

Child labour in Palestine: the role of adult labour market and Israeli closures

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Abstract

This paper studies the impact on Palestinian child labour of changes occurred in the domestic adult labour market. We use Labour Force Survey data from Palestine for the period 1999-2006. Using a bivariate probit model for child labour and schooling decision we find that, in addition to some specific household characteristics, both adult wage and the intensity of the military restriction imposed by Israel increase child labour.

Keywords: Palestine, child labour, conflict, Labour Force Survey, closures

JEL Classification:

1 Introduction

The existence of child labour obviously poses a number of ethical, social and economic questions. While the dimension of the phenomenon is well known and its evolution has been deeply studied in the last decades, there is still a large disagreement concerning its main determinants. In particular, the traditional idea of poor households being more likely to send their children to work seems to have not been generally confirmed by empirical evidence. In fact, recent evidence suggests that in some cases the characteristics of the adult labour market have a fundamental role in determining the dynamics of child labour. This may indicate that child labour is a more varied, country and context-specific phenomenon than usually believed. It follows that the general economic condition of the country are important determinants of child labour. In the context of already weak and fragile developing country economies, any additional difficulty may thus have a strong impact on child labour and school attendance by children. Moreover, all these elements are extremely exacerbated in the case of countries which are suffering a conflict. This is the case of the Palestine Territories in the last decade.

While the Palestinian Territories have been occupied for the last forty years, it is in the last decade that the situation had dramatically worsened. In particular, starting from the end of 2000, in response to the so-called Second Intifada Palestinian workers have been suffering mobility restrictions through different means: closures (which are usually on the whole West Bank, i.e. between Israel and the WB), curfews (on specific places, usually lately in Hebron, but sometimes on other towns and villages, e.g. Huwarra), and sieges, which is the closing off of certain towns (e.g. Jenin) for a length of time.

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Recently the effects on the Palestinian economy of these Israeli military interventions have been analysed by both Palestinian research centers and academic researchers. The main focus of these contributions has been the labour market because, on the one hand, this was expected to be the most affected part of the economy and, on the other, the availability of a detailed Labour Force Survey allows a careful analysis of what happened.

In this paper, on the contrary, we analyse the dynamics of Palestinian child labour during the period 1999-2006. We study its main determinants focusing on the evolution of the adult labour market and on the effects of the Israeli closure policy on Palestinian child labour. In particular, understanding the effect of closures on child labour will give us a more detailed picture of how the Palestinian economy has adapted to the new situation.

The paper is structured as follows. In the next section we briefly review the three strands of literature that are relevant to the present paper. In Section 3 we describe the data and the characteristics of child labour in Palestinian Territories. Section 4 present the econometric model and Section 5 discusses the results. Section 6 concludes.

2 Literature review

The Palestinian labour market and Israeli border restrictions In this paper we analyze the Palestinian economy. This is an interesting region to be studied for both its political relevance and its unique economic features. The Palestine economy is indeed characterized by a rather peculiar labour market dynamic. In fact, the Palestine labour market is symbiotic with the Israeli one. Indeed Palestinian unemployment and domestic wage respond to external job opportunities and wages in Israel (Angrist 1995, 1996; , Sayre 2001; Shaban 1993).

Recently some papers have analysed the effects of closures on the Palestinian economy and in particular on the labour market.¹

Ruppert Bulmer (2003) develops a model to quantify 1) the impact of change in Israeli border policy; 2) the magnitude of daily Palestinian labour flows to Israel on Palestinian employment, unemployment and wages. The model is calibrated for alternative policies using data from the PCBS. The model predicts that the larger the Palestinian labour supply - which is always smaller than labour demand for Palestinian workers in Israel - the higher the wage paid to Palestinian in Israel. This implies that the more strict are closures, which limit labour supply, the more the wage paid to Palestinian workers decreases. At the same time, a reduction in the supply of Palestinian workers to Israel increases the supply for domestic workers in WB and Gaza. She finds that for a sharp reduction in Palestinian labour flows to Israel following a policy decision of political and economic separation, the return of Palestinian workers to the domestic labour market would put downward pressure on domestic wages and domestic employment would rise. These gains would be offset by higher unemployment in the long run, limiting the use of available productive assets of the Palestinian economy. Summarizing, a reduction in the supply of Palestinian labour to Israel (i.e. due to an increase in closure enforcement) would:

1. decrease the wage paid to Palestinian in Israel²- this makes less Palestinian workers search for jobs in Israel

¹Other contributions include Elkhafif and Daoud (2005), Farsakh, L. (2002), Kadri and MacMillen (1998), PCBS (2001) and Saleh (2004).

²The model predicts this result, even if I do not understand why it should be like this. In any case this point is not central to our argument.

2. increase the domestic supply of labour in Palestine
3. reduce the domestic (Palestinian) wage
4. increase domestic labour demand (because of lower wages)
5. increase domestic unemployment (thus Palestinian employment decreases).

In other words: a decrease in the number of Palestinian employed in Israel leads to a decrease in total employment and to higher unemployment but also to an increase in domestic employment and declining wages - as *some* workers who were employed in high paid Israeli jobs now are employed domestically. Thus in the Palestinian case, as a consequence of closure, we have a case of increasing unemployment and decreasing wages (thus larger poverty). This is actually a rather peculiar situation.

Two papers have analysed the effect of closures on the labour market using actual data. Aranki (2004) shows that closures had a significant impact on wages, workdays, and employment outcome in the West Bank and Gaza Strip. The effect differs between the two regions. The external closure appears to have been more detrimental for residents in the Gaza Strip relative to West Bankers. Furthermore, the Israeli demand for Gazan workers appears to have diminished.

Also Miari and Sauer (2006) measure the effect of the Israeli-Palestinian conflict for Palestinian employment and earnings using the frequency of temporary closures of the West Bank and Gaza Strip as measure of the severity of the conflict. Their results show that the conflict has a large and statistically significant negative effects on Palestinian employment rates in Israel and mean monthly earnings, regardless of work location (Israel or West Bank and Gaza Strip).

Child labour and its interaction with adult labour The second source of inspiration of our paper is the Child Labour literature. Until very recently, models of child labor have rested on one basic axiom: the 'luxury axiom' introduced by Basu and Van (1998) - which implies that parents make their children work when driven by poverty (non-work is, therefore, a luxury good).³ The two main assumptions are that parents are altruistic towards children and that from the employers' point of view, adults and children are substitutes. These two assumptions imply that if any individual household withdraws its children from work, the household will face acute poverty. Thus the model predicts that a household only sends children to work if the household's income is very low because adult wages are low.

While this is considered the reference point in the theoretical literature, there is no consensus in the empirical literature on the relationship between poverty and child labour. Among the few studies supporting the 'luxury axiom' there is Ray (2000). It shows that for Pakistan (but not for Peru) there is a strong positive association between child labour hours and poverty. On the contrary Bhatti (1998), Ahmed (1999) and Lieten (2000), among others, argue that poverty has only a limited role in explaining child labour. Other studies show that child labor, on the contrary, clearly responds to opportunities provided by the market (Barros et al. (1994); (Levison, 1999 and Duryea and Arends-Kuennings (2003)). These latter models do not indicate that poverty is not a cause of child labor but 'simply that child labor, like all other inputs, responds also to incentives and opportunities'. It is clear then that child labor is responsive not only to income but to opportunities to work and the opportunity cost of not working.

³Although primarily a function of poverty, child labor is also determined by other socio-economic factors. Factors such as access to school, intergenerational expectations, opportunities for work, and employment opportunities have been shown to be important components of the child labor puzzle.

A much less studied aspect is the relationship between adult labour and child labour. Among the few exceptions there is Ray (2000). He shows that the responsiveness of hours of child labor to changes in adult wages differ in the Peruvian and Pakistani case. Moreover the interaction between men's and children's labor markets is different from the interaction between women's and children's labor markets⁴. In general, the evidence is inconclusive also because most of previous studies have used aggregate data.

There is also some evidence that inequality (rather than poverty) is positively correlated with child labour (Ray 2001).⁵

Our main reference is Wahba (2006). This is the first paper that studies, using individual data, the sensitivity of household supply of child labour to adult market wages.⁶ The paper thus provide empirical evidence on the influence of adult market wages on the household decision to supply child labour while controlling for household specific characteristics. He finds that the higher the adult male and female provincial wages relative to the national average, the lower is the probability of child labour. This negative relationship exists for both boys and girls for both paid and unpaid works⁷. He also finds that higher income inequality within a province/region also increases the likelihood of child labour.

Papers on child labour in Palestine To the best of our knowledge Al Kafri (2003) is the only paper which has analysed child labour in Palestine. His results show an increase in the probability for male to go to work and for female to leave school following the beginning of the Second Intifada. The analysis focuses on supply factors at the household level and it also considers the impact of Israeli measures on the Palestinian Territories. The estimation method is a sequential-response model (SRM) using three binary probit models. The series of binary decisions are: 1) go to school and not to work; 2) go to school and to work; 3) go to school and economically active; 4) not to go to school and not economically active. The analysis show that there are major differences between male and female: there is an increase in the probability of joining labor market by male children and of leaving school for girls. Parents' characteristics have a strong effect on children decision. The educational level for the father or mother of the household has a positive effect on all cases.

⁴In Peru increasing adult wages reduce boys' and girls' labor hours, suggesting that child and adult labor hours are substitutes in that country. In Pakistan rising women's wages sharply increase the labor hours of girls but have a negligible impact on the labor hours of boys.

⁵Note that the transmission mechanism from household poverty to child labour is essentially a 'supply side'. In contrast, cluster level poverty (inequality) would control for poverty related variables from the 'demand side' since, as suggested by Addison et.al. (1997) and Lieten (2000) households living in poor clusters have only limited opportunities for employment.

⁶Other contributions analysing the substitutability between adult and child labour but using aggregate data include Diamond and Fayed (1997), Amin, Quayes and Rives (2006).

⁷A 10% increase in the illiterate male market wage decreases the probability of child labour by 22% for boys and 13% for girls.

3 Data description

We use data from the Palestinian Labour Force Survey for the period 1999-2006.⁸ In addition we also use individual data on children age 10-17 supplied as separate information by the Palestinian Central Bureau of Statistics (PCBS).

The analysis is based on children between 10 and 17 years old for whom information on schooling, labour participation and a number of parent's characteristics are available. We consider only male since observation for female working children are very few. A child is considered working if she worked and was remunerated for at least one hour during the reference week of the survey, or was working as an unpaid family member.

Tables 1 and 2 present descriptive statistics of the sample of children in our dataset by region, West Bank (WB) and Gaza Strip (GS). We present separated data for the two regions because they are separated and thus, even if formally under the same Authority *de facto* they are two separated entities. The first column presents the characteristics of the all sample. The second and third columns present the distribution of child, parental and household characteristics for school participants and non-school participants respectively. The fourth column presents the same for child labour, with break down into paid work and unpaid work in the following two columns. The last column is for the children group involved in neither work nor school. Our sample consists of 139,897 observations on 10-17 years old children. The first column shows that 60.31% of our sample is from WB and 39.69% from GS. Around 66% is children below 15 years and around 33% above 14 years in both the samples. Distribution of characteristics is quite similar in two samples except for the following. Father's unemployment is much higher in GS (34.81%) than in WB (23.15%). The percentage of children whose father is self employed is much higher in WB (36.15%) than in GS (22.98%). Mother's education is higher in GS than in WB. However, mother is more likely to be employed in WB than in GS, percentage of employment being quite low in both regions. Column two shows that more than 90% children are attending school in both WB and GS. Schooling is higher among the age group 10-14 years than in 15-17 years. Father's education seems to be higher in GS than in WB among the school participants. It is interesting to note that father's education is much lower among non school participants than among school participants. Similar pattern is observed for father unemployed. Average number of unemployed adult is higher among the school non-participants than among the school participants. Child labour is higher (9.62%) in WB than in GS (3.10%). In WB, 4.6% is paid child labour and 5.02% is unpaid labour. The similar percentages are 1.69 and 1.41, respectively in GS. Paid child labours are mainly in the age group 15-17 years. It is surprising to note that the father's education is higher among unpaid child labour than among paid child labour. More than 70% of unpaid children have their father self employed. It is likely that they are involved in father economic activity. Similarly, more than 40% paid child labour have their father wage earner. School non-participants and paid child labour are the groups where female household head is higher than school participants and other groups. It is plausible that female head households are among the poor households and are more likely to have children work and not attend school.

Table 2 presents the distribution of four states that are observable for a child, namely both

⁸The PLFS have a rotating sample design as individuals are replaced. The same household remains in the sample over two consecutive rounds, rests for the next two rounds and is represented again in the sample for two additional consecutive rounds before it is dropped from the sample. Each survey round consists of approximately 7,600 households, which amounts to a sample of around 22,000 individuals aged 15 years and above living in the Palestinian territories.

Column	1		2		3		4		5		6		7	
	Total Sample		School Participants		Non-school Participants		Labour Force Participants		Paid workers		Unpaid workers		Non-LF Participants	
	WB	GS	WB	GS	WB	GS	WB	GS	WB	GS	WB	GS	WB	GS
All (%)	60.31	39.69	90.44	92.42	9.56	7.58	9.62	3.10	4.60	1.69	5.02	1.41	90.38	96.90
Age (%)														
10-14 years	66.38	66.75	71.41	70.20	18.85	24.67	27.41	17.19	13.25	9.91	40.39	25.89	70.53	68.34
15-17 years	33.62	33.25	28.59	29.80	81.15	75.33	72.59	82.81	86.75	90.09	59.61	74.11	29.47	31.66
Years of schooling (%)														
Less than 5 years	15.88	16.99	16.17	16.09	13.16	28.04	4.63	10.51	3.53	12.05	5.64	8.67	17.08	17.20
5 to 8 years	57.41	56.05	58.00	56.42	51.77	51.47	51.51	55.81	49.60	56.61	53.26	54.85	58.03	56.05
More than 8 years	26.71	26.96	25.83	27.49	35.07	20.48	43.86	33.68	46.87	31.34	41.10	36.48	24.89	26.75
Father's characteristics (%)														
<i>Education</i>														
No education	10.30	9.81	9.52	9.17	17.67	17.68	13.88	13.70	17.22	15.35	11.31	11.73	10.11	9.74
1 to 4 years	7.89	4.08	7.20	3.74	14.36	8.13	12.12	7.61	13.23	7.68	10.60	7.53	7.24	3.91
5 to 8 years	32.04	28.26	31.06	27.42	41.37	38.43	37.38	37.69	40.73	40.72	34.32	34.06	31.47	27.95
9 to 12 years	32.83	38.55	34.01	39.14	21.63	31.37	26.28	35.48	22.22	31.88	30.00	39.80	33.52	38.65
More than 12 years	16.95	19.31	18.21	20.53	4.97	4.40	10.34	5.52	6.60	4.37	13.77	6.89	17.65	19.75
<i>Employment Status</i>														
Unemployed	23.15	34.81	22.21	33.97	32.02	45.06	17.85	27.47	28.49	41.04	8.10	11.22	23.71	35.04
Self employed	36.15	22.98	36.16	22.97	36.07	23.10	52.30	45.88	29.78	16.52	72.93	80.99	34.43	22.25
Wage earner	40.70	42.21	41.63	43.07	31.91	31.84	29.85	26.66	41.74	42.43	18.97	7.78	41.86	42.71
Mother's characteristics (%)														
<i>Education</i>														
No education	16.22	12.80	14.96	11.92	28.13	23.50	24.06	19.80	25.91	18.23	22.37	21.68	15.39	12.57
1 to 4 years	9.94	4.01	9.30	3.68	16.02	8.01	14.06	6.74	16.22	8.21	12.09	4.97	9.50	3.92
5 to 8 years	33.41	25.31	33.08	24.61	36.52	33.91	36.19	34.67	36.94	36.78	35.50	32.14	33.11	25.02
9 to 12 years	32.82	49.64	34.38	51.03	18.02	32.72	22.86	37.51	19.36	36.03	26.07	39.29	33.88	50.03
More than 12 years	7.61	8.23	8.28	8.75	1.31	1.85	2.82	1.28	1.57	0.75	3.97	1.91	8.12	8.45
<i>Employment Status</i>														
Unemployed	91.65	95.67	91.37	95.55	94.31	97.17	92.09	97.21	92.96	97.44	91.28	96.94	91.61	95.62
Employed	8.35	4.33	8.63	4.45	5.69	2.83	7.91	2.79	7.04	2.56	8.72	3.06	8.39	4.38

Table 1: Descriptive statistics

Column	1		2		3		4		5		6		7	
	Total Sample		School Participants		Non-school Participants		Labour Force Participants		Paid workers		Unpaid workers		Non-LF Participants	
	WB	GS	WB	GS	WB	GS	WB	GS	WB	GS	WB	GS	WB	GS
Household's characteristics														
Male head (%)	95.90	95.39	96.08	95.56	94.25	93.35	95.12	94.77	92.68	92.96	97.35	96.94	95.99	95.41
Female head (%)	4.10	4.61	3.92	4.44	5.75	6.65	4.88	5.23	7.32	7.04	2.65	3.06	4.01	4.59
Number of children: 10-14 years	2.01	2.25	2.03	2.26	1.77	2.06	1.88	2.07	1.76	2.03	1.99	2.12	2.02	2.25
Number of children: 15-17 years	1.08	1.18	1.03	1.15	1.50	1.53	1.44	1.61	1.55	1.66	1.33	1.54	1.04	1.16
Number of unemployed adults	1.92	2.31	1.89	2.29	2.16	2.58	1.91	2.27	1.81	2.25	2.01	2.29	1.92	1.47
Size	6.39	6.80	6.34	6.75	6.94	7.31	6.80	7.30	6.82	7.34	6.79	7.25	6.35	6.78
District (%)														
<i>West Bank</i>														
Jenin	9.29		9.37		8.52		9.86		8.12		11.45		9.23	
Tubas	3.90		3.99		2.98		4.52		4.36		4.68		3.83	
Tulkarm	5.92		5.95		5.68		5.90		5.05		6.68		5.92	
Nablus	10.19		10.12		10.79		15.62		15.85		15.40		9.61	
Qalqilya	5.11		5.21		4.24		5.78		3.71		7.68		5.04	
Salfit	4.58		4.62		4.17		4.72		3.38		5.95		4.57	
Ramallah	12.09		12.14		11.66		8.92		12.14		5.98		12.43	
Jericho	3.55		3.36		5.33		4.56		4.31		4.79		3.44	
Jerusalem	12.09		12.00		12.92		5.51		7.48		3.71		12.79	
Bethlehem	9.50		9.55		9.02		6.10		8.09		4.27		9.86	
Hebron	23.79		23.69		24.70		28.50		27.51		29.40		23.29	
<i>Gaza Strip</i>														
North Gaza		19.18		18.92		22.36		18.87		20.15		17.35		19.19
Gaza		22.89		22.20		31.23		39.20		45.84		31.25		22.37
Deer Al-Balah		18.84		19.17		14.83		13.36		13.11		13.65		19.01
Khan Younis		21.84		22.18		17.68		16.38		12.58		20.92		22.02
Rafah		17.25		17.53		13.90		12.20		8.32		16.84		17.41
Sample size (N)	84376	55521	76312	51313	8064	4208	8113	1722	3879	938	4234	784	76263	53799
% of total sample	100		91,23		8,77		7,03		3,44		3,59		92,97	

Table 2: Descriptive statistics (continued)

	Working and studying		Working only		Studying only		Neither	
	WB	GS	WB	GS	WB	GS	WB	GS
Total sample	4,42	0,78	5,19	2,32	86,02	91,64	4,36	5,26
Age (%)								
10-14 years	3,12	0,43	0,85	0,37	94,17	96,77	1,86	2,43
15-17 years	6,99	1,48	13,77	6,24	69,94	81,34	9,3	10,93
Year (%)								
1999	7,51	0,79	9,85	4,59	78,18	87,96	4,47	6,66
2000	6,19	1,57	8,63	4,45	80,87	87,62	4,32	6,36
2001	1,58	0,5	5,49	2,65	87,68	89,45	5,24	7,41
2002	0,84	0,09	3,35	1,77	90,36	92,11	5,45	6,04
2003	3,4	0,93	4,2	2,17	88,43	92,98	3,97	3,93
2004	2,72	0,64	3,71	1,65	89,13	93,61	4,44	4,1
2005	4,89	0,76	3,96	1,49	87,54	93,79	3,62	3,96
2006	8,77	0,94	4,41	1,23	83,05	93,17	3,77	4,66

Table 3: Labour and school participation rates by region and age group.

work and school, only work, only school and neither. The first row shows that 4.52% children are engaged in both work and school in West Bank. A considerable 5.19% is involved in only working and another 4.36% in neither of work and school. In Gaza Strip, the percentage of doing both work and school is less than 1% and the percentage only working is much lower than in West bank. However, a striking 5.26% is involved in neither work nor school in Gaza Strip. Similar pattern is observed for two age groups, 10-14 years and 15-17 years. A notable difference between these two age groups is that percentage of both work and school, only work, and doing neither is much higher for the 15-17 years group than the 10-14 years group. On the contrary, percentage of only school is much higher among the younger group.

The last block of numbers in table 2 shows the yearly pattern of these four states of children. Looking at the only school column we note that schooling has increased over the period 1999-2006, more in GS than in WB. The state working and studying has followed a U-shaped path over the years in WB. In GS it has remained quite stable except for the big increase in 2000 and big decrease in 2002. Only work has steadily decreased over time in both the regions. Adding the values of both work and study with work we get the yearly percentage of child labour. In WB, child labour decreases from 17.36% in 1999 to 4.19% in 2002, then increases to 13.18% in 2006. In GS, it changes from 5.38% in 1999 to 2.18% in 2006, lowest being 1.86% in 2002. Similarly adding the both work and school to school gives the percentage of children attending school. It has gradually increased over time, from 85.69% in 1999 to 91.82% in 2006 in WB and from 88.75% in 1999 to 94.11% in 2006.

4 Econometric model

This section briefly describes the econometric model used to study the effect of market wage and household characteristics on the household decision to supply child labour. The estimation method

used in this paper reflects two decision making process: child labour and schooling. Conceptually four options are available to a child: only school, only work, both, and neither of them. Often children's work and schooling are treated as two independent decisions or as a sequential process (Al Kafri 2003). We deviate from these methods on the following grounds. First, a sequential choice model requires strong assumptions concerning the hierarchy of the options. However, different welfare perspectives can give rise to different orderings of the options. Second, using a multinomial choice model requires that options considered are simultaneous and independent - infamous assumption of independence of irrelevant alternatives (IIA). Often multinomial logit model is used since its theoretical alternative, multinomial probit, requires higher order integrals. However, IIA assumption in either case implies that child labour and schooling decisions are independent which is unlikely to be the case. A conditional logit model overcomes the IIA problem, but requires choice specific variables which are often not available in general surveys.

Assuming that the decisions (work and school) are interdependent, we use a bivariate probit model. This model allows for the correction of random components in order to capture the interdependence of the decisions. Let y_1^* and y_2^* denote two latent variables underlying the working and schooling decisions, respectively. We can represent the decision making process as follows:

$$\begin{aligned} y_1^* &= \beta_1 x_1 + u_1 \\ y_2^* &= \beta_2 x_2 + u_2 \end{aligned} \tag{1}$$

where $[u_1, u_2] \sim BN(0, 0, 1, 1, \rho)$. *BN* stands for bivariate normal distribution. The correlation coefficient captures the interdependence between the choice processes. The zero mean assumption is standard as long as a constant term is incorporated in x . Since the model is identified up to scale, normalization is achieved by setting variance equal to one.

Suppose y_1 and y_2 are the observed dummy variables for working and schooling decisions.

$$\left\{ \begin{array}{l} y_1 = 1 \quad \text{if } y_1^* > 0 \\ \quad = 0 \quad \text{otherwise} \\ y_2 = 1 \quad \text{if } y_2^* > 0 \\ \quad = 0 \quad \text{otherwise} \end{array} \right.$$

The choice probabilities are

$$\begin{aligned} p_{11} &= Pr[y_1 = 1, y_2 = 1] = \Phi(\beta_1 x_x, \beta_2 x_2, \rho) \\ p_{10} &= Pr[y_1 = 1, y_2 = 0] = \Phi(\beta_1 x_x, -\beta_2 x_2, \rho) \\ p_{01} &= Pr[y_1 = 0, y_2 = 1] = \Phi(-\beta_1 x_x, \beta_2 x_2, \rho) \\ p_{00} &= Pr[y_1 = 0, y_2 = 0] = \Phi(-\beta_1 x_x, -\beta_2 x_2, \rho) \end{aligned} \tag{2}$$

where $\Phi(\cdot)$ is the standardized bivariate normal distribution function. The model is estimated maximizing the likelihood function that incorporates these probabilities.

5 Empirical results

Table 4 presents the estimation results from bivariate probit model. The variable definition list and data on closure are reported in Table 6 and 7 in the Appendix. Estimation is done separately for three samples: full sample (both WB and GS), WB and GS. For each sample the first two columns

give the estimates and t-statistics, respectively, for child labour decision, and last columns give the same for schooling decision. The error correlation between the decision process of child labour and schooling is of the order around -0.75. The negative sign of this parameter indicates that the unobservable factors affect the child labour and schooling decisions in opposite direction. In other words, as far as the unobservable factors are concerned there is a trade off between child labour and schooling. The high value of the parameter indicates that child labour and schooling decisions are highly interdependent rather than being independent.

It appears from the table that age has a positive and significant effect on work decision and a negative and significant effect on schooling decision. Father's education reduced the probability of child labour and increases the probability of attending school. Father's employment increases a child's probability of being child labour in WB. The effect is higher when father is self employed than wage earner. For GS, father's being wage earner does not affect the probability of child labour. However, father's being self employed increases the child labour probability. Father employment status does not have any effect on child's chance of attending school, except for in WB where it increases the chance of attending school. We find that mother education is negatively associated with child labour and positively associated in schooling. This is consistent with much of the literature on child labour that focuses on mother's education and employment (Desai and Jain 1994). Mother's being employed increases the chance of child labour in WB. This is consistent with Francavilla and Giannelli (2007) who found that mother's labour market participation is associated with child labour in India. Mother's employment status does not seem to have any effect on schooling decision.

Female household head increases the chance of schooling in both WB and GS. However, it also reduces the chance of child labour in GS. This consistent with the literature on child welfare that argues that female control of household resources improves children outcomes. Higher the number of children in higher is the chance of child labour in WB. It seems opposite in GS, though the coefficient for number of child in the age group 15-17 years in not significant. However, the effect on number of children on schooling outcome is unequivocally negative in both WB and GS.

Number of unemployed adult in a household has a negative effect on child labour; it does not affect schooling out come in any sample. Household size seems to have opposite effects on child labour in WB and GS. It reduces the chance of child labour in WB and increases the chance in GS. Size is also associated with higher schooling, though the effect is confined only in WB.

Out estimation included district level dummies. The estimated coefficients show that chance of child labour is higher in most of the districts in WB, as compared to Ramallah; and it is lower in most of the districts in GS, as compared to Gaza. Conversely, chance of schooling is lower in districts in WB and higher in districts in GS comparing to the respective omitted districts.

Our list of explanatory variables includes the number of days the boarder with Israel remain closed due to conflict in each quarter in the period covered in our data. It appears that closure affect the child outcome negatively in WB. The effect is not significant for GS, however sign of the coefficient is same as in WB. It is important to note that in spite of aggregate nature of this variable, we find indication of negative effect of conflict on child outcome. The actual effect could be much higher than that reflected by this aggregate measure.

The year dummies in our estimation model reflect the evolution of child labour and schooling during the period. Child labour has decreased and schooling increased over the period. A careful reading of the coefficient shows that the decrease in the chance of being child labour has decreased in recent years in WB.

In order to investigate the effect of male adult wage on child labour we estimate the model adding few interaction terms. Results are reported in Table 5. It appears that adult wage alone does not exert a significant effect on child labour and schooling. It is important to note that this variable is also constructed at aggregate level (district). Hence its sign even not significant can be taken at least as an indication of what one might expect if a more disaggregated measure were available. If anything, the sign of adult wage indicate that it is negatively associated with child labour and positively with schooling. Interaction of this variable with a dummy variable representing age greater than 14 years reveals two significant effects in two regions. First, when wage increases children above 14 years old are more likely to be child labour in WB. Second, an increase in wage reduces the chance of schooling of children above 14 years in GS. Other effects of this interaction (on schooling in WB and child labour in GS), though not significant, should not be less important given the aggregate nature of the wage variable.

Turning to the interaction variable between 'father self employed' and 'child's age greater than 14 years' we find that it reduces the chance of schooling. It should be noted that this effect is evident only in GS. The effect of the interaction variable between 'father wage earner' and 'child's age greater than 14 years' is not significant in disaggregate samples. However, at the margin it reflect negative association with schooling as for the interaction variable between 'father self employed' and 'child's age greater than 14 years'. However, though insignificant the former indicated an opposite effect on child labour relative to that of latter.

To sum up our results, we find the effect of parental and household characteristics which are similar to that found in literature. However, the interaction of adult wage with child's age deserves further comments. The positive effect of wage on child labour of children over 14 years old can be interpreted as substitution effect. Recognizing that the reference wage is male private sector wage and the private sector in Palestine comprises of more than 80% business establishment with less than 5 employees suggests that an increase in wage induces private sector employees to substitute adult employees with cheaper children workers who are close to labour market entrance (age more than 14 years). This interpretation is consistent with the macro phenomenon of Palestine in the period 1999-2006. During this period the political conflict with Israel has led to severe boarder control leading to higher adult unemployment in Palestine. This additional increase in adult unemployment puts a downward pressure in local wage, leading to lower child employment. It is also consistent with the interpretation that higher local unemployment partially crowded out child labour during this period. This decrease in child labour partially explains the increase in schooling during this period. However, the increase in schooling is much lower than the decrease in child labour in this period. Our speculation is that the displaced child labours who are already above 14 years are less likely to restart schooling.

6 Concluding remarks and further research

In this paper we analysed the dynamics of Palestinian child labour during the period 1999-2006. We have studied its main determinants focusing on the evolution of the adult labour market and on the effects of the Israeli closure policy on Palestinian child labour.

	Palestine Territory			West Bank			Gaza Strip		
	Child Labour	School	t-stat	Child Labour	School	t-stat	Child Labour	School	t-stat
age	0.265	-0.289	40.99	0.269	-0.314	34.03	0.276	-0.251	32.41
adult wage	0.112	-0.002	0.8	0.134	-0.015	0.86	-0.125	-0.034	-0.6
father education	-0.025	0.051	-13.02	-0.023	0.049	-10.16	-0.033	0.054	-8.79
father self-employed	0.557	-0.030	25.16	0.555	-0.022	21.19	0.554	-0.035	12.96
father wage earner	0.105	0.029	4.42	0.135	0.041	4.79	-0.048	0.026	-1.19
mother education	-0.032	0.034	-15.48	-0.034	0.035	-14.28	-0.025	0.034	-6.46
mother employed	0.105	-0.020	3.68	0.123	0.001	4.09	-0.091	-0.033	-0.87
female household head	-0.021	0.340	-0.57	0.017	0.351	0.41	-0.150	0.340	-2.11
no.children 10-14	0.068	-0.068	6.73	0.094	-0.084	8.28	-0.032	-0.032	-1.64
no.children 15-17	0.040	-0.057	3.06	0.056	-0.064	3.78	-0.025	-0.035	-0.9
no.unemployed adults	-0.057	-0.005	-5.68	-0.042	0.000	-3.72	-0.141	0.002	-7.09
household size	-0.011	0.027	-1.43	-0.031	0.039	-3.72	0.072	-0.002	4.11
Jenin	0.243	-0.029	2.96	0.236	-0.026	2.87			
Tubas	0.242	0.169	3.36	0.243	0.170	3.35			
Tulkarm	0.276	-0.117	3.56	0.274	-0.113	3.52			
Nablus	0.558	-0.169	7.77	0.559	-0.169	7.64			
Qalqilya	0.278	0.045	3.2	0.275	0.045	3.12			
Salft	0.188	-0.029	2.12	0.173	-0.021	1.97			
Jericho	0.312	-0.245	4.04	0.320	-0.260	4.06			
Jerusalem	-0.258	-0.098	-3.44	-0.264	-0.100	-3.43			
Bethlehem	-0.199	0.072	-2.05	-0.200	0.070	-2.05			
Hebron	0.269	-0.030	3.75	0.263	-0.030	3.93			
NorthGaza	-0.382	-0.042	-5.66				-0.282	0.138	-5.11
Gaza	-0.044	-0.182	-0.66						
DeerAlBa h	-0.452	0.101	-5.66				-0.404	0.277	-6.17
Khan Younis	-0.459	0.147	-6.11				-0.422	0.325	-7.45
Rafah	-0.535	0.175	-7.46				-0.509	0.348	-9.45
closure days	0.002	-0.001	2.04	0.002	-0.001	2.17	0.000	-0.001	0.26
year2000	-0.101	0.058	-1.5	-0.158	0.077	-1.91	0.087	0.018	1.29
year2001	-0.578	0.165	-7.42	-0.695	0.217	-7.32	-0.225	0.073	-3.47
year2002	-0.799	0.273	-11.18	-0.890	0.300	-9.99	-0.528	0.228	-8.92
year2003	-0.506	0.339	-7.04	-0.568	0.312	-6.21	-0.273	0.365	-4.43
year2004	-0.643	0.358	-9.07	-0.704	0.330	-8.03	-0.390	0.392	-5.11
year2005	-0.490	0.381	-6.54	-0.505	0.349	-5.53	-0.411	0.432	-4.74
year2006	-0.259	0.312	-3.01	-0.232	0.269	-2.25	-0.391	0.396	-5.62
constant	-4.757	4.661	-42.67	-4.760	5.001	-35.88	-5.102	3.991	-35.53
Log-likelihood	-53670.69			-37303.00			-16103.69		
Error correlation	-0.746			-0.733			-0.786		
Number of obs.	139897			84376			55521		

Table 4: Bivariate probit estimation results

	Palestine Territory						West Bank						Gaza Strip					
	Child Labour			School			Child Labour			School			Child Labour			School		
	Coeff.	t-stat		Coeff.	t-stat		Coeff.	t-stat		Coeff.	t-stat		Coeff.	t-stat		Coeff.	t-stat	
age	0.269	38.25		-0.280	-57.14		0.273	31.44		-0.310	-47.66		0.278	25.64		-0.243	-38.32	
adult wage	-0.142	-0.76		0.038	0.46		-0.105	-0.52		0.039	0.41		-0.341	-1.03		0.203	1.26	
<i>interaction</i> (adult wage and age>14years)	0.416	3.19		-0.086	-1.05		0.401	2.84		-0.110	-1.31		0.337	1.17		-0.393	-2.15	
father education	-0.025	-13.06		0.051	28.95		-0.023	-10.23		0.049	20.06		-0.033	-8.78		0.054	22.53	
father self-employment	0.559	21.5		0.018	0.75		0.563	18.84		-0.004	-0.14		0.564	10.13		0.023	0.6	
<i>interaction</i> (father self employment and age>14years)	0.000	0.01		-0.076	-2.96		-0.013	-0.45		-0.026	-0.81		-0.003	-0.06		-0.096	-2.34	
father wage earners	0.088	2.75		0.070	2.92		0.108	2.91		0.072	2.35		-0.048	-0.74		0.062	1.67	
<i>interaction</i> (father wage earners and age>14years)	0.033	1.15		-0.066	-2.86		0.049	1.5		-0.052	-1.72		0.009	0.14		-0.059	-1.61	
mother education	-0.032	-15.49		0.034	20.63		-0.034	-14.26		0.035	16.22		-0.025	-6.46		0.034	12.77	
mother wage earners	0.105	3.69		-0.021	-0.73		0.124	4.13		0.000	0.01		-0.091	-0.87		-0.033	-0.6	
female household head	-0.019	-0.51		0.337	12.1		0.019	0.44		0.350	9.73		-0.147	-2.07		0.337	7.62	
no.children 10-14	0.068	6.64		-0.069	-8.36		0.094	8.17		-0.085	-8.34		-0.032	-1.64		-0.033	-2.29	
no.children 15-17	0.041	3.15		-0.053	-5.12		0.057	3.87		-0.062	-4.59		-0.025	-0.9		-0.030	-1.83	
no.unemployed adults	-0.057	-5.65		-0.005	-0.64		-0.041	-3.65		0.000	0.00		-0.141	-7.1		0.003	0.19	
household size	-0.012	-1.48		0.028	4.4		-0.032	-3.81		0.039	5.12		0.072	4.11		-0.003	-0.24	
Jenin	0.244	2.98		-0.030	-0.96		0.238	2.89		-0.027	-0.86							
Tubas	0.242	3.36		0.170	3.12		0.244	3.36		0.170	3.19							
Tulkarm	0.277	3.56		-0.118	-2.98		0.275	3.53		-0.113	-2.91							
Nablus	0.553	7.69		-0.167	-4.14		0.555	7.59		-0.169	-4.06							
Qalqilya	0.281	3.23		0.044	0.89		0.279	3.15		0.043	0.82							
Salfit	0.191	2.13		-0.029	-0.55		0.176	1.98		-0.022	-0.4							
Jericho	0.307	3.95		-0.245	-5.49		0.316	3.98		-0.259	-5.77							
Jerusalem	-0.271	-3.57		-0.095	-2.24		-0.278	-3.57		-0.097	-2.11							
Bethlehem	-0.199	-2.04		0.072	1.68		-0.200	-2.04		0.070	1.54							
Hebron	0.270	3.76		-0.031	-0.87		0.265	3.94		-0.031	-0.89							
NorthGaza	-0.388	-5.72		-0.040	-0.95								-0.281	-5.09		0.136	4.21	
Gaza	-0.045	-0.67		-0.181	-5.15													
DeerAIBa h	-0.454	-5.65		0.102	2.41								-0.403	-6.17		0.277	8.95	
KhanYounis	-0.459	-6.08		0.146	3.53								-0.422	-7.44		0.324	11.16	
Rafah	-0.532	-7.42		0.174	4.08								-0.507	-9.45		0.345	10.94	
closure days	0.002	2.05		-0.001	-2.45		0.002	2.18		-0.001	-2.12		0.000	0.27		-0.001	-1.42	
year2000	-0.100	-1.49		0.058	1.97		-0.158	-1.9		0.077	2.24		0.088	1.29		0.017	0.34	
year2001	-0.580	-7.43		0.165	4.47		-0.698	-7.33		0.218	4.96		-0.224	-3.46		0.072	1.28	
year2002	-0.801	-11.2		0.274	8.05		-0.893	-10.01		0.301	6.6		-0.528	-8.91		0.228	4.5	
year2003	-0.509	-7.06		0.340	10.33		-0.572	-6.23		0.314	8.28		-0.272	-4.42		0.364	5.99	
year2004	-0.645	-9.07		0.359	10.88		-0.708	-8.05		0.331	8.6		-0.389	-5.11		0.391	6.82	
year2005	-0.492	-6.57		0.382	11.27		-0.509	-5.56		0.350	8.81		-0.410	-4.73		0.431	7.28	
year2006	-0.261	-3.02		0.312	8.05		-0.234	-2.27		0.270	6.04		-0.389	-5.6		0.395	6.12	
constant	-4.809	-39.41		4.530	54.47		-4.816	-33.21		4.933	45.09		-5.139	-28.67		3.873	35.38	
Log-likelihood	-53655.46						-37291.05						-16100.92					
Error correlation	-.747						-.733						-.786					
Number of obs.	139897						84376						55521					

Table 5: Bivariate probit estimations results - with interaction variables

We found a number of results. Some of them are in line with the literature; others are not. Among the latter, one that seems most interesting is the interaction of adult wage with child's age. The positive effect of wage on child labour of children over 14 years old can be interpreted as *substitution effect*. At the same time, the intensity of the conflict (proxied by the closure days) seems to be increase child labour and decrease school attendance showing how the conflict has a possible long-run impact on the Palestinian economy through its effects on education choices.

The results clearly indicate that the employment dynamics in the Palestinian labour market - which itself is strongly influenced by the conflict - is interlinked to the child labour. Further investigation is warranted in this direction.

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7 Appendix

Table 6: Closure days: Data collected from UNSCO, B'Tselem and UN-Humanitarian Monitor

Variable	Definition
Child labour	= 1 if a child worked and was remunerated for at least one hour during the reference week of the survey, or was working as unpaid family member; 0 otherwise.
School age	= 1 if a child is attending school; 0 otherwise.
adult wage	age of the child.
	log of the ratio of the district level average of male daily wage in private sector to the regional level average of male daily wage in the same sector. Wage of male between 18-64 years are considered
<i>Father's characteristics</i>	
Education	Father's years of education.
Self employed	= 1 if father is self employed; 0 otherwise.
Wage earner	= 1 if father is wage earner; 0 otherwise.
<i>Mother's characteristics</i>	
Education	Mother's years of education.
Employed	= 1 if mother is employed; 0 otherwise.
<i>Household's characteristics</i>	
Female head	= 1 if head of the household is female; 0 otherwise.
Number of children: 10-14 years	Number of children in the age group 10 - 14 years.
Number of children: 15-17 years	Number of children in the age group 15 - 17 years.
Number of unemployed adults	Number of unemployed adults (18 - 64 years) in the household.
Household Size	Number of household members: age 10 years and above.
Closure Days	Days of closure: number of days in which mobility between Israel and Palestinian Territories is prohibited

Table 7: Closure days: Data collected from UNSCO, B'Tselem and UN-Humanitarian Monitor

years/quarters	Q1	Q2	Q3	Q4	total
1999	3	4	0	0	7
2000	0	0	0	47	47
2001	50	25	64	20	159
2002	0	51	5	0	56
2003	12	49	19	18	98
2004	17	45	21	65	148
2005	8	17	45	62	132
2006	35	37	44	51	167