employment

explanatory variables	Jews			Non-Jews		
	OLS	*rf*	IV	OLS	*rf*	IV
A. by Sector of employment						
S_FW_agriiculture	-4.0822		-13.2374*	4.7693		37.5234
	(2.9997)		(6.2298)	(3.9970)		(26.6874)
S_FW_construction	-0.0503		0.0000	-2.6113*		-4.9902**
	(1.3990)		(.)	(0.9817)		(2.9197)
S_FW_manufacturing	-0.9616		-8.5242	-3.7118*		-1.4784
	(0.8173)		(12.5977)	(1.5049)		(2.4240)
S_PW_agriiculture	-3.6819		-4.7119	4.9456		35.3583
	(3.7712)		(6.3906)	(3.6827)		(27.1227)
S_PW_construction	-1.0190		-1.5254	-5.7785*		-6.1548*
	(0.9105)		(1.9484)	(0.7627)		(2.5295)
S_PW_manufacturing	0.0521		-7.4483	-0.0174		2.8354
	(0.6048)		(10.1106)	(1.8861)		(2.2684)
Gaza_Closures*agriculture		0.1910**			-0.3306**	
		(0.1007)			(0.1693)	
Gaza_Closures*construction		0.2853			0.1856*	
		(0.1958)			(0.0806)	
Gaza_Closures*manufacturing		0.0865*			-0.0514	
		(0.0343)			(0.0529)	
WB_closures*agriculture		-0.3326*			0.0497	
		(0.1427)			(0.1625)	
WB_closures*construction		-0.1624			0.0026	
		(0.1656)			(0.0685)	
WB_closures*manufacturing		-0.0533			-0.1342	
		(0.0705)			(0.1085)	
Anderson-Rubin F test		F(6,121)= 2.66			F(6,106)= 2.07	
P-value			0.0185			0.0633
Number of Observations			8259			3159
B. By level of Education						
FW* 0-11education	0.1216		0.1663	0.0083		-0.8219
	(0.0938)		(0.2458)	(0.1872)		(0.7902)
PW* 0-11education	-0.1839		1.4936	0.0958		1.5646
	(0.2497)		(4.6121)	(0.4331)		(5.5987)
FW* 12 education	0.0469		0.1104	-0.1090		-2.2616
	(0.0912)		(0.4367)	(0.2372)		(1.6246)
PW* 12 education	-0.0100		0.5896	0.0239		9.6246
	(0.2816)		(2.6267)	(0.5984)		(7.5463)
Closures WB *0-11 education		0.0133			-0.0150	
		(0.0217)			(0.0288)	
Closures Gaza *0-11 education		0.0173			0.0011	
		(0.0262)			(0.0203)	
Closures WB *12 education		0.0096			-0.1058	
		(0.0183)			(0.0687)	
Closures Gaza *12 education		0.0088			0.0834	
		(0.0245)			(0.0597)	
Anderson-Rubin F test		F(4,121)= 0.75			F(4,106)= 0.64	
P-value			0.5621			0.6377
Number of Observations			8259			3159

Source: Author's calculation from the Labor Force Surveys 1998-2006 (CBS).

Additional controls are: age, age squared, dummy for immigration status if migrated to Israel after 1989 (only in the regressions for Jews), dummy for married, GDP and a set of dummies for having children in age groups: less than 1-year old, 2-4, 5-9 and 10-14.
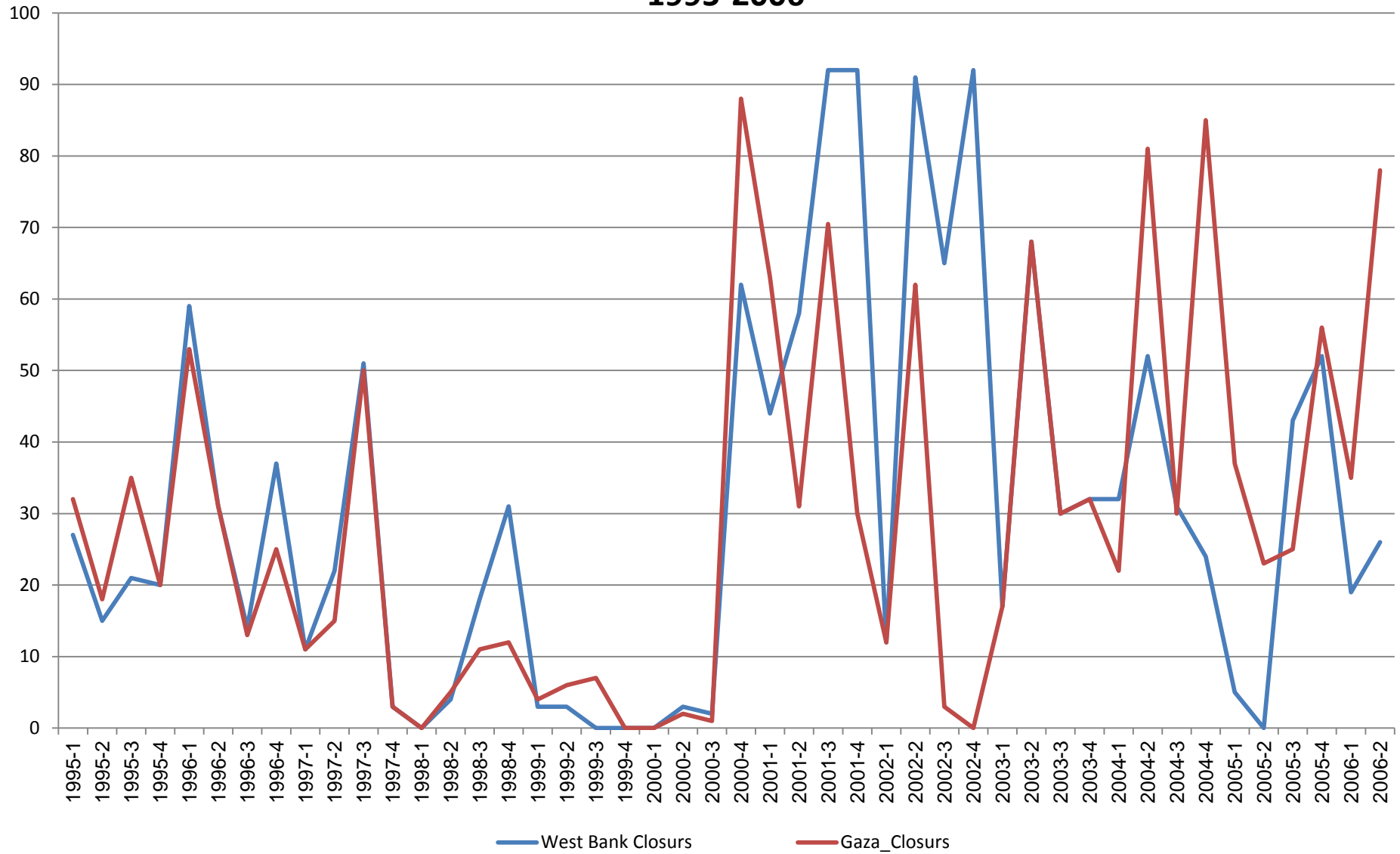
Figure 1: Share of FW and PW of Total Israeli Employment in 1990
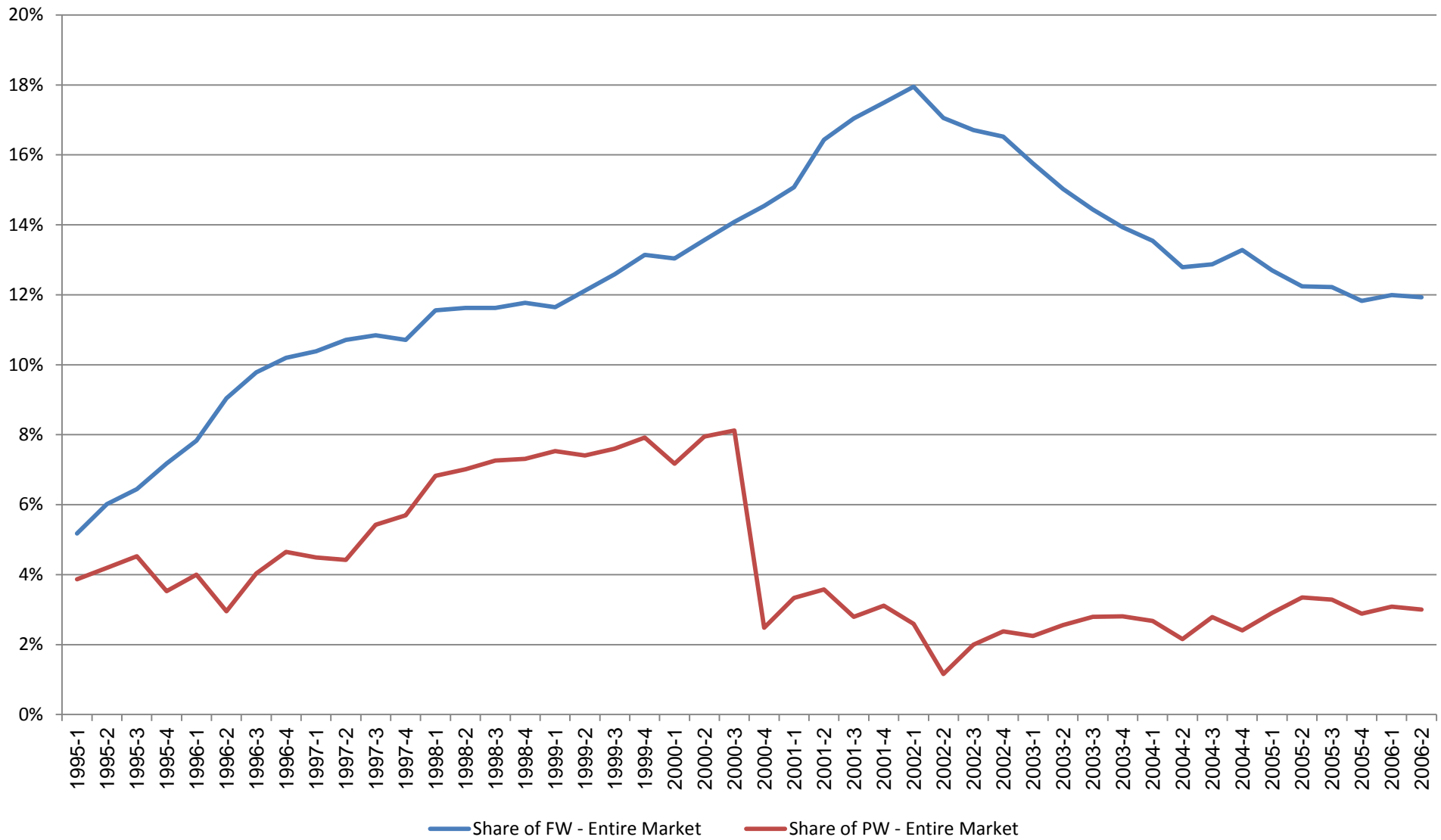
* Total Israeli employees in 1990=1491.9 thousands.
Source: CBS.

Figure 2: Number of Closure Days from Gaza and the West Bank by Quarters 1995-2006

West Bank Closurs — Gaza_Closurs

Source: Palestinian Ministry of Labor.

Table A1: Summary Statistics by Number of Interviews

Variable	Jews		Non-Jews	
	interviewed once	interviewed twice	interviewed once	interviewed twice
Age	40.66 (12.62)	42.44 (12.15)	37.12 (11.75)	38.43 (11.46)
Years of Schooling	13 (3.38)	13.28 (3.35)	11 (3.86)	10.69 (3.78)
Share of immigrants	0.14 (0.35)	0.14 (0.35)	0 (0)	0 (0.06)
Share of Married	0.65 (0.48)	0.73 (0.44)	0.67 (0.47)	0.75 (0.43)
Participation Rate	0.72 (0.45)	0.77 (0.42)	0.65 (0.48)	0.66 (0.47)
Employment Rate	0.92 (0.27)	0.93 (0.26)	0.9 (0.31)	0.89 (0.31)

Standard deviation in parentheses.
Source: Author's culculations from Labor Force Surveys 1998-2006 (CBS).