Human Capital in Palestine: Causes and Consequences

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CHAPTER 1

Introduction

1.1. Motivation, Aim, and Contribution

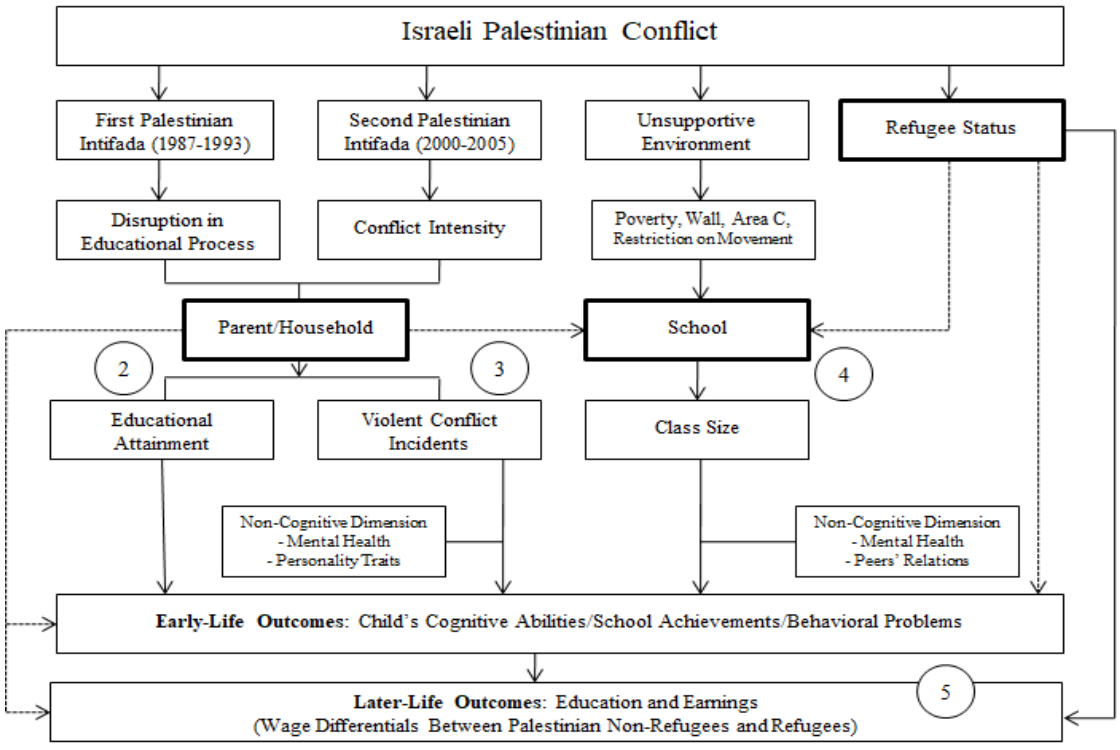
Investment in household and school education at an early stage shapes human capital and contributes to sustainable economic development. Heckman (2006) cited the great advantage of early intervention in the life cycle, since children's cognitive and non-cognitive abilities develop through interaction with their parents and the surrounding environment. Economists have pointed to the consequences of early childhood circumstances and later-life outcomes (Currie, 2001; Heckman, Pinto, & Savelyev, 2013; Jürges, 2013). Furthermore, they have highlighted the association between inequality in the distribution of both wealth and income and inequality in education, which has lasting effects beyond the generation that experiences it (Benabou, 1994; Black, Devereux, & Salvanes, 2005). School quality, particularly during the primary education stage, is viewed as one of the most important inputs into an education function. Hence, a broad array of studies has shown that the achievement of students can be raised and their behavioral problems mitigated if the quality of the school improves (Angrist & Lavy, 1999; Häkkinen, Kirjavainen, & Uusitalo, 2003; Lavy, 2010; Leung & Ferris, 2008). An under-resourced school environment coupled with exposure to violence can have a short-run "direct" impact as well as a long-run "indirect" effect on human capital, especially if these violent events are frequent and directly affect the household and educational process (Chamarbagwala & Morán, 2011; Rodriguez & Sanchez, 2012). This work contributes to this strand of literature by providing four chapters that employ individual-level data capturing several key traits to offer a better understanding of the causes and consequences of investment in human capital in Palestine.

Education is still one of the predominant topics of public policy debates even several decades after the birth of the human capital theory. Although several empirical studies around the world have shed light on the relationship between accumulated human capital and country growth, the country-specific effect with a variety of human capital variables constitutes the main problems that economists face in this regard (Van Leeuwen & Foldvari, 2008). At the national level, in this thesis I measure several aspects of human capital indicators, namely cognitive ability test scores, school achievements, years of education, income, and health. With regard to the country-specific issue, the focus is on the Palestinian territories, in particular contrasting the West Bank and the Gaza Strip; these two regions are geographically and administratively segmented, and each operates with respective labor market characteristics.

The Palestinian economy relies heavily on financial aid to support its national budget, with the educational sector representing a significant portion of its public expenditure (MoFP, 2016). The country is still under occupation, and the Government does not have full control over all aspects of life. Thus, in all the empirical works in this thesis, I try to control many contextual variable levels that may affect the results to overcome the omitted variable bias. Investment in human capital is an attractive proposition to Palestinians, since this investment is less likely to be affected by Israeli measures (Daoud, 2005). In addition, education reduces the wage gap among different groups in society classified according to gender, refugee status, and socio-economic rank; it may also enhance the chances of an applicant securing a job in the service sector, which constitutes the largest sector of the Palestinian economy (PCBS, 2016). The thesis focuses on two significant components of the Palestinian society that represent a sizeable portion of a country's human capital: children and refugees. Understanding the defining characteristics of these two groups is crucial to a better understanding of their impact on the economy.

This thesis aims to provide empirical evidence on the diverse determinants and consequences of human capital in Palestine at different life stages. The early-life measurements emphasize the role of household and schooling in the context of early childhood poverty, an unstable political environment, and under-resourced schools in children's cognitive development as well as their school achievements. The later-life outcomes relate to the role of education and other wage determinants in reducing the wage gap in the Palestinian society based on refugees' status. The conceptual framework in this thesis is illustrated in Figure (1.1). The solid arrows present the direct impact of different events on human capital determinants and outcomes (the 1948 and the 1967 Israeli–Palestinian Conflict, the First and the Second Palestinian Intifada, and an unsupportive environment). The boxes shown in bold are the human capital determinants used in this thesis (household, schools, and individual identification as a refugee). The dashed arrows reflect other direct (short-run) and indirect (long-run) influences of these circumstances on an individual's early-/later-life outcome. The circled numbers indicate the thesis chapters that discuss the causes and consequences of the aforementioned components. The first two studies discuss the role of family in the educational function. To be more specific, chapter two addresses the intergenerational education spillover form and chapter three employs conflict-related incidents to ex-

plore the long-term consequences of household exposure to political violence on children's school achievements. In chapter four, I investigate the impact of class size as a proxy for one of the school quality components of child cognitive abilities, bullying, and violent behavior. The current thesis also evaluates the effect of health outcomes on human capital. In particular, I use mental health and non-cognitive traits as likely channels through which the main covariates (conflict incidents and class size) may affect children's educational achievement and violent behavior. The findings of the three studies can be helpful in promoting cost-effective policies for high-risk children to alter the relationship between the unsupportive environment of "disadvantaged family and under-resourced schools" and the educational function. Finally, chapter five presents another long-term adverse consequence of the Palestinian–Israeli Conflict on human capital measured by the wage differential between Palestinian non-refugees and Palestinian refugees in the West Bank and the Gaza Strip. The results of this study emphasize the importance of education to reduce the wage gap between the two population groups as well as a way to reduce the Palestinian labor market's dependency on employment in Israel.



Source: Own illustration.

Figure1.1: Conceptual framework of the thesis

1.2. Overview

This thesis consists of four parts, one of which is a joint work with Professor Hendrik Jürges, Luca Stella, and Alexandra Schwarz at the University of Wuppertal. All the essays are written to be read both individually and collectively; therefore, some degree of overlap is unavoidable. The following section briefly introduces the topics of each chapter and summarizes the main findings.

1.2.1 First Palestinian Intifada and Intergenerational Transmission of Human Capital

This chapter attempts to estimate the intergenerational transmission of human capital in Palestine. The main question is whether formal parental education improves their offspring's cognitive skills and school achievements. I use the instrumental variable method in the estimations to overcome the potential endogeneity of parental education. The main source of variation in parental educational attainment is parents' exposure to the First Palestinian Intifada (1988–1993) during their middle and high school ages. During the First Palestinian Intifada, many school days were lost due to frequent school closures and other restrictions. Furthermore, many young people preferred to search for low-skill employment in Israel, since it provided them with better wages than the local labor market and hardly required any level of educational attainment. In contrast, the motivation for some women to complete their education to secure jobs increased differentially to compensate for the overall loss of household income during that turbulent time. This study employs two outcomes, namely the standardized cognitive test scores and school achievements during the academic year 2012/2013 for students between grade 5 and grade 9 in West Bank schools. The cognitive score results show the educational spillover between maternal education and offspring, while school achievement results provide significant evidence of paternal schooling and children's achievements. Focusing on female and male students' results separately, the IV coefficients precisely demonstrate a strong causal relationship between both parents' educational attainment and their daughters' educational attainment with quite similar positive magnitude effects.

1.2.2 Cohort at Risk: Long-Term Consequences of Conflict for Child School Achievement

(with Hendrik Jürges, Luca Stella, and Alexandra Schwarz)

This chapter investigates the long-term effect of household exposure to the Israeli–Palestinian Conflict during the Second Intifada (2000–2005) on children's primary school (grades 5 to 9) achievements in the West Bank. The identification strategy exploits the exogenous geographical variation in locality-level conflict intensity proxied by the number of fatalities during the Second Intifada. Exposure to the conflict is assessed using a direct self-reported measure of household experience with violence during the conflict period, such as house inspection and occupation by the Israeli Army. We employ the IV technique to overcome the omitted variable bias due to the potential correlation of household experiences of violence with various unobservable determinants of student achievement. For example, one of the potential endogeneity sources is that the richer and better-educated families, who have children who display better academic abilities, resided in areas less prone to Palestinian violence, which in turn reduced the chance of counter-violence by the Israeli army. While the model controls for observed background characteristics to address this concern, there may still be unobserved confounders. Another source of endogeneity is the presence of time-invariant unobservable factors at the locality level, which is correlated with both conflict intensity and child primary education performance. The main results suggest that an increase in family experience of conflict has a large negative long-term impact on the educational attainment of children. Exposure to conflict may also affect the development of the important skills in life. Thus, the study proposes that impaired non-cognitive, such as conduct, problems and a reduced level of conscientiousness are likely channels through which conflict may affect children's educational achievements. Although cognitive skills are an important determinant of school achievement, it appears that it was not affected by family exposure to conflict.

1.2.3 Class Size, Cognitive Abilities, Bullying, and Violent Behavior

The third chapter explores the importance of school resources as an indicator of the shaping of human capital. The debate about the class size effect on cognitive as well as non-cognitive skills is still vibrant. The empirical results of the impact of class size range from no effects to signifi-

cant and substantial ones. Small classes are still recommended by educationalists to improve students' achievements, despite the cost and the lack of any guarantees that class reduction will lead to improved students' achievements. However, large classes can influence other non-cognitive skills, such as conduct problems that hurt school performance and academic process as a whole. This study sheds light on the effects of class size on students' cognitive tests as well as bullying and violent behavior. I use the maximum class size rule to create a regression discontinuity (RD) relation between cohort enrollment size and class size in the public and UNRWA school system.[1] In addition, I provide evidence that there is no violation of the RD assumptions resulting from discontinuities in the relationship between enrollment and students' household background at cutoff points induced by a maximum class size rule. The main findings suggest that class size has no direct impact on students' cognitive skills except for those in grade 6. However, class size reduction improves the quality of life for children by mitigating bullying and violent behavior among pupils, which may negatively affect their achievements. Finally, I point to peer relations and mental health problems as a potential mechanism through which class size affects children's self-reported bullying–victim instances and violent behavior. The study argues that the long-run return on mitigating behavioral problems with respect to students' achievement offsets the incremental costs of decreasing the class size. The costs and benefits of a class size reduction policy should be weighed carefully, especially if the school resources are limited, the school suffers from ill-behaved pupils, or the pupils come from a disadvantaged background. Much of the gain from a class size reduction policy depends on students' and teachers' characteristics in the contextual setting.

1.2.4 Wage Differential between Palestinian Non-refugees and Palestinian Refugees in the West Bank and Gaza

As a result of the 1948 war, thousands of Palestinians fled their homes and became refugees. Unlike the refugees in other parts of the world, Palestinian refugees who were forced to relocate to

[1] The UNRWA is the United Nations Relief and Works Agency for Palestine Refugees in the Near East. UNRWA schools provide children of Palestinian refugees with basic education until grade 9.

Palestinian territories, like the West Bank and Gaza, led to consecutive generations of Palestinian refugees. Although they have the same nationality as their hosting communities, these Palestinian refugees are still suffering from different adverse life circumstances. This chapter measures the wage differential between Palestinian non-refugees and Palestinian refugees in the West Bank and Gaza Strip over the years 1999–2012. First, I present the main individual and occupational differences between the two groups in the two regions. Then, the wage differential is decomposed into two components: a "human capital effect, explained part" and a "coefficient effect, unexplained part." Second, I find that the wage gap has always existed and favored non-refugees in the West Bank; it has more of a substantial impact among low-skilled workers and those in the private sector. Furthermore, most of this gap is attributed to the unexplained part of the wage decomposition model. In Gaza, the wage gap favored refugee workers. Most of this wage gap among unskilled workers is attributed to the endowment/human capital effect, while, for skilled workers, most of the wage gap is due to the unexplained part, the "coefficient effect," after 2006.

CHAPTER 2

First Palestinian Intifada and Intergenerational Transmission of Human Capital

2.1 Introduction

Environmental factors have a significant role in determining students' school achievements and cognitive abilities at different learning stages. One of these factors is the child's socioeconomic status, which is profoundly affected by the parents' level of education. Well-educated parents can provide their children with a better learning environment, and many works of literature have documented the importance of the intergenerational return on human capital (Anger & Heineck, 2010; Bauer & Riphahn, 2013; Black et al., 2005; Chevalier, 2004). Ideally, better-educated parents may increase their skills or knowledge relevant to the well-being and capabilities of a child. Researchers have suggested that parenting interventions may be more effective than health interventions in improving cognitive outcomes (Grantham-McGregor, Walker, Chang, & Powell, 1997).

With regard to policy implications, it is important to know the long-run impact of investing in human capital. Economists have recognized the accumulation of human capital as a key determinant of economic growth (Van Leeuwen & Foldvari, 2008). The importance of school education lies in the fact that the children of today will become the adult citizens of tomorrow. The economic growth and future of society are highly dependent on the quality of the present education. Moreover, governments spend a significant portion of their budget on education[2]; understanding the benefits of this spending can reduce the degree of inequality in the opportunity for education. Attention to such inequality will grow if there is evidence of a causal relationship between the educational attainment of parents and that of their offspring. On the national level, in particular, for the newly established state of Palestine, education plays a crucial role in securing economic and social progress in addition to improving income.

Parents have an important influence on their children's outcomes. On average, better-educated parents have better-educated children (Ermisch & Pronzato, 2010). Parents transmit some abilities genetically or, on further examination, this may also partly reflect human capital spillovers from parent to child, since education may change the way in which parents interact with their children (Lee, Roys, & Seshadri, 2015). Undermining a causal interpretation of the

[2] For example, the education sector represents 18 percent of the Palestinian National Authority public expenditures (MoFP, 2016).

intergenerational correlation are aspects of the family environment that facilitate the acquisition of cognitive skills during childhood, which may also correlate with parents' education. A growing body of recent empirical studies has attempted to investigate the causal relationship between parents' and children's education. Economists have suggested three identification strategies to address the endogeneity problem caused by omitted variables: twin parents (Behrman & Rosenzweig, 2005); adopted children (Plug, 2004); and instrumental variables (Black et al., 2005; Chevalier, 2004; Oreopoulos, Page, & Stevens, 2006; Stella, 2013). In this study, I employ the instrumental variable approach by identifying parents' exposure to the First Palestinian Intifada (1988–1993) at the preparatory and high school ages[3] to create an exogenous variation in their educational attainment. The political conflict during that period affects the ability of parents to attend schools without directly affecting their children. Losing school days during a political conflict causes severe damage to human capital, since this loss can translate into significant losses in lifetime earnings. Those Palestinian adolescents who were affected by conflict during the First Intifada are now parents, and their children represent the larger part of the human capital of their country.[4]

This chapter contributes to two distinct strands of the literature. First, it contributes to the literature that discusses the intergenerational transmission of human capital in developing countries. Most of the literature addressing human capital spillovers has focused on developed countries, while the literature addressing developing countries has tended to focus on child outcomes, such as health, mortality, and well-being, rather than educational attainment. Second, it contributes to the body of literature discussing the long-term impact of the Israeli–Palestinian conflict on schooling and quality of education. To the best of my knowledge, this is the first study to take the First Intifada as an IV to create variation in parents' educational attainment. The article also considers how political instability may give rise to distinct impacts on the educational outcomes of males and females, respectively. Therefore, the chapter aims to discuss the varying

[3] Before the establishment of the Palestinian Ministry of Education in 1994, grades were classified into three categories: elementary, grades 1–6; preparatory, grades 7–9; and secondary, grades 10–12. UNRWA schools provide education until the end of the preparatory stage (grade 9) (MoEHE, 2016b; UNRWA, 2014).

[4] At the end of 2013, 39.9 percent of the Palestinian population was aged under 15 years (PCBS, 2014). Moreover, children in primary school accounted for 20 percent of the total human capital in the country (MoEHE, 2015).

roles played by mothers and fathers in the transmission of knowledge to their offspring.

The primary outcomes in this chapter are the test scores of survey data from approximately 4,000 students in grades 5 to 9 in West Bank schools. These data were collected by a cooperative research project funded by the German Research Foundation (DFG). The rich data set provides information on educational attainment for two family generations. The data allow me to control a large set of observed demographic and socioeconomic family background covariates that might affect child cognitive outcomes. I also control for the school fixed effect, which captures a range of unobserved differences across schools and covers other location-specific unobserved determinants of students' abilities. The comprehensive breadth of the data enables me to formulate relevant policy recommendations within the Palestinian context.

The main results suggest that 1 more year of maternal education correlates with a 1.14 percentage point increase in child cognitive test scores. Focusing on female and male students' results separately, the study demonstrates a significant causal relationship between the schooling of both parents and that of their daughters. The magnitude of the estimated effect is large: an additional year of parental education raises girls' cognitive scores by 2 percentage points. Employing the school achievements for the 2012/2013 academic year as a secondary outcome confirms the positive educational spillover between both parents and their daughters. Unlike the primary outcome, the school performance results suggest a causal relation only between paternal schooling and offspring. The findings are robust to a number of specification tests.

The remainder of the chapter is structured as follows. The second section discusses the background of the First Palestinian Intifada and its impact on education. Section (2.3) reviews the literature related to the intergenerational transmission of human capital and the effect of the ongoing Israeli–Palestinian conflict on education. Section (2.4) describes the data used in this study. In Section (2.5), I present the empirical specification and the identification strategy. The OLS and instrumental variable results are reported in Section (2.6); Section (2.7) provides robustness checks, while the discussion and concluding remarks are presented in section (2.8).

2.2 Background

The Palestinian education system faced several challenges over the periods during which it was controlled by different authorities until 1994, when the Palestinian Ministry of Education was established and became responsible for all educational processes in the Palestinian territories (the

West Bank, East Jerusalem, and the Gaza Strip) (UNESCO, 2011). Before then, and mainly between 1988 and 1993, all Palestinian territories were subject to different types of political violence due to the first Palestinian uprising (Intifada). During these years, the educational system in Palestine suffered severely from various Israeli actions against schools and universities.

The First Palestinian Intifada was an uprising against the Israeli occupation of the Palestinian Territories, which lasted from December 1987 until 1993 with the signing of the Oslo Accords. According to B'Tselem (2017), the first Intifada claimed the life of more than 1000 Palestinians.[5]

The events of the First Palestinian Intifada imposed several restrictions on adolescents' schooling. At that time, young people were hindered from obtaining their right to education at various stages. Many factors led to the decline in the quality of education. One reason was the loss of school time during the Intifada resulting from frequent school closures, curfews, and other measures (UNESCO, 1995). Table (2.1) shows an example of the destruction of the learning process during that period.

Table 2. 1: Maximum number of days on which schools were open during the years 1988–1989 (total number of school days 205–210)

Level	Total no. of days/year	Percentage of school days
Elementary (grades 1–6)	135	64
Preparatory (grade 7–9)	115	55
Grades 10–11	85	40
Grade 12	120	57

Source: Tawil (1997).

The learning environment and access to education suffered during the First Intifada. As a result of the lack of financial resources for maintenance or construction, schools in the West Bank were set up in rented buildings that were not constructed for this purpose. Schools operated

[5] During the First Palestinian Intifada, a large number of victims were children, 2,532 persons had their houses razed to the ground, and between 57,000 and 120,000 were arrested (López-Ibor, Christodoulou, Maj, Sartorius, & Okasha, 2005).

on double or triple shifts, and classes were overcrowded (UNESCO, 1995).

The Israeli Civil Administration and the Israeli Army considered the universities' administrations to be directly responsible for the conduct of students and hence ordered the immediate closure of all Palestinian campuses.[6] As a result, several Palestinian higher educational institutions were closed (Barghouti, 2005).[7] Figure (2.1) represents the number of students enrolled in West Bank universities before, during, and after First Intifada.

The First Palestinian Intifada was characterized by a high level of youth participation and activism (Ghanem, 2012). Because students played a vital role in the daily Intifada activities, their time and attention were directed away from education. Instead, they were exposed to different types of violence and were affected physically, socially, and psychologically (Barber, 1997; Qouta, Punamäki, & Sarraj, 1995; Tessler, 1994).

Source: Own calculation based on Palestinian Ministry of Education and Higher Education (MoEHE, 2016a) data.

Figure 2. 1: Admission to universities before and after the First Intifada (1989–1993)

School students were also less likely to complete their education due to economic factors. For decades, many young Palestinians searched for low-skilled jobs in the Israeli labor market, for example in construction and agriculture, since the Israeli market provided better daily wages

[6] The universities remained closed until the autumn of 1991 with the exception of Birziet University, which remained closed until April 29, 1992 (Robinson, 1997, p. 106).

[7] On February 2, 1988, Israeli Radio announced that the Israeli Army had ordered all 1,194 schools in the West Bank to close until further notice. In addition, 6 universities, 13 colleges, and 5 government training schools were officially ordered to close (ARIJ, 2007).

than the local market. The salaries in the West Bank still increased regularly until 1988, when the First Intifada began and wages decreased dramatically due to the curfews and strikes that prevented access to the Israeli labor market (Elkhafif & Daoud, 2005). Additionally, during that period, there was less incentive to return to schooling in the Palestinian territories due to the increase in the number of Palestinian college and university graduates (Angrist, 1995).

Despite the significant obstacles to formal education mentioned above, the motivation for learning increased during the First Intifada (Nasser & Berlin, 2011). Teachers and students managed to resume the educational process despite the damage caused by the closures. During the first two years of the Intifada (before the Israeli decision to reopen the schools and universities under pressure applied by the European Parliament), Palestinian society adopted alternative modes of education as a reaction to the closure of schools and universities. The following actions were key aspects of this alternative education: 1) universities set up off-campus classes; 2) universities set up popular or neighborhood schools in which teachers taught students within a geographic area; and 3) private and UNRWA schools distributed special educational materials for remote education, for example learning objective assignments, self-evaluation tests, and graded exercises (Mahshi & Bush, 1989).

2.3 Conceptual Framework and Related Literature

Researchers have suggested that children's cognitive abilities have a significant impact on their future outcomes, such as earnings. These abilities may affect children directly as part of the individual overall human capital or indirectly through educational attainment if innate abilities determine schooling outcomes (Anger & Heineck, 2010). Recently, a growing body of knowledge has suggested that low levels of cognitive development in early childhood have long-term adverse consequences for adult well-being (Paxson & Schady, 2007). Further, other factors, such as the level of non-school home activities and the quality of education, can be important inputs into human capital production (Glick & Sahn, 2009).

There are two main channels for the transmission of cognitive skills between generations: the inheritance of genes ("nature") and the productivity effect of parental education ("causal") (Anger & Heineck, 2010). To understand whether formal parental education improves children's cognitive abilities and school performance, researchers have suggested three possible channels for the correlation in education between generations: liquidity constraint, causal, and

nature. Less educated parents have a greater probability of facing a liquidity concern than well-educated parents. This liquidity constraint will prevent their children from realizing their schooling potential (Becker & Tomes, 1994).[8] A parents' decision to invest in his or her child's education might be affected by his or her own observable and unobservable characteristics. Some of these features may be correlated with parenting skills, while others are genetically transmitted from parents to children, thus generating a correlation between parents' and offspring's cognitive abilities. To identify the causal relation of parents' education on their offspring, economists have relied on three identifying strategies: twin parents, adopted children, and instrumental variables. The first two strategies do not eliminate the non-genetic endogeneity that stems from unobservable characteristics in the educational choices, which are also correlated with parenting skills (Chevalier, 2004). The related literature has differed in discussing the causal relationship between parents and their offspring's educational outcome based on these three strategies.

Chevalier (2004) used the change in the minimum age of school leaving that took place in the 1970s in Britain as a way of measuring the exogenous effect on parents' educational choice, at least for those wishing to drop out of school at the first opportunity. The law provided some parents with an extra year of education compared with parents born just before the reform. He found that mothers' education has a larger positive impact on that of their offspring but that fathers' education has no significant impact. Further, he pointed out that the intergenerational link in education is causal when focusing on natural parents only, while step-parents have no or a negative impact on children's education.[9] Plug (2004) employed data on adopted children to investigate whether the intergenerational transmission of human capital is due to the causal relationship or other unobserved variables. The results demonstrated a positive effect of fathers' education on children's education but no significant effect for mothers. The maternal influence vanishes with innate genetic abilities and if assortative mating is taken into account. However, the results had two limitations; the sample size was small, and children were not randomly placed with adoptive parents.

Björklund, Lindahl, and Plug (2006) estimated the intergenerational mobility in income and

[8] Even when education is free, parents from higher socioeconomic backgrounds may send their children to well-resourced schools that provide a better educational level.

[9] The estimations for step-parents in Chevalier's (2004) study are rather imprecise due to the small sample size.

parents' education using data on adoptees born in Sweden and their biological and adoptive parents. They found that pre-birth factors (e.g., genetic and parental education) and post-birth factors (e.g., long-term earnings) for both adaptive and biological parents contribute to intergenerational earnings and education transmission. In addition, they provided evidence that biological mothers' coefficient in the intergenerational transmission coefficients was slightly larger than that of biological fathers.

Over the last decades, a growing body of literature has used the instrumental variable identification strategy to remove the potential endogeneity from the estimated education spillover coefficient. Studies have taken advantage of real or "natural" experiments that produce exogenous variation in family and contextual variables of interest (Duncan, Magnuson, & Ludwig, 2004). Black et al. (2005) relied on the change in implementing the reform of the education system in Norway across different municipalities in 1960 to create an exogenous variation in parents' education. As a result, the IV estimations were consistently lower than the OLS estimates; they concluded that the high correlation between parental schooling and offspring's education is due to unobserved abilities and family background rather than causal relationships. Oreopoulos et al. (2006) examined the causality in parents and their children by exploiting the variation in implementing compulsory schooling laws across states in the U.S. They found that increasing parents' education reduces the probability of children repeating grades. Stella (2013) used the change in compulsory schooling reforms across nine European countries over the period 1920–1956 as an IV to instrument parents' years of education; he found that the size of the estimated effect of parents' education on their offspring's education is larger. He also concluded that mothers' schooling is more important than fathers' education for the academic performance of their children.

2.4 Data and Measurements

2.4.1 Study Sample

This study uses a cross-sectional, micro-level survey containing information on approximately 6000 students enrolled in grades 5 to 9 in single-sex primary schools in the West Bank and East Jerusalem. The survey data were collected from May to September 2013 in the context of a cooperative research project funded by the German Research Foundation (DFG). A total of 100 schools were randomly selected based on their regional distribution (north, central, and south)

and classified by education authority (60 governmental and 40 UNRWA). Then, from each school, 60 students were randomly selected and stratified by grade (12 students from each class). The students were asked to complete the standardized cognitive test and the health behavior questionnaire. Then, the school nurses collected their anthropometric measurements. The parents of the participants were asked to complete a survey directed to them. Another questionnaire was distributed to the school principals using the same items as those used in the Trends in International Mathematics and Science Study (TIMSS).

This chapter employs the following parts of the survey: (1) the standardized cognitive test; (2) student grades in different subjects obtained from the Palestinian Ministry of Education and Higher Education records; and (3) the parental background questionnaire, which provides information about household income, parental education, age, and household structure. Due to the sample requirement,[10] girls are over-represented in this sample by approximately 67 percent. The contextual database on the locality level[11] was collected from the Palestinian Central Bureau of Statistics and the World Bank Report *Poverty in the Palestinian Territories, 2014*. The report includes information on the poverty level based on a household consumption survey from 2009. Finally, observations without parental education and cognitive score results were eliminated. Approximately 4,000 cases remain for the analyses across 98 schools (under full specification).

2.4.2 Parental Educational Attainment

The parental educational level was measured with ten categories used by the PCBS from illiterate to Ph.D. Out of 5,017 observations, 4,718 respondents, usually mothers, answered their level of education and provided information about their partner's education. Similar to other studies, I converted parents' educational levels into years of schooling.[12] The summary statistics

[10] To meet the selection criteria, single-sex schools should contain grades from 5 to 9. Only 436 schools in the West Bank matched the sample requirement: 382 governmental schools (160 boys and 222 girls) and 54 UNRWA schools (20 boys and 34 girls). Private and gender-mixed schools were excluded.

[11] The locality is the smallest administrative unit used by the Palestinian Central Bureau of Statistics.

[12] I converted the educational attainment into years based on the number of grades in each level. For example, illiterate (0); can read and write (3 years); elementary (6 years); preparatory (9 years); secondary (12 years); diploma

in table 2.2 show that fathers and mothers have a close level of education (the average schooling level is 10.77 years for mothers and 11.10 years for fathers).

The data set that I used also provides information about both parents' years of birth, which enable me to determine whether parents' educational attainment was affected by exposure to the First Intifada during the identified age. Since fathers tend to be older than mothers, approximately 67 percent of mothers in my sample were exposed to the First Intifada while 51 percent of fathers were exposed between the ages of 13 and 19 years according to tables (2.A.1) and (2.A.2) in the appendix.

2.4.3 Outcome Variables

2.4.3.1 Cognitive Test Scores

The primary outcome is the cognitive test scores.[13] Students' cognitive ability was measured through exams distributed to all the students who participated in this survey; the test contains 181 items. These questions examine three aspects of child cognitive abilities, numerical, verbal, and figural. Each of the three groups consists of several subtests. Table (2.A.3) in the appendix shows that the internal consistency (Cronbach's α) is high for each subtest, for example 0.87 for the figure analogies test and 0.82 for the verbal classification test.

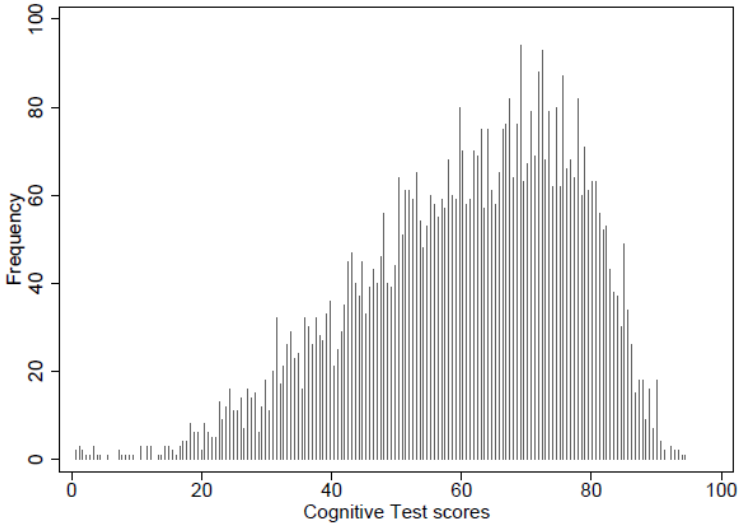
For the purpose of this study, the final results were obtained by computing the percentage of correctly answered items. Figure (2.2) shows that the distribution of the cognitive test results has a left-skewed distribution, with an arithmetic mean of 62 percent and a standard deviation of 17 percent. The cognitive result is profoundly affected by gender (females, in general, are better than males).

(14 years); bachelor (16 years); higher diploma (17 years); master (18 years), and Ph.D. (21 years). These classifications are very close to the ISCED-97 codes.

[13] The test questions were selected and adapted from established tests of general ability: the Cognitive Ability Test (CAT; Thorndike & Hagen, 1971), Malta – a Hebrew version of the Lorge–Thorndike Test (Ortar & Shachor, 1980), Standard Progressive Matrices (Raven, 1983), and the Cattell and Cattell (1965) Culture Fair Intelligence Test.

2.4.3.2 School Achievements

I use the school grade point average (GPA) in the academic year 2012/2013 as a secondary outcome. To measure the educational performance, I compute students' GPA in the six major subjects taken by all students in all schools.[14] These topics are Religious Education, Arabic, English, Mathematics, Science, and Social Science. All the courses are graded on a 100-point scale. The pass grade is 50 percent or more in all the subjects. In our sample, the school achievements have a mean of 68 percent and a standard deviation of 18 percent.[15]



Source: Own calculations based on survey data.

Figure 2.2: Distribution of the cognitive test score

2.4.4 Control Variables

In addition to the explanatory and outcome variables, I control the following variables that could directly affect children's cognitive abilities and academic performance:

- Demographics: sex, age, grade number, and first-birth status.
- Household structure and socioeconomic status: the number of siblings, mother's and

[14] Approximately 80 percent of the weekly lessons for the elementary grades are allocated to these six subjects (UNESCO, 2011).

[15] All schools in the West Bank (public, UNRWA, and private) use the same national curriculum (MoEHE, 2016b).

father's age, and household income per month.

- School type: governmental or United Nations Relief and Works Agency (UNRWA) schools. The school fixed effect is used since it captures a range of unobserved differences across schools that could influence student performance. It also covers other location-specific unobserved determinants of cognitive abilities (Brück, Di Maio, & Miaari, 2014; Jürges & Schwarz, 2015).
- Contextual data: these variables are related to the locality of the students and consist of the population per locality in 2013, the poverty rate, the percentage of this locality located in area C,[16] and a dummy indicating whether this locality is affected by the separation wall.[17]

[16] Area C: Areas in the West Bank are still under full Israeli military and civil control based on the Oslo Accords of 1993, while the Palestinian Authority (PA) has civil and security control in area A. The PA has civil autonomy but no security control in area B (Vishwanath et al., 2014). Communities in area C are living in difficult life circumstances due to the lack of major services. For more details, see www.btselem.org/topic/area_c.

[17] The Israeli West Bank barrier or wall is a separation barrier built by the Israeli Government in the West Bank along the 1949 Armistice Line known as the "Green Line" (B'Tselem, 2012). The barrier divides Palestinian communities, encircles some, and isolates others from their surroundings while separating East Jerusalem from the rest of the West Bank (UNSCO, 2014).

Table 2. 2: Summary statistics for outcomes and explanatory variables

Variable	Observation	Mean	Std Dev.
Cognitive tests	4,067	61.91	16.32
School achievement (2012/2013)	4,065	67.85	18.43
School achievement (2011/2012)	4,064	70.96	15.99
Mother's years of education	4,067	10.77	3.6
Father's years of education	4,023	11.1	3.8
Mother with a college degree (0,1)	4,067	0.19	0.4
Father with a college degree (0,1)	4,023	0.24	0.43
Mother's years of Intifada (age 13–19)	4,067	2.43	2.21
Father's years of Intifada (age 13–19)	4,067	1.86	2.22
Male student	4,067	0.3	0.46
Student age (years)	4,067	12.8	1.51
Student went to Kindergarten (KG) (0,1)	4,067	0.11	0.31
Number of siblings	4,067	2.6	1.79
Household net monthly income:			
<NIS 1500	4,067	0.36	
NIS 1500–NIS 2499	4,067	0.33	
NIS 2500–NIS 3999	4,067	0.17	
NIS 4000–NIS 5000	4,067	0.08	
>NIS 5000	4,067	0.06	
Mother's age (years)	4,067	39.57	6.58
Father's age (years)	4,067	44.8	7.09
School authority (Gov. 1)	4,067	0.59	0.49
Population per locality (2013)	4,067	28,563	50,826
Separation wall (0,1)	4,067	0.4	0.49
Area C (proportion)	4,067	0.3	0.3
Poverty rate	4,067	0.21	0.11

2.5 Empirical Model and Identification Strategy

To estimate the effect of parents' education on their offspring, I use the following model:

$$Child\ outcome_{isl} = \alpha + \beta * (Edu^{p})_{isl} + \gamma X_{isl} + \varphi_s + \varepsilon_{isl} \qquad (2.1)$$

where unit of observation *i* represents a child enrolled in school *s* during the academic year 2012/2013 in locality *l* in the West Bank. The dependent variable is the child's cognitive test score (primary outcome) or student's academic performance (secondary outcome). Parental educational attainment (Edu^{p}) is the variable of interest. Following Chevalier (2004), this variable is estimated separately for mothers and fathers to eliminate assortative mating bias and measured by years of schooling. (X_{isl}) denotes a set of controls at the level of the individual, family, locali-

ty, and school type, as mentioned in section 2.4.4. I also include the school-level fixed effect (φ_s) to control the unobservable differences across schools that may influence child outcomes. Finally, (ε_{isl}) represents an idiosyncratic error term. I cluster the standard errors at the school level.

As discussed earlier, parents' education is potentially endogenous and might be related to unobservable attributes of their offspring, such as ability, that explain the differences in children's cognitive abilities or educational outcomes. Therefore, parental educational attainment is instrumented by parents' exposure to the First Intifada during their preparatory and high school ages (13–19 years), which produces variation in their schooling that is exogenous and unlikely to be related to children's cognitive abilities or educational outcomes.[18] The first-stage regression is given by:

$$(Edu^{\mathrm{p}})_{isl} = \pi + \vartheta D_{isl} + \delta X_{isl} + \tau_s + \mu_{isl} \qquad (2.2)$$

The dependent variable is parental educational attainment for child *i* in school *s* in locality *l*. The term (X_{isl}) is defined in the same way as in equation (2.1). (τ_s) stands for the school fixed effect, and (D) is the instrument and denotes the number of years for which the child's parents were exposed to the First Intifada (1988–1993) aged 13–19. Thus, in equation (2.2), parameter ϑ measures the effect of parental exposure to the First Intifada. Tables (2.A.1) and (2.A.2) in the appendix show the construction of the instrument based on the year of birth for the parental sample and determines which parents were aged between 13 and 19 during the First Intifada; the values of the variables range from 0–6 years of exposure. For example, Table 2.A.1 indicates that, if a student's father was born in 1972, then he was exposed to the First Intifada at the identified age of 4 years, and if another father was born in 1975, he was exposed to the First Intifada at 6 years of age, and so on. Finally, (μ_{isl}) represents an idiosyncratic error term and, similar to equation (2.1), standard errors are clustered at the school level.

The main assumption of this identification is that exposure to the First Intifada at a certain age should affect child outcomes only through its effect on the parental years of schooling. Nevertheless, there are a number of potential identification threats. Exposure to violent conflict may

[18] The employed instrument cannot have affected children directly, because they were all born after the First Intifada. The oldest group of individuals observed is in grade 9, born 5 years after the First Intifada ended.

have an adverse long-term impact on the accumulated wealth of families. One of these causes is decreasing returns of education as a result of a reduction in productivity due to the collapse of the quality of education under conflict (Santos, 2014).[19] Thus, those parents who experienced the First Intifada during schooling age might face a decrease in their income, and their situation will be different from parents who did not have such an experience. I investigate the impact of the First Intifada on household income based on the following specification:

$$(Household\ income)_{isl} = \tau + \phi D_{isl} + \zeta F_{isl} + \partial_l + \mu_{isl} \qquad (2.3)$$

where the outcome variable is the household income for student *i* enrolled in school *s* in locality *l* and represents different levels of family income (intervals).[20] (*D*) is the instrument employed and takes the value 1 if the father was exposed to the First Intifada aged 13–19 years and 0 otherwise. The term (*F*) captures the father's characteristics (schooling, age, and age squared). ∂_l is the locality fixed effect.[21] The results are presented in Table (2.A.4) in the appendix and suggest that there is no significant impact of paternal exposure to the First Intifada at the identified age on income. However, in Palestinian territories, education is not only the main tool that helps in increasing income, since employment in Israel provides a wage premium over the local labor market and individuals with higher levels of schooling are less likely to be employed in Israel (Daoud, 2005). Furthermore, in all the estimations, I include the household income to capture any impact of family wealth on their offspring's outcomes. Finally, the Palestinian economy experienced some improvements after the First Palestinian Intifada. As a result, the Palestinian Na-

[19] Some literature has stated that the labor force participation stayed below the long-term average during the first 10 years after the conflict (Bircan, Brück, & Vothknecht, 2017). In general, during the conflict period, disruption exerted a negative impact on all economic activities, and the process to reach fully recovery is long (Cerra & Saxena, 2008). However, other researchers have suggested that conflict can cause severe damage to the economy and human capital in the short run, while most countries recuperate after wars are over in the long run. For instance, one can observe Japan and West Germany, where the postwar economic recovery was speedy (Brakman, Garretsen, & Schramm, 2004; Davis & Weinstein, 2002).

[20] I run an ordered logit model, since the outcome represents five unequal intervals for household income measured in the new Israeli shekel currency: [1] <1500; [2] 1500–2499; [3] 2500–3999; [4] 4000–5000; and [5] >5000.

[21] I run this regression only for fathers, since the majority of mothers in the sample are not working.

tional Authority was established in 1994, which provided more working opportunities inside the Palestinian territories (MAS, 2014).

In addition to the economic consequences of the First Palestinian Intifada, it may have affected the psychological well-being of families. The literature has shed light on the direct effects of violent conflict, such as depression (Do & Iyer, 2012; Swee, 2011), as well as behavioral problems and PTSD (post-traumatic stress disorder) in both children and adolescents in Palestine (Mataria et al., 2009; Thabet, Abed, & Vostanis, 2002). However, there is less evidence about this effect on human capital in the long run or the possibility that these effects will spill over to the next generation and negatively affect its members' well-being and human capital development (Akresh, 2016). Finally, another threat to the identification strategy is that possibility that the parents whose educational attainments were affected by the First Intifada may live in an area suffering from several long-term adverse life circumstances. This problem is mitigated by the employed model capturing several locality-level contextual variables as well as a school fixed effect, which covers other location-specific unobserved determinants of students' outcomes.

2.6 Results and Discussion

2.6.1 First-Stage Regression (Intifada and Parents' Education)

Exposure to the First Intifada during adolescence (13–19 years) had different effects on paternal and maternal educational attainment. Columns 7 and 8 in panel A of Table (2.3) show the negative and significant impact of the First Intifada on fathers' years of education. Fathers who were exposed to the First Palestinian Intifada acquired 0.13 fewer years of schooling than other fathers, who were not exposed to the First Intifada during the identified age. Additionally, Table (2.8) shows that those fathers were 3.2 percentage points less likely to attend university or college than those who were not exposed.

This result is expected and consistent with the contextual data obtained during the First Intifada. Figure (2.1) demonstrates a sharp decrease in the enrollment of male students in West Bank universities and colleges during that period. There was a 20–24 percent reduction in enrollment from 1986–1987. This may be attributed to the closure of educational institutions and lost school days. Furthermore, that period was characterized by economic instability; many young males sought low-skilled jobs in Israeli markets, which provided better wages. Figure (2.3.a) shows the decrease in male participation in the labor force in Palestine during and after

the First Intifada, since many of those males went to work inside Israeli territory.

Panel B of Table (2.3) shows that females who were exposed to the First Intifada during the identified age (13–19 years) acquired 0.12 years of schooling compared with other females, who were not exposed to the First Intifada at this age.[22] This result emerged after controlling for both maternal age and age of marriage, since the latter could negatively affect the completion of education. Figure (2.1) shows that the number of female students increased slightly after the third year of the Intifada (1991). There are four plausible explanations for this positive correlation. First, the increase may be due to a reaction to the Israeli Army's decision to close all educational institutions for approximately two years. Second, it may be due to an increase in the number of higher education institutions; in particular, several branches of Al-Quds Open University in West Bank cities and the Gaza Strip.[23] In general, the demand for higher education increased after 1981, since several higher educational institutions opened (Angrist, 1995). Third, it may be due to a change in women's work preference to support themselves and their families. For example, Shemyakina (2015) indicated a shift in the labor market outcome by gender after exposure to the 1992–1998 armed conflict in Tajikistan. Further, Fernández, Ibáñez, and Peña (2014) suggested that females who experienced violent shocks in rural Colombia decreased their leisure time and increased the time devoted to household chores and caring for children and other family members.

Two pieces of evidence support the third reason. First, according to Figure (2.3.b), female participation in the labor force increased continuously after the First Intifada and the establishment of the Palestinian National Authority in 1993. Further evidence was provided in the PCBS (1996) Labor Force Survey in 1995, which showed that 46 percent of female jobs fall into the categories of professionals, technicians, associates, and clerks according to the international standard classification of occupations ISCO-08, all of which require at least 12–13

[22] Further, Table (2.7) indicates that those mothers were 0.7 percent more likely to complete their college or university education than other mothers, who were not exposed to the First Intifada during the identified age.

[23] Al-Quds Open University officially started accepting students in 1991. This university adopted an open and remote educational system, with less demanding criteria for admission, such as a lower minimum score on the General Secondary Certificate Exam (compared with 65 percent in other universities at that time). Unlike other universities, regular attendance is not compulsory. The education process depends on paperwork systems instead of lectures and exams. For more details, see http://www.qou.edu/

years of education. The traditional value of women's education, especially formal schooling, has strengthened over time. Formal education was perceived as a means of securing white-collar jobs with a steady income and to enhance the social status in a predominantly peasant society.

Finally, the alternative education process is implemented more efficiently in girls' schools. Most of the boys at this age were engaged in the Intifada's violent activities, and it was less risky for females to meet in one place, like public schools or worship houses, to conduct educational sessions.[24]

Concerning the validity of the instrument, Table (2.3), panel A also reports the corresponding F-statistic of the first stage for each specification that accounts for the clustering of standard errors at the school level and the school fixed effect (columns 7 and 8). The F-statistic is greater than 10 and passes the rule of thumb for a weak instrument (Bound, Jaeger, & Baker, 1995) for the main specification (around 22), but it falls to around 7 after adding the school fixed effect. In panel B, the first-stage regression is positive and significantly different from zero; the F-statistic is around 25, but it falls to 8.6 after adding the school fixed effect.

2.6.2 OLS and IV Regression Results

The primary outcome of this study is the cognitive test scores. In the next section, I will present the impact of parents' education on students' school achievements.

Table (2.3) presents the main results of the OLS and IV regressions. The first-stage and reduced-form estimations are also presented in the same table. Panel A shows the effects of fathers' years of education on their children's cognitive abilities, while the effect of mothers' educational attainments is presented in panel B.

[24] Some sociological studies (Ricks, 2006) have indicated that high-school-age girls (16–18 years) during the First Intifada played a vital role in the non-violent resistance to the Israeli measures. They also insisted on attending schools just to study because they were always waiting for another curfew to be called. Another study, by Velloso (1996), concluded that girls' education in Palestine improved during and after the First Intifada. They played an active part during the struggle rather than doing nothing. This study indicated that women's organizations started their work in Palestine during and after the First Intifada, running projects for female empowerment and capacity building.

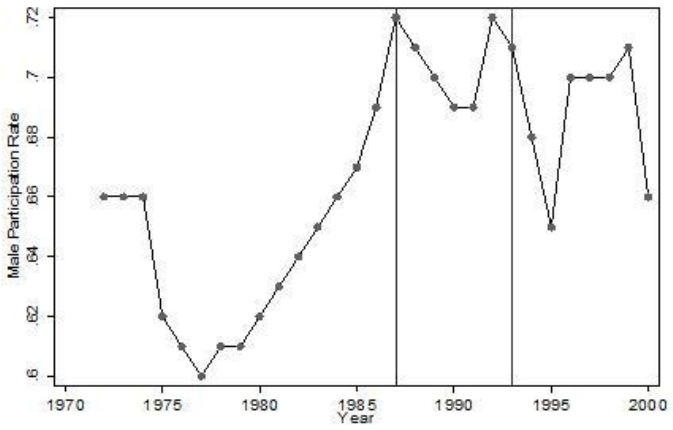


Figure 2.3.a: Male participation in the labor force

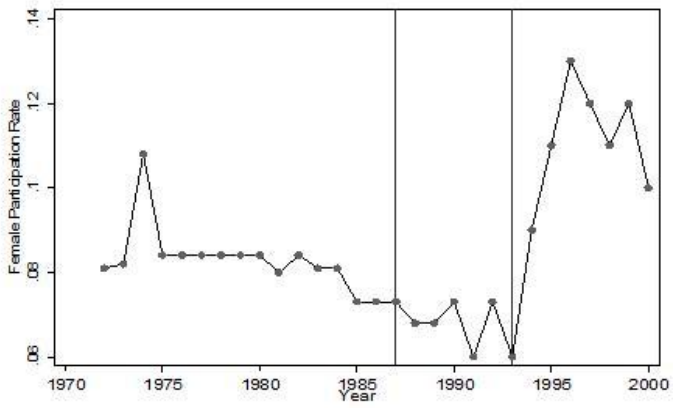


Figure 2.3.b: Female participation in the labor force

Source: Elkhafif and Daoud (2005).

Figure 2.3: Male and female participation in the labor force

Columns with odd numbers represent the estimations with all the control variables in addition to the school type (governmental versus UNRWA schools). Columns with even numbers show the results after adding the school fixed effect to the model.

In panel A, the OLS estimate suggests that a one-year increase in a father's years of schooling is associated with a 0.837 percentage point increase in his child's cognitive test. This coefficient is significant taking into consideration the inclusion of the set of controls that were discussed in the previous section. After including the school fixed effect in the model (column 2), I continue to find that fathers' education is positively and significantly associated with their children's cognitive abilities, although the coefficient is slightly lower: 0.75.

Column (1) in panel B shows the effect of mothers' schooling on their children's cognitive

outcome. The OLS estimate indicates that a 1-year increase in a mother's education is associated with a 0.8 percentage point increase in her child's cognitive tests. The coefficient remains almost the same after adding the school fixed effect to the model. In general, the OLS estimates confirm a strong positive correlation between parents' years of schooling and their offspring's cognitive abilities, even when the school fixed effect, along with a large set of demographic and socio-economic variables, is controlled. In the following paragraphs, employing the IV strategy will allow me to explore whether this positive correlation is due to a causal relation or other omitted variables. Such omitted variables may include family characteristics or inherited ability transmitted to the children rather than education spillovers.

Columns 3 and 4, in panels A and B, respectively, present the 2SLS results. The coefficients of both parents' education are imprecisely estimated and statistically insignificant. In panel A (column 3), the 2SLS estimate is smaller than the OLS estimate and falls from 0.464 to 0.298 percentage points after adding the school fixed effect. This result suggests that child cognitive ability is positively correlated with unobserved ability or family characteristics rather than human capital spillovers from father to child.

The main reason for this imprecise estimate is the relatively weak reduced form between fathers' exposure to the First Intifada and their children's cognitive outcome. These results suggest that the First Intifada did not have an impact on the cognitive abilities of the next generation.

The 2SLS estimate for mothers indicates that a year of maternal education increases her child's cognitive ability tests by 1.131 percentage points. The IV estimate is slightly larger than the OLS but not significant due to the large standard error (1.003). Concerning the magnitudes, the effect of mothers' education becomes smaller when I introduce the school fixed effect into the estimation but is still larger than the OLS (0.722 versus 1.117 percentage points, respectively). The results suggest that there is evidence of a causal relationship for educational spillovers between mothers and their offspring despite the estimate's lack of precision.

2.6.3 Change in Outcome by Student Gender

In this section, I will try to explain the different roles that fathers and mothers play in the transmission of human capital by gender. Some pieces of literature state that same-sex intergenerational links are the strongest (Chevalier, 2004), while other researchers have found, in

contrast, a positive effect of mothers' education only on their sons (Black et al., 2005). To conduct the analysis, I consider samples of male and female children separately. The results for sons and daughters are presented in Table (2.4). Before discussing the 2SLS results, I will comment on the OLS results in panels A and B. The OLS estimates confirm that both parents' educational attainment has a stronger correlation with their daughters' cognitive outcome than with that of their sons (0.926 versus 0.659 and 0.989 versus 0.335 percentage points, paternal and maternal, respectively). When conducting the analysis on girls, the IV coefficients for both parents' education are statistically significant and larger than those generated by the full sample (2.3 versus 0.404 for fathers and 2.023 versus 1.131 for mothers). Moreover, the IV estimates are greater than the OLS estimates. When examining the sample of sons, the IV estimation on paternal and maternal schooling yields an imprecise result, which is not statistically different from zero, with a high standard error and wrong sign. A potential explanation for the implausible result of parental education's effect on boys could be the sampling error rather than gender differences. Girls are more representative in my sample than male students (approximately 70 percent due to the sample requirement, as mentioned in section 2.4). The IV estimations demonstrate an educational spillover across generations. The size of the estimated effect is large: increasing paternal and maternal education by 1 year will raise their daughters' cognitive outcome by 2.3 and 2.03 percentage points, respectively. The smaller maternal effect may be due to the fact that better-educated mothers work more in paid employment and spend less time interacting with their daughters.

The results demonstrate an educational spillover across generations with respect to daughters only. Cultural specificity can explain this finding. In a mostly conservative society, such as that of Palestine, girls are more connected to their parents and spend most of their time either at school or at home, acquiring the majority of their experience by observing their parents. In contrast, boys are exposed to different experiences, having more choice when it comes to selecting their peers and interacting with their environment.[25]

[25] For example, according to the PCBS (2014), males aged over 10 years tend to spend more time per day on leisure activities (sports participation and out-of-home exercises) than females (17 minutes per day vs. 4 minutes, respectively). Meanwhile, the percentage of females engaged in performing domestic work in the West Bank is significantly larger than that for males (90.2% vs. 43%).

2.6.4 Outcome of School Achievements in 2012/2013

In this section, I will employ another vital educational outcome to investigate the human capital spillover. The students' school achievements during the academic year 2012/2013 represent a long-term educational investment in children by their parents. The student GPA is a good indicator, since it measures parents' investment in their child during the entire academic year rather than over a short period. These results are documented in the school administration records and measure the students' abilities in the main educational subjects. Moreover, the students' GPA during the year could reflect another indicator of the level and quality of non-school "home" inputs into human capital production.

Thus far, the primary outcomes in the results suggest educational spillover effects of mothers' schooling on children's cognitive abilities, while the fathers' IV estimations lack precision with a large standard error. These findings are contrary to some pieces of literature that have found evidence that fathers' education is more important than that of mothers in influencing children's educational attainment (Ermisch & Pronzato, 2010).

Table (2.5), panel A demonstrates that the IV estimates are higher than the OLS estimates of the effect of paternal educational attainment on children's school results. The IV estimates have the same sign as the OLS estimates and are statistically significant (10 percent). The OLS estimates suggest that increasing a father's education by 1 year increases the child's score by 1.19 percentage points. Moreover, the IV estimates show that 1 additional year of parental education significantly increases child school achievement by 1.5 percentage points. Introducing the school fixed effect into the model does not change the results.

The 2SLS model confirms a causal relation between paternal education and offspring's academic achievements. The findings show that the estimates obtained from the IV models are larger than their OLS counterparts. These results are consistent with the existing literature that instrumented parental educational attainment by introducing exogenous variation into family and contextual variables of interest, such as a change in compulsory school law, and found that IV estimates are larger than OLS estimates (Chevalier, 2004; Oreopoulos et al., 2006; Stella, 2013). That said, the finding could call into question the assumption of correlation between

child education and other omitted variables, such as inherent genetic abilities or family input.

The fact that the IV estimates are larger than the OLS estimates could be due to measurement error in self-reporting parental educational attainment (the endogenous variable). Another interpretation is the compiler effect, since the obtained results are consistent with the local average treatment effect (LATE) interpretation. The First Intifada did not affect the entire population. The applied IV strategy captures the impact on only the subgroup of parents whose educational attainment was affected by exposure to the First Intifada at the identified age. Hence, the treatment effect of those parents whose schooling complied with the First Intifada effect tends to be above the average marginal effect for the entire population,[26] in particular those children whose parents completed their education or have less schooling, regardless of whether they were exposed to the First Intifada during the identified age range (always takers/never takers).

[26] For example, Card (2001) pointed out that IV estimates based on changing in mandatory schooling law will yield estimated returns to schooling above the average marginal return to schooling in the population and potentially above the corresponding OLS estimates, since the group of individuals captured by the local average treatment effect (LATE) is most likely to be affected by the compulsory schooling law.

Table 2.3: OLS and IV estimates of the effect of parents' years of education on cognitive ability

	OLS		2SLS		Reduced form		First stage	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable:	Cognitive tests		Cognitive tests		Cognitive tests		Parents' edu.	
			Panel A					
Father's years of education	0.837***	0.749***	0.464	0.298				
	(0.072)	(0.064)	(0.745)	(0.887)				
Father's exposure to Intifada (age 13–19)					-0.075	-0.040	-0.163***	-0.133***
					(0.123)	(0.119)	(0.029)	(0.030)
First-stage F-statistic							21.73	6.72
Observations	3,994	3,994	3,994	3,994	3,994	3,994	3,994	3,994
R-squared	0.265	0.375	0.258	0.365	0.231	0.349	0.104	0.162
			Panel B					
Mother's years of education	0.790***	0.722***	1.131	1.117				
	(0.086)	(0.078)	(1.003)	(1.138)				
Mother's exposure to Intifada (age 13–19)					0.135	0.105	0.119***	0.094***
					(0.122)	(0.110)	(0.025)	(0.026)
First-stage F-statistic							25.29	8.62
Observations	4,067	4,067	4,067	4,067	4,067	4,067	4,067	4,067
R-squared	0.254	0.366	0.249	0.360	0.228	0.347	0.134	0.212
Individual controls	YES	YES	YES	YES	YES	YES	YES	YES
Family controls	YES	YES	YES	YES	YES	YES	YES	YES
School type	YES	NO	YES	NO	YES	NO	YES	NO
Contextual variables	YES	YES	YES	YES	YES	YES	YES	YES
School FE	NO	YES	NO	YES	NO	YES	NO	YES

Note: The robust standard errors clustered at the school level are reported in parentheses. **Individual controls**: sex, age, month of birth, and a dummy showing whether the student attended Kindergarten (KG). **Family controls**: number of siblings, household income, and father's and mother's age. **School type**: UNRWA or governmental. **Contextual controls**: area population in 2013, whether this area was affected by the separation wall, percentage of the locality in area C, locality poverty rate, and school fixed effect. *** p<0.01, ** p<0.05, and * p<0.1.

In panel B, I continue to find that a mother's education is positively and significantly associated with her child's scores. Increasing maternal schooling by one year increases the child's school GPA by one percentage point. However, when the coefficient is instrumented, the 2SLS becomes lower than the OLS, with insignificant statistical power. Due to the lack of precision of the maternal IV estimates, and since the IV estimates are smaller than the OLS estimates, the results are not conclusive regarding the effect of maternal schooling on child school achievements. This may be due to possible correlation with other unobserved variables, such as ability or family background and characteristics, rather than a causal relationship.

The overall results in Table (2.5) provide some evidence that fathers' education has a larger effect than that of mothers. As indicated by Ermisch and Pronzato (2010), the explanation for this result could be that better-educated mothers work more in paid employment and spend less time interacting with their offspring.

Table (2.6), panel A presents the OLS and IV estimates by gender differences. As I found with the main outcome variable, the IV father–all and father–daughter estimates are statistically significant, greater than the OLS estimates, and confirm the causality in the transmission of human capital. Despite the strong OLS relationship, in panel B, I find little causal relationship between maternal education and child school achievements. The only exception is mother–daughter relations; the IV estimate is still larger than the OLS estimate and provides some evidence of human capital spillover.

The overall IV findings are in the vicinity of the OLS estimations. Both cognitive test scores and students' school performances demonstrate the educational spillover in father–daughter and mother–daughter relations. While the father–son and mother–son coefficients are imprecisely estimated and lack significant power, these findings need further analysis to investigate whether the strong correlation between paternal schooling and sons' GPA is due to family characteristics or inherited ability rather than education spillovers.

Table 2.4: OLS and IV analysis – Effects of parents' educational attainment on cognitive abilities by gender

	All		Girls		Boys		All		Girls		Boys	
Dep. var: Cognitive tests	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
Panel A												
Father's schooling	0.841***	0.404	0.926***	2.299**	0.659***	-2.397*	0.757***	0.205	0.841***	1.989	0.573***	-1.769
	(0.073)	(0.769)	(0.079)	(1.006)	(0.135)	(1.344)	(0.065)	(0.912)	(0.076)	(1.407)	(0.115)	(1.177)
Observations	3,994	3,994	2,803	2,803	1,191	1,191	3,994	3,994	2,804	2,804	1,191	1,191
First-stage F-statistic		21.73		16.49		9.08		6.72		7		5.32
R-squared	0.266	0.257	0.274	0.166	0.212		0.377	0.363	0.354	0.284	0.366	0.168
Panel B												
Mother's schooling	0.790***	1.131	0.989***	2.023**	0.335**	-1.190	0.722***	1.111	0.889***	1.660	0.335**	-0.595
	(0.086)	(1.003)	(0.089)	(0.878)	(0.145)	(4.150)	(0.078)	(1.138)	(0.085)	(1.107)	(0.145)	(4.180)
Observations	4,067	4,067	2,861	2,861	1,206	1,206	4,068	4,068	2,862	2,862	1,206	1,206
First-stage F-statistic		25.29		19.88		17.92		8.62		8.81		5.76
R-squared	0.254	0.249	0.266	0.212	0.358	0.126	0.366	0.361	0.344	0.317	0.358	0.332
Individual controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Family controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
School type	YES	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
Contextual variables	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
School FE	NO	NO	NO	NO	NO	NO	YES	YES	YES	YES	YES	YES

Note: The robust standard errors clustered at the school level are reported in parentheses. **Individual controls**: sex, age, month of birth, and a dummy showing whether the student attended KG. **Family controls**: number of siblings, household income, and father's and mother's age. **School type**: UNRWA or governmental. **Contextual controls**: area population in 2013, whether this area was affected by the separation wall, percentage of the locality in area C, locality poverty rate, and school fixed effect. *** p<0.01, ** p<0.05, and * p<0.1.

Table 2.5: OLS and IV analysis – Effects of parents' years of education on children's school achievement

	OLS		2SLS		Reduced form		First stage	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable:	GPA2013		GPA2013		GPA2013		Parents' edu.	
Panel A								
Father's years of education	1.189***	1.186***	1.524*	1.551				
	(0.084)	(0.085)	(0.863)	(1.026)				
Father's exposure to Intifada (age 13–19)					-0.242*	-0.204	-0.159***	-0.132***
					(0.141)	(0.142)	(0.029)	(0.031)
First-stage F-statistic							21.67	6.69
Observations	3,999	3,999	3,999	3,999	3,999	3,999	3,999	3,999
R-squared	0.145	0.205	0.141	0.200	0.092	0.155	0.117	0.172
Panel B								
Mother's years of education	1.236***	1.194***	0.869	0.928				
	(0.096)	(0.096)	(1.035)	(1.225)				
Mother's exposure to Intifada (age 13–19)					0.105	0.089	0.121***	0.096***
					(0.130)	(0.122)	(0.025)	(0.026)
First-stage F-statistic							25.06	8.55
Observations	4,073	4,073	4,073	4,073	4,073	4,073	4,073	4,073
R-squared	0.142	0.200	0.138	0.198	0.092	0.158	0.133	0.211
Individual controls	YES	YES	YES	YES	YES	YES	YES	YES
Family controls	YES	YES	YES	YES	YES	YES	YES	YES
School type	YES	NO	YES	NO	YES	NO	YES	NO
Contextual variables	YES	YES	YES	YES	YES	YES	YES	YES
School FE	NO	YES	NO	YES	NO	YES	NO	YES

Note: The robust standard errors clustered at the school level are reported in parentheses. **Individual controls**: sex, age, month of birth, and a dummy indicating whether the student attended KG. **Family controls**: number of siblings, household income, and father's and mother's age. **School type**: UNRWA or governmental. **Contextual controls**: area population in 2013, whether this area was affected by the separation wall, percentage of the locality in area C, locality poverty rate, and school fixed effect. *** p<0.01, ** p<0.05, and * p<0.1.

Table 2.6: OLS and IV analysis – Effects of parents' educational attainment on school achievements by gender

	All		Girls		Boys		All		Girls		Boys	
Dep. var.: GPA2013	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
Panel A												
Father's schooling	1.186***	1.524*	1.266***	2.024	1.055***	0.452	1.184***	1.551	1.252***	2.128	1.083***	0.722
	(0.083)	(0.863)	(0.104)	(1.346)	(0.134)	(0.910)	(0.085)	(1.026)	(0.106)	(1.848)	(0.132)	(0.960)
Observations	3,999	3,999	2,804	2,804	1,195	1,195	3,999	3,999	2,804	2,804	1,195	1,195
First-stage F-statistic		25.06		16.33		9.18		6.69		6.69		5.36
R-squared	0.145	0.141	0.132	0.111	0.208	0.194	0.205	0.2	0.187	0.161	0.269	0.264
Panel B												
Mother's schooling	1.240***	0.869	1.398***	1.786	0.876***	-2.693	1.197***	0.919	1.344***	2.088	0.876***	-2.418
	(0.096)	(1.037)	(0.113)	(1.124)	(0.159)	(2.951)	(0.097)	(1.224)	(0.113)	(1.430)	(0.159)	(3.072)
Observations	4,073	4,073	2,863	2,863	1,210	1,210	4,073	4,073	2,863	2,863	1,210	1,210
First-stage F-statistic		25.06		18.9		7.5		8.55		8.64		5.62
R-squared	0.143	0.138	0.137	0.132	0.247		0.201	0.199	0.19	0.174	0.247	
Individual controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Family controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
School type	YES	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
Contextual var.	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
School FE	NO	NO	NO	NO	NO	NO	YES	YES	YES	YES	YES	YES

Note: The robust standard errors clustered at the school level are reported in parentheses. **Individual controls**: sex, age, month of birth, and a dummy indicating whether the student went to KG. **Family controls**: number of siblings, household income, and father's and mother's age. **School type**: UNRWA or governmental. **Contextual controls**: area population in 2013, whether this area was affected by the separation wall, percentage of the locality in area C, locality poverty rate, and school fixed effect. *** p<0.01, ** p<0.05, and * p<0.1.

2.7. Robustness Checks

In this section, I apply some robustness checks to verify the findings. First, I conduct the estimation on the sample with higher education cutoff points. I create a dummy variable for those parents with more than 12 years of schooling (university or college degree). One advantage of this check is that it eliminates the measurement error of self-reporting of parental education. Information about paternal and maternal schooling was obtained from the household questionnaire and classified into ten levels (from illiterate to Ph.D.) according to the PCBS scale. At some levels (for example preparatory), it is not clear whether parents have 7 or 9 years of education. The elementary stage is also unclear (grade 1 or 4). The OLS estimates in Table (2.7) confirm a significant positive effect of parents with more than 12 years of education on their offspring's cognitive abilities, which is much larger in size than the OLS obtained for years of schooling. However, I continue to find that the IV for fathers with a college degree is smaller than the OLS estimate. In panel B, the IV estimate for mothers with a college degree is larger than the OLS estimate. Despite the estimate being insignificant due to the large standard error, it assumes a causal relation between highly educated mothers and their offspring, while the actual causal effect of paternal education on the child cognitive outcome appears to be weak. One exception is that, when I run the regressions separately for parents and their daughters, I find that the IV estimates, especially for fathers, precisely confirm the causality in the intergenerational transmission of human capital and are larger than the OLS estimates.

Table (2.8) assumes a causal relationship between mothers with more than 12 years of education and their offspring's school achievements. Regarding the magnitudes, the IV estimate is greater than the OLS estimate (12 versus 9.051, respectively). The IV estimates give quite a close estimate to the OLS for the effect of fathers with more than 12 years of education on their offspring's school performance.

Another robustness check is implemented by considering the student's GPA as an outcome. By running the same regression on the previous academic year (2011/2012), both the OLS and the IV estimates in Table (2.9) yield similar results to those that were obtained in the main analysis. The 2SLS for paternal schooling confirms an intergenerational educational spillover, while there is no such evidence for a causal relationship between maternal education and offspring's school performance.

Table 2.7: OLS and IV estimates of the effect of parents with a university degree on their children's cognitive ability

	OLS		2SLS		First stage	
	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable:	Cognitive tests		Cognitive tests		Parents' edu.	
Panel A						
Fathers with uni./college degree	5.058***	4.489***	2.239	1.295		
	(0.616)	(0.527)	(3.610)	(3.873)		
Father's exposure to Intifada (age 13–19)					-0.034***	-0.031***
					(0.003)	(0.003)
First-stage F-statistic					24.82	7
Observations	3,994	3,994	3,994	3,994	3,994	3,994
R-squared	0.247	0.361	0.242	0.355	0.118	0.163
Panel B						
Mothers with uni./college degree	4.918***	4.382***	15.684	14.035		
	(0.704)	(0.678)	(14.623)	(15.491)		
Mother's exposure to Intifada (age 13–19)					0.009***	0.008**
					(0.003)	(0.003)
First-stage F-statistic					29.37	8.37
Observations	4,067	4,067	4,067	4,067	4,067	4,067
R-squared	0.24	0.355	0.182	0.312	0.153	0.201
Individual controls	YES	YES	YES	YES	YES	YES
Family controls	YES	YES	YES	YES	YES	YES
School type	YES	NO	YES	NO	YES	NO
Contextual variables	YES	YES	YES	YES	YES	YES
School FE	NO	YES	NO	YES	NO	YES

Note: The robust standard errors clustered at the school level are reported in parentheses. Individual controls: sex, age, month of birth, and a dummy indicating whether the student went to KG. Family controls: number of siblings, household income, and father's and mother's age. School type: UNRWA or governmental. Contextual controls: area population in 2013, whether this area was affected by the separation wall, percentage of the locality in area C, locality poverty rate, and school fixed effect. *** p<0.01, ** p<0.05, and * p<0.1.

Table 2.8: OLS and IV estimates of the effect of parents with a university degree on their children's school achievements

	OLS		2SLS		First stage	
	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable:	GPA2013		GPA2013		Parents' edu.	
Fathers with uni./college degree	7.626***	7.154***	7.277*	6.713		
	(0.768)	(0.772)	(4.198)	(4.580)		
Father's exposure to Intifada (age 13–19)					-0.033***	-0.030***
					(0.003)	(0.003)
First-stage F-statistic					25.52	7.19
Observations	3,999	3,999	3,999	3,999	3,999	3,999
R-squared	0.12	0.179	0.12	0.179	0.134	0.175
Mothers with uni./college degree	9.051***	8.350***	12.004	11.542		
	(0.814)	(0.826)	(14.275)	(15.231)		
Mother's exposure to Intifada (age 13–19)					0.009***	0.008***
					(0.003)	(0.003)
First-stage F-statistic					29.37	8.37
Observations	4,073	4,073	4,073	4,073	4,073	4,073
R-squared	0.124	0.184	0.121	0.18	0.152	0.201
Individual controls	YES	YES	YES	YES	YES	YES
Family controls	YES	YES	YES	YES	YES	YES
School type	YES	NO	YES	NO	YES	NO
Contextual variables	YES	YES	YES	YES	YES	YES
School FE	NO	YES	NO	YES	NO	YES

Note: The robust standard errors clustered at the school level are reported in parentheses. Individual controls: sex, age, month of birth, and a dummy indicating whether the student attended KG. Family controls: number of siblings, household income, and father's and mother's age. School type: UNRWA or governmental. Contextual controls: area population in 2013, whether this area was affected by the separation wall, percentage of the locality in area C, locality poverty rate, and school fixed effect. *** p<0.01, ** p<0.05, and * p<0.1.

Table 2.9: Robustness checks, OLS and IV estimates of the effect of parents' years of education on school achievements

Dep. var.	Student GPA 2011/2012				Student GPA 2012/2013			
	OLS		2SLS		OLS		2SLS	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A								
Father's years of education	1.107***	1.084***	1.758**	1.711*	1.190***	1.188***	1.553*	1.593
	(0.070)	(0.069)	(0.717)	(0.871)	(0.084)	(0.085)	(0.865)	(1.032)
First-stage F-statistic			22.89	7.08			22.81	7.06
Observations	3,998	3,998	3,998	3,998	3,996	3,996	3,996	3,996
R-squared	0.193	0.243	0.172	0.224	0.145	0.205	0.140	0.200
Panel B								
Mother's years of education	1.050***	0.992***	0.536	0.567	1.236***	1.194***	0.858	0.924
	(0.089)	(0.088)	(0.964)	(1.198)	(0.096)	(0.096)	(1.033)	(1.221)
First-stage F-statistic			27.1	9.32			26.95	9.28
Observations	4,072	4,072	4,072	4,072	4,070	4,070	4,070	4,070
R-squared	0.179	0.227	0.167	0.220	0.142	0.201	0.138	0.199
Individual controls	YES	YES	YES	YES	YES	YES	YES	YES
Family controls	YES	YES	YES	YES	YES	YES	YES	YES
School type	YES	NO	YES	NO	YES	NO	YES	NO
Contextual variables	YES	YES	YES	YES	YES	YES	YES	YES
School FE	NO	YES	NO	YES	NO	YES	NO	YES

Note: The robust standard errors clustered at the school level are reported in parentheses. **Individual controls**: sex, age, month of birth, and a dummy indicating whether the student attended KG. **Family controls**: number of siblings, household income, and father's and mother's age. **School type**: UNRWA or governmental. **Contextual controls**: area population in 2013, whether this area was affected by the separation wall, percentage of the locality in area C, locality poverty rate, and school fixed effect. *** p<0.01, ** p<0.05, and * p<0.1.

The third robustness check is undertaken by controlling the school performance for the previous year, 2011/2012, when the cognitive test scores are the outcome variable. In Table (2.A.6) in the appendix, the IV estimates for paternal education yield an imprecise smaller coefficient than the OLS estimates, with the wrong sign. However, the OLS estimate for maternal education produces a smaller coefficient than the one derived from the model without cognitive scores (0.294 versus 0.79, respectively), while the IV estimate is still larger than the OLS estimate. Overall, the 2SLS results for maternal education suggest some evidence for a causal relationship for intergenerational transmission of human capital. On the other hand, the paternal 2SLS

estimates confirm that the positive correlation between maternal education and child cognitive test scores is due to the association with other unobserved factors, such as ability, family background, or inherent genetics rather human capital spillovers.

The last robustness check is executed by changing the specification of the instrument. The primary instrument is constructed by recognizing the parents' exposure to the first Intifada between 13 and 19 years of age. One concern is that those parents of college age (19–22) were additionally influenced by the Intifada, and along these lines they had a lower chance of being admitted to colleges during that period. Table (2.A.7) in the appendix does not support an educational spillover after changing the instrument specification. The IV lacks precision and has a high standard error. Indeed, even the first stage is significant, and the F-statistic is greater than 10 before adding the school fixed effect. However, the IV estimates are consistently lower than the OLS estimates with the wrong sign.

2.8. Conclusion

In this study, I use cognitive test scores from approximately 4,000 students from grade 5 to grade 9 in the West Bank to investigate the intergenerational transmission of human capital. I identify the exogenous effect of parental education using exposure to the First Palestinian Intifada as the instrumental variable. The results suggest a partial causal relationship between fathers' schooling and that of their children, while there is some evidence of an educational spillover between mothers and their offspring. However, when focusing on girls' and boys' results separately, I find that both mothers' and fathers' education have quite a similar causal impact solely on their daughters' cognitive test scores. Employing the school achievements for the 2012/2013 academic year as a secondary outcome indicates a significant educational spillover between fathers and their offspring. Furthermore, this outcome confirms the positive educational spillover between both parents and their daughters. Nevertheless, there remains much to explore about parents' roles in enhancing their children's cognitive abilities and how these abilities are correlated with parents' education.

The findings of this study are in line with other existing literature that has discussed the intergenerational transmission of human capital. The cognitive test results suggest that maternal education has a larger impact on children than paternal education. These results are also consistent with other studies that have shed light on the educational spillover across generations. Black et al.

(2005) attributed this stronger effect of maternal education to positive assortative mating. Another explanation is the fact that women with more education have fewer children and therefore more resources to invest in each child's education. They also suggested that educated mothers may reduce the cost (in terms of effort) of education for the child. Chevalier (2004) indicated that the stronger effect of maternal education could be explained by the role that an educated mother plays in her family, for example spending more time with her children, helping them with homework, reading to them, or taking them outside.

The overall findings are consistent with the idea that policies aimed at improving education will have a substantial impact on the second generation. Although some unobserved variables related to the Palestinian context may exist and girls are over-represented in the sample, the sampling process captures all West Bank governorates, thus enhancing the policy implications of the study.

Long-term impacts should be considered when estimating the social return on education. The findings of this chapter indicate the importance of education intervention policies that would augment the human capital spillover across generations. Furthermore, understanding the benefit of investment in human capital can lead to a reduction in the inequality of opportunity in the educational attainment of subsequent generations. Another indication of the results is the long-run effect of educational destruction during conflict. Losing school days can be translated into significant loss not only in life but also in the educational outcome of the next generation. Thus, formulating policies that undergird educational institutions during conflict periods will have a remarkable accumulated positive impact on human capital.

Appendix

Table 2.A.1: Fathers' exposure to the First Intifada (1988–1993) during the age 13–19 years

Father's YOB	Freq.	1988	1989	1990	1991	1992	1993
Before 1950	70	38	39	40	41	42	43
1951	15	37	38	39	40	41	42
1952	13	36	37	38	39	40	41
1953	17	35	36	37	38	39	40
1954	38	34	35	36	37	38	39
1955	35	33	34	35	36	37	38
1956	43	32	33	34	35	36	37
1957	46	31	32	33	34	35	36
1958	72	30	31	32	33	34	35
1959	64	29	30	31	32	33	34
1960	110	28	29	30	31	32	33
1961	94	27	28	29	30	31	32
1962	151	26	27	28	29	30	31
1963	162	25	26	27	28	29	30
1964	160	24	25	26	27	28	29
1965	189	23	24	25	26	27	28
1966	189	22	23	24	25	26	27
1967	227	21	22	23	24	25	26
1968	238	20	21	22	23	24	25
1969	243	19	20	21	22	23	24
1970	272	18	19	20	21	22	23
1971	251	17	18	19	20	21	22
1972	234	16	17	18	19	20	21
1973	245	15	16	17	18	19	20
1974	250	14	15	16	17	18	19
1975	192	13	14	15	16	17	18
1976	150	12	13	14	15	16	17
1977	103	11	12	13	14	15	16
1978	77	10	11	12	13	14	15
1979	68	9	10	11	12	13	14
1980	26	8	9	10	11	12	13
1981	22	7	8	9	10	11	12
1982	8	6	7	8	9	10	11
1983	6	5	6	7	8	9	10
1984	2	4	5	6	7	8	9
Total	4,082						
Number of observations exposed to the First Intifada						2,085	

Table 2.A.2: Mothers' exposure to the First Intifada (1988–1993) during the age 13–19 years

Mother's YOB	Freq.	1988	1989	1990	1991	1992	1993
1950	8	38	39	40	41	42	43
1952	1	36	37	38	39	40	41
1953	4	35	36	37	38	39	40
1954	3	34	35	36	37	38	39
1955	4	33	34	35	36	37	38
1956	12	32	33	34	35	36	37
1957	11	31	32	33	34	35	36
1958	18	30	31	32	33	34	35
1959	30	29	30	31	32	33	34
1960	42	28	29	30	31	32	33
1961	47	27	28	29	30	31	32
1962	81	26	27	28	29	30	31
1963	74	25	26	27	28	29	30
1964	92	24	25	26	27	28	29
1965	102	23	24	25	26	27	28
1966	120	22	23	24	25	26	27
1967	134	21	22	23	24	25	26
1968	160	20	21	22	23	24	25
1969	169	19	20	21	22	23	24
1970	160	18	19	20	21	22	23
1971	213	17	18	19	20	21	22
1972	222	16	17	18	19	20	21
1973	217	15	16	17	18	19	20
1974	243	14	15	16	17	18	19
1975	270	13	14	15	16	17	18
1976	277	12	13	14	15	16	17
1977	283	11	12	13	14	15	16
1978	256	10	11	12	13	14	15
1979	252	9	10	11	12	13	14
1980	211	8	9	10	11	12	13
1981	152	7	8	9	10	11	12
1982	133	6	7	8	9	10	11
1983	86	5	6	7	8	9	10
1984	38	4	5	6	7	8	9
Total	**4,125**						
Number of observations exposed to the First Intifada							2,773

Table 2.A.3: Subtests of the cognitive test

Subtest no. (1)	Subtest name	No. of items	Cronbach's α
	Verbal tests		
1	Verbal classification	17	0.82
3	Verbal analogies	18	0.76
6	Vocabulary	30	0.73
9	Verbal oddities	13	0.74
12	Sentence completion	16	0.77
	Numerical tests		
7	Number series	12	0.79
11	Word arithmetic prob-lems	13	0.78
	Figural tests		
2	Figure classification	15	0.71
4	Figure analogies	15	0.87
5	Matrices	8	0.8
8	Figure series	10	0.76
10	Figural oddities	14	0.55

(1) Subtest order in the test

Table 2.A.4: Effect of exposure to the First Intifada on household income

Outcome: Household income	(1)	(2)	(3)	(4)
Exposure to Intifada (age 13–19)	0.00926	0.0671	0.0724	0.0294
	(0.0550)	(0.0566)	(0.0597)	(0.0615)
Observations	4,370	4,222	3,819	3,819
Education	NO	YES	YES	YES
Age	NO	NO	YES	YES
Age squared	NO	NO	YES	YES
Locality fixed effect	NO	NO	NO	YES

The results are obtained by ordered logit regression. The outcome variable is household income in 2013, measured in the new Israeli shekel currency, and takes 5 intervals: [1] <1500; [2] 1500–2499; [3] 2500–3999; [4] 4000–5000; and [5] >5000. Fathers' exposure to the First Intifada is a dummy variable that takes the value 1 if the father was exposed to the First Intifada at the age of 13–19 years and 0 otherwise. s ehTtandard errors are in parentheses and clustered at the locality level. *** p<0.01, ** p<0.05, * and p<0.

Table 2.A.5: OLS – The effect of all the variables on cognitive tests and school performance

	(1)	(2)	(3)	(4)
Dep. var.:	Cognitive tests		GPA 2013	
Father's years of education	0.637***	0.584***	0.841***	0.871***
	(0.069)	(0.066)	(0.084)	(0.083)
Mother's years of education	0.519***	0.490***	0.852***	0.836***
	(0.074)	(0.072)	(0.090)	(0.091)
Male student	-7.822***	-4.531	-3.055***	-6.841*
	(0.500)	(2.990)	(0.603)	(3.779)
Student age (years)	3.431***	3.467***	-1.027***	-1.018***
	(0.155)	(0.146)	(0.187)	(0.184)
Student attended KG	0.06	-0.07	-1.422	-1.623*
	(0.728)	(0.694)	(0.879)	(0.877)
Number of siblings	-0.505***	-0.443***	-0.814***	-0.928***
	(0.136)	(0.131)	(0.164)	(0.165)
Household net monthly income	1.289***	1.351***	1.534***	1.795***
	(0.209)	(0.204)	(0.253)	(0.257)
Population per locality (2013)	0	-0.000*	-0.000*	0
	0.000	0.000	0.000	0.000
Locality affected by the separation wall (0,1)	0.871*	-5.066*	-0.929	-9.539**
	(0.509)	(2.975)	(0.613)	(3.760)
Area C (proportion)	-4.811***	0.561	-1.5	-5.381
	(0.878)	(3.535)	(1.058)	(4.468)
School authority (gov. 1)	-4.695***		-3.540***	-4.695***
	(0.468)		(0.565)	(0.468)
Observations	3,898	3,899	3,904	3,904
R-squared	0.275	0.384	0.162	0.221
School FE	NO	YES	NO	YES

The robust standard errors clustered at the school level are reported in parentheses. *** p<0.01, ** p<0.05, and * p<0.1.

Table 2.A.6: OLS and IV estimates of the effect of parents' years of education on cognitive ability

	OLS		2SLS	
Dep. var.: Cognitive tests	(1)	(2)	(3)	(4)
	Panel A			
Father's years of education	0.332***	0.267***	-0.279	-0.387
	(0.070)	(0.059)	(0.716)	(0.831)
First-stage F-statistic			37.54	11.48
Observations	4,064	4,064	4,064	4,064
R-squared	0.432	0.527	0.419	0.514
	Panel B			
Mother's years of education	0.294***	0.262***	0.870	0.853
	(0.081)	(0.069)	(0.891)	(1.044)
First-stage F-statistic			65.48	10.44
Observations	3,990	3,990	3,990	3,990
R-squared	0.433	0.525	0.416	0.507
Individual controls	YES	YES	YES	YES
Family controls	YES	YES	YES	YES
School type	YES	NO	YES	NO
Contextual variables	YES	YES	YES	YES
GPA 2011/2012	YES	YES	YES	YES
School FE	NO	YES	NO	YES

Note: The robust standard errors clustered at the school level are reported in parentheses. **Individual controls**: sex, age, month of birth, and a dummy indicating whether the student attended KG. **Family controls**: number of siblings, household income, and father's and mother's age. **School type**: UNRWA or governmental. **Contextual controls**: area population in 2013, whether this area was affected by the separation wall, percentage of the locality in area C, and locality poverty rate. **School achievement in 2011/2012** and school fixed effect. *** p<0.01, ** p<0.05, and * p<0.1.

Table 2.A.7: OLS and IV estimates of the effect of parents with a university degree on their children's cognitive abilities

	OLS		2SLS		First stage	
	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable:	Cognitive tests		Cognitive tests		Parents' edu.	
Panel A						
Fathers with uni./college degree	5.038***	4.515***	-10.999	-11.395		
	(0.626)	(0.541)	(13.916)	(13.304)		
Father's exposure to Intifada (age 19–22)					-0.045***	-0.043***
					(0.014)	(0.014)
First-stage F-statistic					22.68	6.73
Observations	3,994	3,994	3,994	3,994	3,994	3,994
R-squared	0.248	0.363	0.088	0.214	0.108	0.156
Panel B						
Mothers with uni./college degree	4.918***	4.382***	-7.763	3.18		
	(0.704)	(0.678)	(34.412)	(42.241)		
Mother's exposure to Intifada (age 19–22)					0.015	0.011
					(0.013)	(0.014)
First-stage F-statistic					30.11	8.6
Observations	4,067	4,067	4,067	4,067	4,067	4,067
R-squared	0.24	0.355	0.16	0.355	0.151	0.2
Individual controls	YES	YES	YES	YES	YES	YES
Family controls	YES	YES	YES	YES	YES	YES
School type	YES	NO	YES	NO	YES	NO
Contextual variables	YES	YES	YES	YES	YES	YES
School FE	NO	YES	NO	YES	NO	YES

Note: The robust standard errors clustered at the school level are reported in parentheses. Individual controls: sex, age, month of birth, and a dummy indicating whether the student attended KG. Family controls: number of siblings, household income, and father's and mother's age. School type: UNRWA or governmental. Contextual controls: area population in 2013, whether this area was affected by the separation wall, percentage of the locality in area C, locality poverty rate, and school fixed effect. *** p<0.01, ** p<0.05, and * p<0.1.

CHAPTER 3

Cohort at Risk: Long-Term Consequences of Conflict for Child School Achievement

Joint work with Hendrik Jürges, Luca Stella, and Alexandra Schwarz

3.1 Introduction

Violent conflicts can have enormous social and economic consequences for the affected civilian population. These consequences can be especially dramatic for children. A growing body of research from different countries has provided robust evidence of the short-run adverse effects of conflicts on a large array of children's outcomes, including, for instance, health (Akresh, Lucchetti, & Thirumurthy, 2012; Minoiu & Shemyakina, 2014), psychological well-being (Blattman & Annan, 2010), child labor (Di Maio & Nandi, 2013), and education (Brück et al., 2014; Di Maio & Nandi, 2013; Shemyakina, 2011). However, exposure to conflict may also affect the outcomes of individuals later in life, particularly if this happens during early childhood, which may be a sensitive or even critical period for the development of important skills in life (Conti & Heckman, 2014).

This chapter contributes to the literature in two ways: first, we investigate the long-term effects of households' exposure to violent conflict on children's educational attainment. So far, only a few authors have investigated such long-term effects, and the results remain inconclusive and context dependent. For instance, whereas Akresh and De Walque (2008) and León (2012) found that exposure to conflict in early childhood reduces completed years of schooling by 0.3 to 0.5 years, Arcand and Wouabe (2009) found no such effect. Second, and perhaps more importantly, we provide detailed analyses of the causal channels through which exposure to conflict may affect educational outcomes – which are critical for designing and implementing effective policies that protect children from the negative conflict effects (Justino, 2011). We are not aware of any papers in the related literature that have examined skill development as a potential mechanism. We fill this gap by explicitly analyzing cognitive skills (IQ) and non-cognitive skills (personality and behavioral problems) as possible causal mechanisms. In a way, we provide a mirror image of the work by Heckman and coauthors on the long-term beneficial effects of preschool programs; see, for example, Heckman et al. (2013). More generally, by investigating how exposure to conflict in the early stages of a child's development affects her skills and outcomes later in life, this study contributes to our knowledge of how the early childhood environment affects long-term outcomes (see, for instance, Currie, 2001; Gould, Lavy, & Paserman, 2011; Heckman, 2000; Krueger & Whitmore, 2001).

Specifically, our study is set in the context of the Israeli–Palestinian conflict. We study the intelligence, non-cognitive skills, and school grades of West Bank students seven years after the end of the Second Intifada, and we compare children whose families were directly affected by this conflict with those whose families were not. The Second Intifada took place between

September 2000 and February 2005. During that period, a resurgence in the intensity of violence between Palestinian organizations and Israeli Defense Forces (IDF) resulted in more than 38,000 casualties (dead and wounded). It claimed the life of about 4,000 Palestinian and 1,000 Israeli civilians (18 percent of whom were children), with the number of fatalities varying markedly across localities and over time.[27] For example, 2002 saw a peak in the number of deaths in the context of a large-scale Israeli military offensive, Operation Defensive Shield, in response to Palestinian suicide attacks. This military operation was concentrated primarily on some very violent localities in the West Bank, such as Jenin, Nablus, and Hebron (Mansour & Rees, 2012). During the conflict, the IDF also engaged in operations involving violence against civilians in Palestine, such as the occupation of Palestinian houses, beatings, and abuse. Tight restrictions were imposed on the movement of people and goods within the Palestinian territories and between the territories and Israel (see, for instance, B'Tselem, 2002; Calì & Miaari, 2013). As noted by Mataria et al. (2009), these mobility restrictions further depressed the Palestinian economy, leading to a rise in unemployment, a decline in real wages, and a reduction in the quantity and quality of food. The initial building of the separation barrier across the West Bank contributed to a further division of Palestinian communities by isolating them from their surroundings (UNSCO, 2014). The social and political consequences of this conflict did not stop with the end of the Second Intifada but continue to this day (Jaeger, Klor, Miaari, & Paserman, 2012). An important aspect of the Second Intifada that is relevant to researchers is the temporal and spatial variation in the level of violence – which can fruitfully be exploited for the identification of causal effects. This is also made possible by the detailed information on the intensity of the conflict, as it is made publicly available by non-governmental organizations such as B'Tselem.[28]

Another feature of our analysis is the use of a direct, self-reported measure of household exposure to a violent event during the conflict. Such direct measures of exposure are often

[27] For a detailed description of the different periods of violence during the Second Intifada, see, for instance, Jaeger and Paserman (2008).

[28] B'Tselem is an Israeli human rights organization, which provides information on each Palestinian and Israeli fatality, including the date, location, and circumstances of the fatality and the age, sex, and locality of residence of the victim, since the beginning of the Second Intifada. The B'Tselem data have been employed by many authors analyzing the Israeli–Palestinian conflict (see, for example, Jaeger et al., 2012, or Mansour & Rees, 2012). They are considered to be accurate and reliable by both Israelis and Palestinians.

missing from conflict data. While retrospective self-reports have limitations, for instance due to recall bias, they improve our understanding of the consequences of conflict (Brück, Justino, Verwimp, Avdeenko, & Tedesco, 2015). Moreover, an individual family's exposure to the conflict might depend on a range of characteristics that are also linked with children's educational attainment and are thus likely not to be exogenous. Therefore, we exploit the locality-level variation in conflict intensity to identify exogenous variation in households' experience of conflict-related events. An earlier example of an analysis that employs the number of fatalities in a given locality to measure conflict intensity during the Second Intifada is that by Brück et al. (2014). The authors used the year-to-year variation in the number of (Palestinian) victims at the school locality to investigate the short-term effects of violence on students' probability of passing the high school final exam. We also use the locality-level number of fatalities as a measure of conflict intensity, but, since we consider the long-run effects of the conflict, we employ the cumulative number of victims over the entire Second Intifada period. Our identification relies on the assumption that the number of fatalities in the household locality only influences children's grades several years later through family exposure to conflict. This assumption may not hold if time-invariant unobservable factors at the locality level are correlated with both conflict intensity and children's school performance. To circumvent this problem, we control for a range of local labor market and institutional characteristics, such as the unemployment rate, the poverty rate, the proportion of the locality under the Israeli administration, and the presence of the separation wall.

A further threat to the validity of our exclusion restriction arises from the endogenous sorting of households across localities in response to increased levels of violence. In particular, if households systematically move away and children's primary education outcomes are correlated with the household decision to move, this can lead to biased estimates of family exposure to conflict. While we cannot address this concern directly, we note that, in the West Bank during the Second Intifada, internal and external mobility was extremely difficult and is still at a very low level. For example, Mansour and Rees (2012) pointed out that most Palestinian families living in the West Bank could not migrate because of the mobility restrictions imposed by Israel. Furthermore, data from the most recent (2007) census suggest that less than 10 percent of the current West Bank residents have moved away from their mother's place of residence at birth (PCBS, 2010a).

For our empirical analysis, we draw on data collected in 2013 in the West Bank, which contain information on a random sample of primary school students in grades 5 to 9 and their

families. These data are well suited to our purposes. First, they contain administrative information on children's primary school grades for three subsequent school years, specifically 2010/2011, 2011/2012, and 2012/2013. Second, they contain retrospective self-reported information on parents' experience of violence during the Second Intifada. Finally, the data contain detailed information on children's skills, thereby enabling us to shed light on the potential mechanisms through which families' exposure to conflict may affect children's school achievement. Throughout the analysis, we combine the individual-level data with locality-level information on the number of fatalities from the beginning of the Second Intifada in September 2000 to February 2005, allowing us to exploit the previously discussed geographical variation in fatalities.

Overall, our results demonstrate that families' exposure to conflict during the Second Intifada has long-term effects on their children's primary education achievement in the West Bank. An additional event of household exposure to conflict reduces their children's grade point average (GPA) by 5.74 points (on a 0 to 100 scale), which corresponds to a decline of approximately 0.3 standard deviations. As regards the potential mechanisms through which parents' exposure to conflict may affect children's performance at primary school, we show that more exposure to conflict leads to lower non-cognitive skills, such as conduct problems or a reduced level of conscientiousness. In contrast, there is little evidence that cognitive skills, although being important determinants of school achievement, are affected by family exposure to conflict.

The remainder of this chapter is organized as follows. Section (3.2) presents a description of the data. Section (3.3) describes the empirical specification and identification strategy. Section (3.4) shows our main results and related robustness checks. Section (3.5) provides evidence on cognitive and non-cognitive skills as potential causal channels. Section (3.6) summarizes our findings and concludes.

3.2 Data

The data used in this study are drawn from a new data set collected in 2013 in the West Bank and East Jerusalem in the context of a joint research project between Wuppertal University, Hebrew University, and Al-Quds University, funded by the German Research Foundation (DFG). The data set contains information on a sample of approximately 6,000 primary school students (around 4,000 girls and 2,000 boys – girls were oversampled) in grades 5 to 9 and their families. Students were randomly selected, stratified by grade level, from a random sam-

ple of 100 single-sex primary schools across the West Bank, and stratified by region (north, center, and south) and school authority (public or UNRWA schools).[29]

The data set combines administrative and survey data. First, it contains individual grades in each subject for three subsequent school years, specifically 2010/11, 2011/12, and 2012/13. This information was obtained from the Ministry of Education's administrative records. We use this information to create our main educational outcome of primary schools: the student GPA, which is computed as the average of the most recent grades (i.e., school year 2012/2013) obtained in the six main subjects: Arabic, English, Science, Mathematics, Social Science and National Education, and Religious Education. This set of subjects covers more than 80 percent of the weekly lessons (UNESCO, 2011). Students are graded on a scale ranging from 0 to 100.

Second, our data set provides information at the individual and household level collected through paper-and-pencil student and family questionnaires. Of particular importance for our study is the parent-reported information on whether households themselves were exposed to violent events during the Second Intifada. This information is used to create the main explanatory variable in our analysis. Each household respondent was asked the following question: "During the Second Intifada, has your household experienced any of the following events?" The list of possible answers comprised seven items and reflected two aspects of the exposure to conflict: violence and economic consequences. For the purpose of this paper, we focus on the following violent events: "House was searched"; "House was occupied while you were in it"; "House was occupied and you were forced out"; and "House was sealed or destroyed." Whereas one-fourth of households reported that the house was searched, between 5 percent and 8 percent reported any of the other events. Furthermore, households were asked about the year and month of the event. Among the households that reported exposure to conflict, 40 percent did not provide an answer regarding the date. The answers of those that gave a date are summarized in Figure (3.B.1) in the Appendix. A small number of households reported events that happened during the First Intifada, and others reported events that happened after the end of the Second Intifada. These events were excluded from the analysis. An inspection of the reported dates further indicates that the events often took place in the same month and year, suggesting that the answers to our exposure questions refer to the same episode. Apparently,

[29] UNRWA schools are run by the United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA). It provides children of Palestinian refugees with basic education until grade 9. All types of school are required to follow the same national curriculum.

there is no single "correct" way to use self-reported information on exposure to conflict in our setting. For ease of interpretation, we use the raw count of events reported during the Second Intifada (a score ranging from zero to four). In a robustness analysis, we consider alternative definitions of exposure to conflict and demonstrate that our results are not sensitive to these changes.

Third, our data contain information on children's cognitive and non-cognitive skills, which we use to study the mechanisms by which household exposure to conflict affects educational attainment. Cognitive ability is measured through three major cognitive tests (verbal, numerical, and figural), each consisting of subtests covering a wide range of item contents (e.g., analogies, series, sentence completion, and vocabulary). The subtests were selected and adapted from established tests of general ability: the Cognitive Ability Test (Thorndike & Hagen, 1971), Milta – a Hebrew version of the Lorge–Thorndike Test (Ortar & Shachor, 1980), Standard Progressive Matrices (Raven, 1983), and the Culture Fair Intelligence Test (Cattell & Cattell, 1965).

Our indicators of non-cognitive skills are often-used measures of mental health and personality traits. We assess student mental health using the Strengths and Difficulties Questionnaire (SDQ), a 25-item behavioral screening questionnaire designed to measure mental health problems in children and adolescents between 3 and 16 years old (Goodman, 1997; Goodman, Ford, Simmons, Gatward & Meltzer, 2000).[30] SDQ items are used to construct three indicators of children's mental health: the total difficulties scale and the corresponding sub-scales for "internalizing" symptoms (emotional symptoms and peer problems) and "externalizing" behavior problems (conduct problems and hyperactivity/inattention). "Internalizing" symptoms are linked to anxiety and depression, whereas "externalizing" behavior problems are related to deviant and aggressive behaviors. The items for these two subscales are listed in Table A.1 in the Appendix. To facilitate the interpretation, we standardize the scores for internalizing and externalizing problems to have a mean of zero and a standard deviation of one.

Student personality is measured in terms of the Big Five model, a widely accepted approach to conceptualizing personality (Barenbaum & Winter, 2008; Goldberg, 1993), which is increasingly also used in labor market research to assess "soft" skills (Heckman & Kautz,

[30] The SDQ exists in three versions, to be answered by children, teachers, and parents, respectively, and has been validated in many languages, including Arabic (see www.sdqinfo.org). In this paper, we use the parent-reported version included in the parental background questionnaire.

2012). According to this model, personality traits can be organized in five basic dimensions: openness, conscientiousness, extraversion, agreeableness, and neuroticism. We use a parent-reported 15-item version of the Big Five questionnaire (see Table 3.A.2 in the Appendix). The scores on each dimension are z-standardized.

With regard to the local context, we use locality-level information on labor market and institutional characteristics, such as the type of locality (rural, urban, or refugee camp), unemployment and poverty rates, whether the locality is affected by the separation wall, and the proportion of the locality under area C.[31] Localities are the smallest administrative units defined by the Palestinian Central Bureau of Statistics (PCBS) based on their economic inter-linkages. There are 528 localities overall in the West Bank. Data on such a specific geographic level are available only occasionally. For instance, locality-level unemployment rates are available only for 2007 and are drawn from the PCBS. The information on unemployment for localities in East Jerusalem comes from the Applied Research Institute Jerusalem (ARIJ, 2014) and the Jerusalem Institute for Israel Studies. The poverty rates (available for 2009 only), the proportion of the locality under area C, and information on whether a locality is affected by the separation wall are obtained from the World Bank (Vishwanath et al., 2014). These contextual variables are then merged with the individual-level data using information on the residence of the household living in a locality.

Our most important contextual variable is the number of Palestinian fatalities at each child's school locality from September 2000 to February 2005, which is drawn from B'Tselem. These data measure the local area conflict intensity during the Second Intifada. While the measures of conflict intensity used in the literature differ considerably,[32] the number of conflict-related Palestinian victims can be regarded as the best proxy for Palestinian exposure to conflict in the West Bank during the Second Intifada (Amodio & Di Maio, 2016).

[31] Since 1995, the West Bank has been divided into three areas: A, B, and C. Figure (3.1) shows a map of the West Bank and the geographical division of Palestinian territories into those areas. The Palestinian National Authority (PNA) has control over both administration (e.g., health, education, sanitation, water, and taxation) and security in area A, whereas control by the PNA is limited to administration in area B and is absent in area C (Vishwanath et al., 2014). Communities in area C are at higher risk of adverse life circumstances due to the lack of primary services (UNSCO, 2014).

[32] For example, Di Maio and Nandi (2013) use the number of closure days, Calì and Miaari (2013) employ the number of IDF check points in the West Bank, and Eckstein and Tsiddon (2004) utilize the number of Israeli victims of Palestinian attacks in Israel.

Our analytical sample is constructed as follows: only observations with missing data for students' achievement in primary school and households' experience of political violence are excluded from the analysis. To minimize the loss of observations, missing values in any other variable are substituted by mean values. Additionally, an indicator for such missing values is created.[33] After these restrictions, we obtain a working sample that contains 4,235 children in grades 5 to 9 enrolled in 98 primary schools located across 74 distinct localities throughout the West Bank.[34]

Table (3.1) reports the descriptive statistics of the main variables used in the analysis. It consists of three panels, panel A for the sample at the individual level and panels B and C for the corresponding samples at the school level and locality level, respectively. The children in our sample are on average 12.8 years old, and 70 percent are girls. Their GPA is on average 67.8 points and has a standard deviation of 17.6 points. On average, parents report having been exposed to 0.45 conflict-related incidents during the Second Intifada.[35] Of the children in our sample, 41 percent have refugee status, meaning that they are descendants of families who were displaced after the 1948 Palestine War. A total of 25 percent of fathers and 19 percent of mothers have a college degree, and 37 percent of fathers and 39 percent of mothers have a high school diploma. As regards children's mental health and personality, we show the summary statistics before standardization. Children score, on average, 12.6 in terms of total difficulties, 6.1 in terms of "internalizing" symptoms, and 6.5 in terms of "externalizing" problems. These averages are fairly high compared with the corresponding figures from Western countries. For example, in the US, children of the same age score on average 7.1 in terms of total difficulties, 4.0 in terms of "externalizing" problems, and 3.0 in terms of "internalizing" symptoms (see www.sdqinfo.org).

[33] While the inclusion of these observations does not substantially affect the point estimates, it does improve the precision of our estimates.

[34] Data from two schools that did not collect household questionnaires (containing information on households' exposure to conflict) had to be dropped from our sample.

[35] Approximately 40 percent of the households reported at least one violent event, and, among those that reported at least one event, 95 percent reported that their house was searched. This is by far the most common violent event experienced by the students' households during the Second Intifada.

Table 3. 1: Descriptive statistics

Variable	Mean	Std Dev.	Min.	Max.
Panel A: Individual level. Observations: 4,235				
School achievement (2012/2013)	67.8	17.6	7.2	99.5
Family exposure to conflict	0.45	0.85	0	4
Child's age in years	12.8	1.5	10	18
Girl	0.70	0.46	0	1
Refugee status	0.41	0.49	0	1
Mother's age	39.5	6.0	24	65
Father's age	44.7	6.6	27	91
High school diploma (mother)	0.39	0.49	0	1
College degree (mother)	0.19	0.40	0	1
High school diploma (father)	0.37	0.48	0	1
College degree (father)	0.25	0.43	0	1
Cognitive test score	0.62	0.17	0	0.94
Numerical test score	0.62	0.21	0	1
Figural test score	0.58	0.19	0	0.97
Verbal test score	0.64	0.16	0	0.95
SDQ total score	12.6	5.7	0	34
Internalizing problems	6.1	3.1	0	17
Externalizing problems	6.5	3.6	0	19
Conscientiousness	3.9	0.9	1	5
Extraversion	3.3	0.7	1	5
Openness	4.0	0.8	1	5
Neuroticism	3.2	0.9	1	5
Agreeableness	3.8	0.8	1	5
Panel B: School level. Observations: 98				
UNRWA school	0.41	0.49	0	1
Panel C: Locality level. Observations: 74				
Separation wall	0.43	0.50	0	1
Locality under area C	0.32	0.33	0	1
Poverty rate 2007	0.22	0.12	0.02	0.50
Unemployment rate	0.17	0.08	0.02	0.40
Locality: rural	0.42	0.50	0	1
Locality: refugee camp	0.18	0.38	0	1

Notes: All the samples contain children for whom information on their school achievement and their exposure to conflict during the Second Intifada is not missing. To minimize the loss of observations, missing entries in any other covariate are replaced using mean values. Accordingly, an indicator for such missing values is created. * The mental health and personality variables are not standardized.

3.3Empirical Specification and Identification Strategy

The first part of our analysis aims to estimate the effects of parents' exposure to conflict on their children's educational attainment. To this end, we estimate the following linear model for student school achievement:

$$Y_{isl} = \alpha + \beta \, \text{Exposure}_{isl} + \gamma X_{isl} + \xi U_{sl} + \lambda Z_l + \varepsilon_{isl} \qquad (3.1)$$

where the index *isl* denotes child *i* enrolled in primary school s and residing in locality *l* in the year of the interview. The outcome variable Y_{isl} represents the GPA of child *i* for the school year 2012/2013.

Our variable of interest is Exposure_{isl}, defined as the number of violent events during the Second Intifada reported by the household respondent (child's mother or father) and detailed in the previous section. Thus, β captures the impact on the student GPA in the interview year of an additional event of parents' exposure to political violence at least seven years earlier. X_{isl} is a vector of individual covariates, including child sex, refugee status, dummies for children's and parents' age, and indicators for the maximum of fathers' and mothers' educational level as well as indicators for missing values of these covariates. U_{sl} is a school type indicator (UNRWA vs. public school). Z_l is the set of locality-level labor market and institutional characteristics, such as the unemployment rate, the poverty rate, the proportion of the locality under area C, the presence of the separation wall, and the type of locality (rural, urban, or refugee camp). Finally, ε_{isl} represents an idiosyncratic error term.

The need for an identification strategy arises from the potential correlation of household experience of violence during the Second Intifada with various unobservable determinants of student achievement. Such correlation, related in particular to family background characteristics but also the education infrastructure, may confound our relationship of interest. One obvious concern might be, for example, that richer and better-educated families – who have children of better academic ability – may reside in certain areas that are less prone to Palestinian violence, which may have provoked counter-violence by the IDF. While we are able to control for observed background characteristics to address this concern, there may still be unobserved confounders.

We therefore apply an IV strategy to identify the long-term effect of household exposure to conflict on children's primary school achievement, using the number of Palestinian fatalities at

the locality level as an instrument for family exposure to conflict. However, since the present analysis focuses on the long-term academic outcomes of children, seven years after the conclusion of the conflict, we can exploit only the cross-locality variation in the total number of Palestinian victims (and not the variation over time within the locality during the Second Intifada) to identify the effect of family exposure to conflict. Thus, one potential threat to the validity of our instrument is the omitted variable bias resulting from the presence of time-invariant unobservable factors at the locality level correlated with both conflict intensity and child primary education performance. We argue that this problem is substantially mitigated by controlling for locality-level contextual variables.

Model (3.1) is estimated using two-stage least squares (2SLS), with the following first-stage regression:

$$\text{Exposure}_{isl} = \eta + \delta\ \text{Fatalities}_{l} + \theta X_{isl} + \zeta U_{sl} + \sigma Z_{l} + \nu_{isl} \qquad (3.2)$$

where Exposure_{isl} is regressed on Fatalities $_{l}$, defined as the locality-level number of all conflict-related Palestinian victims during the Second Intifada. X_{isl}, Z_{l}, and U_{sl} are defined in the same way as in Equation (3.1). The standard errors are clustered by locality, the level of variation of our instrument.

To illustrate the variation of our instrument, Figure (3.1) provides a map of the West Bank. Each circle represents a locality contained in our sample. The size of the circle indicates the locality-level number of Palestinian fatalities during the Second Intifada. Overall, Figure (3.1) shows a substantial degree of variation in the number of Palestinian fatalities, with the highest levels of conflict intensity being concentrated in some very violent localities, such as Nablus, Jenin, Tulkarm, Hebron, and Ramallah. Figure (3.2) shows the relationship between the total number of fatalities during the Second Intifada at the governorate level (there are 11 governorates in the West Bank) and the average level of exposure to conflict as reported by parents. This graph reflects the (first-stage) variation that we exploit in our analysis.

3.4 Results

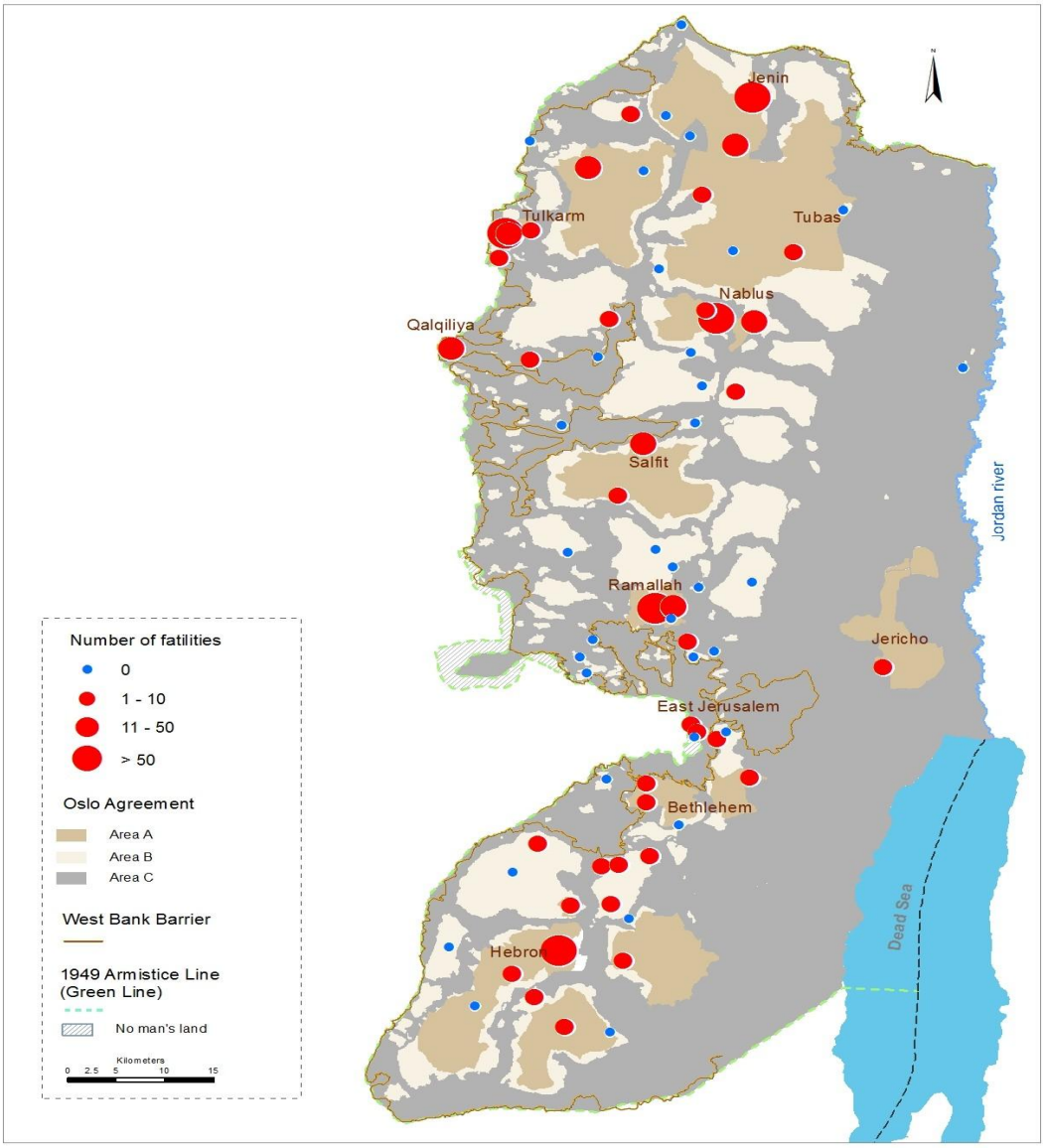
3.4.1 Main Results

Table (3.2) reports the estimates of the effects of an increase in household exposure to conflict during the Second Intifada on children's primary school achievement obtained from an OLS

regression (column 1) and a 2SLS regression (column 4). In addition, we show the corresponding results from the reduced-form (column 2) and first-stage (column 3) regressions. As described in the previous section, in each regression, we include individual-level, school-level, and locality-level control variables.

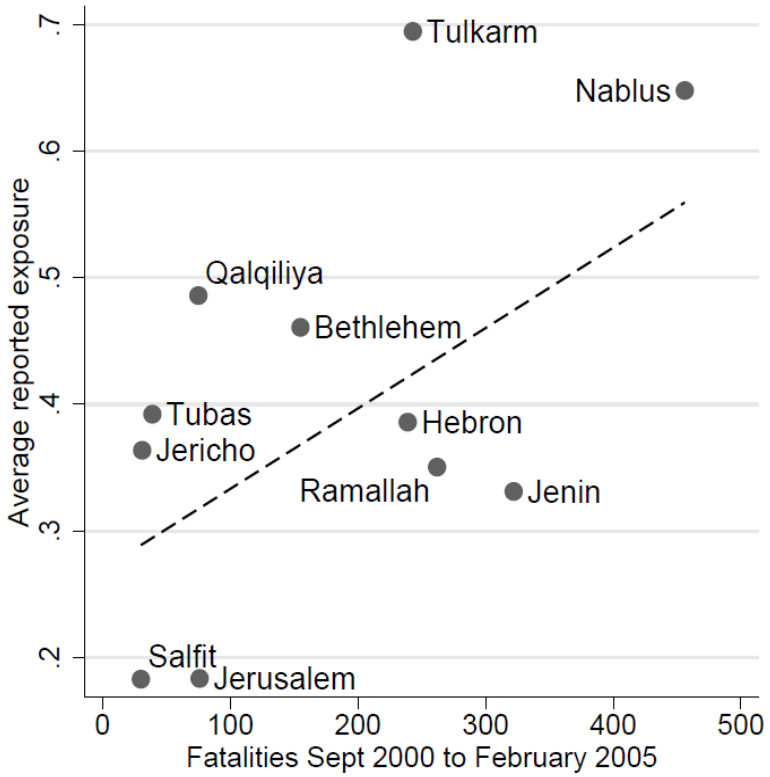
The OLS coefficient suggests a negative and significant association between households' exposure to conflict and their children's school performance: an additional event of parents' experience of conflict is associated with a 1.32-point decrease in students' GPA in primary school, which corresponds to approximately 8 percent of a standard deviation. The reduced-form regression suggests that the GPA drops by approximately 2 points per 100 fatalities in the locality.

The first-stage regression shows that 100 more fatalities in the locality increase parents' exposure to conflict by 0.35 events on average. With a first-stage F-statistic of 46, our instrument easily passes the conventional thresholds for strong instruments. The 2SLS coefficient for parents' exposure to conflict remains negative and statistically significant and is larger than our OLS estimate. We find that 1 additional event of parents' exposure to conflict induced by the Second Intifada reduces the primary school GPA of their children by 5.74 points. This effect represents a decline of about 30 percent of a standard deviation.



Source: Own calculations based B'Tselem data.

Figure 3.1: Map of the West Bank, school locations, and the number of Palestinian fatalities during the Second Intifada



Source: Own calculations based on survey data and B'Tselem data.

Figure 3.2: Correlation between the average exposure (number of reported events) and the total number of Second Intifada fatalities by governorate

As previously mentioned, we also estimate a range of regressions with alternative operational definitions of the exposure variable, obtaining very similar results. The details can be found in Table 3.B.1 in the Appendix. Importantly, as shown in Columns E and F, our instrument does not predict exposure to conflict before or after the Second Intifada. We interpret this as evidence that the instrument does not pick up any trends in location-specific levels of violence.

3.4.2 Robustness Checks

We assess the robustness of our main results to a number of further specification changes. The results are reported in Table (3.3). First, in Column (1), we check the sensitivity of our results to a change in the functional form of the first-stage and reduced-form regressions. The major concern here is that the exposure to conflict and GPA may not follow linear functions of the number of fatalities. To allow for this possibility, we recode our instrument into 4 categories (as shown in Figure (3.1)): 0 fatalities, 1–10 fatalities, 11–50 fatalities, and >51 fatalities. Our

point estimate changes somewhat, we lose precision, and the first-stage F-statistic decreases, but the qualitative result remains.

Table 3. 2: Effects of family exposure to conflict on children's primary school GPA, main specification

	(1) OLS	(2) Reduced form	(3) First stage	(4) 2SLS
Dep. var.:	Child GPA	Child GPA	Family exposure to conflict	Child GPA
Family exposure to conflict	-1.32***	—	—	-5.74***
	(0.26)			(1.60)
Fatalities (in hundreds)	—	-2.04***	0.35***	—
		(0.59)	(0.05)	
First-stage F statistic			46.12	46.12
Mean of dep. var.	67.83	67.83	0.45	67.83
SD of dep. var.	17.63	17.63	0.85	17.63
Individual-level controls	Yes	Yes	Yes	Yes
School-level controls	Yes	Yes	Yes	Yes
Locality-level controls	Yes	Yes	Yes	Yes
N obs.	4,235	4,235	4,235	4,235

Notes: The standard errors are reported in parentheses and clustered at the locality level. The individual-level controls include the sex of the child, the sex of the household respondent, dummies for children's and parents' age, dummies for parental educational levels, and indicators for missing values of these covariates. The school-level control variable is an indicator for UNRWA versus public school. The locality-level variables contain the unemployment rate, the poverty rate, the proportion of the locality under area C, the presence of the separation wall, and the type of locality (rural, urban, or camp). * Significant at 10%; ** significant at 5%; and *** significant at 1%.

Second, to investigate heterogeneous effects across the distribution of the GPA, in columns (2) to (4), we report the treatment effects at the twenty-fifth, fiftieth, and seventy-fifth percentiles. Our results suggest that the effect of family exposure to conflict induced by the Second Intifada is concentrated in the lower quantiles of the GPA distribution. In other words, the long-term effects of family exposure to conflict induced by the Second Intifada seem to be driven by poor academically performing students.

Third, another concern regards the sensitivity of our findings with respect to the year in which school achievement in primary school is measured. As previously mentioned, our data

set provides information on student GPA not only for the school year 2012/2013 but also for the two preceding school years, namely 2010/2011 and 2011/2012. Hence, we run two additional 2SLS regressions of model (1) using the student GPA for the school years 2010/2011 (column 5) and 2011/2012 (column 6) as alternative outcomes. The results remain qualitatively unchanged relative to the main specification: the coefficient for family exposure to conflict has negative and significant effects on children's GPA in primary school. Note, however, that the point estimates are actually smaller in the two earlier years than in 2012/13. This suggests that the effects on student GPA do not tend to subside over time. We interpret this as corroborating evidence for the plausibility and usefulness of our long-term analysis.

Fourth, in column (7), we verify the robustness of our results when using a broader measure of conflict intensity that includes the locality-level number of all Palestinian and Israeli victims during the Second Intifada. The reason for this check is that both sides of the conflict may react in a regular and predictable way to violence against them. This would imply that an increase in the number of conflict-related Israelis fatalities may lead to more violent actions against the civilian population in the West Bank. Again, the estimated parameter closely resembles the one obtained in the benchmark specification.

Next, we check what happens when we include governorate fixed effects (column 8) in model (3.1). The identification then rests on within-governorate variation in the intensity of conflict. Differences in exposure to violence or children's educational attainment that are linked to the larger region are hence controlled for – addressing potential concerns about the validity of our instrument. Again, we find that the point estimate hardly changes. The standard errors increase a little, but the first-stage F-statistic remains safely above 20. In a related robustness check, we exclude single governorates one at a time to examine whether the results are driven by a specific governorate. This exercise, for which we do not report detailed results, confirms that our main results are robust.

As the final check, in columns (9) and (10), we split the sample into two parts based on the date of birth of the children in our sample. Specifically, in column (9), we restrict the sample to all children born before February 2000. These children attended school for at least one year during the Second Intifada. One might argue that part of the effect that we measure is not due to parental exposure to conflict but rather to disruptions to teaching, such as the closing of schools, the detainment of teachers, road closures keeping children from reaching schools, and so on (Brück et al., 2014). In column (10), we focus on children born in February 1999 or later, who entered school in September 2005 (after the end of the Second Intifada) and whose

schooling has not been directly affected by the conflict. Taken together, the results in columns (9) and (10) do not provide any evidence for differential effects of household exposure to conflict by date of birth.

Table 3. 3: Robustness checks, 2SLS estimates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Categorical	Distribution			Earlier years		All	Province	In school	
	instrument	Top 75%	Top 50%	Top 25%	GPA 10/11	GPA 11/12	fatalities	fixed ef-fects	During Second I.	After Second I.
Family exposure to con-flict	-4.07*	-0.12***	-0.14***	-0.02	-4.45***	-3.68***	-5.74***	-4.64	-5.17*	-5.86***
	(2.20)	(0.04)	(0.04)	(0.04)	(1.31)	(1.31)	(1.65)	(2.87)	(3.01)	(1.95)
First-stage F statistic	10.3	46.1	46.1	46.1	45.8	46.1	61.3	31.6	33.6	45.1
Mean of dep. var.	67.8	0.75	0.5	0.25	72.7	70.5	67.9	67.8	65.8	69.2
SD of dep. var.	17.6	0.43	0.5	0.43	16	15.9	17.6	17.6	17.8	17.4
Individual-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
School-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Locality-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N obs.	4,235	4,235	4,235	4,235	4,206	4,231	4,235	4,235	1,737	2,498

Notes: The standard errors are reported in parentheses and clustered at the locality level. The individual-level controls include a female dummy for children and parents, dummies for children's and parents' age, dummies for parental educational levels, and indicators for missing values for these covariates. The locality-level variables contain the unemployment rate, the poverty rate, the proportion of the locality under area C, the presence of the separation wall, and indicators for UNRWA school and type of locality (rural, urban, or camp). * Significant at 10%; ** significant at 5%; and *** significant at 1%.

3.5 Potential Mechanisms

We now turn to the second part of our analysis: the identification of the potential mechanisms underlying the relationship between family exposure to conflict and primary school achievement of children. We hypothesize that exposure to conflict and violence in the early stages of a child's development may have long-term detrimental consequences for their skills, both cognitive and non-cognitive, which in turn translate into worse school outcomes. Our hypothesis is related to a recent strand of the literature suggesting that non-cognitive skills have independent predictive power for a wide range of socio-economic outcomes. For instance, Heckman, Stixrud, and Urzua (2006) show that non-cognitive skills – which include personality traits – are important determinants of academic and economic success and that their long-run effects seem to be comparable to those of cognitive skills. Currie and Stabile (2009) argued that non-cognitive skills are conceptually linked with mental health. They showed that mental health problems in early childhood, in particular those associated with "externalizing" and "internalizing" behavior problems, have negative and persistent effects on future educational outcomes.

With our data, we are not able to identify completely the causal path from exposure to conflict to educational attainment via impaired cognitive and non-cognitive skills. However, we are able to study whether – using the same identification strategy as before – exposure to conflict has a causal impact on these mediating variables. Finding no effect would rule out certain candidate channels.

Before we report the results of the 2SLS regressions with the mediators as dependent variables, we show that they have an "effect" on educational attainment at least in the descriptive sense. As regards cognitive ability, we consider the sub-scores for numerical, verbal, and figural tests as well as the total score obtained in the three tests; regarding non-cognitive skills, we use the score for total strengths and difficulties (SDQ), the corresponding sub-scores for "internalizing" and "externalizing" behavioral problems, and the Big Five personality traits (i.e., openness, conscientiousness, extraversion, agreeableness, and neuroticism).

Table (3.4) shows the results of the OLS regressions of the GPA on z-standardized measures of cognitive ability and the scores for internalizing and externalizing problems, as well as the Big 5 personality dimensions. Column (1) shows the results of twelve separate regressions, in which each mediating variable is included one at a time. As expected, cognitive ability is strongly related to the GPA. Moreover, all the measures of non-cognitive skills are significant predictors of the GPA as well. Since the coefficients show the estimated association in terms

of standard deviation changes, a comparison of the size of the coefficients illustrates the quantitative relevance of non-cognitive skills. For instance, as predictors, externalizing problems and conscientiousness are about half as strong as cognitive skills.

Column (2) shows the results when the cognitive ability sub-scores and the SDQ subscores are included jointly. We find that the influence of internalizing problems disappears almost completely. The coefficient for externalizing problems becomes smaller but remains strong. In column (3), we report the results when the Big Five and cognitive ability are included jointly, and we find that conscientiousness remains the only personality trait with a sizeable association with the GPA. Overall, cognitive and non-cognitive skills have independent "effects" on children's educational achievement. The most important non-cognitive skills are conscientiousness and (the absence of) externalizing, that is, behavioral, problems.

To establish whether these variables lie on the causal path from exposure to conflict to GPA, we now estimate the same specification as in model (1) with children's cognitive and non-cognitive skills as outcomes. We report the results of this analysis in Table (3.5). When examining cognitive ability (panel A), we do not find any significant effects, with the magnitude being close to zero for numeracy and positive coefficients being obtained for the figural and verbal tests. In contrast, the results for non-cognitive skills (panel B) reveal that family experience of conflict increases children's SDQ total score by 0.2 standard deviations. This coefficient masks the heterogeneous effects between "internalizing" problems (column 2), for which our coefficient of interest remains positive but the magnitude is substantially reduced, and "externalizing" behavior problems (column 3), for which we find a significant 0.25 standard deviation effect of family exposure to conflict. This evidence is in line with the results of Currie and Stabile (2006, 2009), who find that "externalizing" behavior problems is more likely to lead to negative outcomes than "internalizing" problems. We therefore believe that increased "externalizing" behavior problems may be one important channel through which exposure to conflict for at least seven years in the past affects children's GPA today.

We now move to the examination of the Big Five personality traits (see columns 4 to 8 of panel B). Our main result is that parents' exposure to conflict during the Second Intifada reduces children's level of conscientiousness by 0.23 standard deviations. In light of the evidence reported in Table (3.4), this finding suggests another important channel, possibly related to the "externalizing" problems channel. Extraversion, agreeableness, and neuroticism also seem to be affected by family exposure to conflict. However, as demonstrated in Table

(3.4), these personality traits show no significant correlation with the GPA when controlling for cognitive skills and the other personality dimensions. The remaining personality trait, openness, is instead not affected by the exposure to conflict.

Table 3. 4: Effects of child cognitive and non-cognitive skills on the GPA, OLS estimates

Dep. var.:	(1) Child GPA	(2) Child GPA	(3) Child GPA
	Separate regressions	Joint regression	Joint regression
Cognitive ability	7.73***	—	—
	(0.52)		
Numeracy	6.01***	1.79***	1.71***
	(0.43)	(0.48)	(0.45)
Figural	6.23***	1.51***	1.62***
	(0.42)	(0.35)	(0.35)
Verbal	7.46***	4.52***	4.56***
	(0.47)		
SDQ total	-3.75***	—	—
	(0.24)		
Internalizing	-2.28***	-0.26	—
	(0.26)	(0.23)	
Externalizing	-3.94***	-2.68***	—
	(0.23)	(0.26)	
Openness	2.48***	—	0.70***
	(0.25)		(0.21)
Conscientiousness	3.22***	—	2.11***
	(0.24)		(0.25)
Extraversion	-0.56**	—	-0.17
	(0.24)		(0.21)
Agreeableness	1.19***	—	-0.17
	(0.21)		(0.19)
Neuroticism	-0.90***	—	-0.05
	(0.23)		(0.22)
Individual-level controls	Yes	Yes	Yes
School-level controls	Yes	Yes	Yes
Locality-level controls	Yes	Yes	Yes
N obs. (minimum)	4,059	4,051	4,114

Notes: The standard errors are reported in parentheses and clustered at the locality level. The individual-level controls include a female dummy for children and parents, dummies for children's and parents' age, dummies for parental educational levels, and indicators for missing values for these covariates. The locality-level variables contain the unemployment rate, the poverty rate, the proportion of the locality under area C, the presence of the separation wall, and indicators for UNRWA school and type of locality (rural, urban, or camp). * Significant at 10%; ** significant at 5%; and *** significant at 1%.

Table 3. 5: Effects of family exposure to conflict on children's cognitive and non-cognitive skills, 2SLS estimates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Cognitive skills								
Dep. var.:	Total	Numeracy	Figures	Verbal				
Family exposure to conflict	0.04	-0.04	0.12	0.00				
	(0.18)	(0.19)	(0.19)	(0.16)				
First-stage F-statistic	46.1	46.1	46.1	46.1				
Mean of dep. var.	0	0	0	0				
SD of dep. var.	1	1	1	1				
N obs.	4,235	4,235	4,235	4,235				
Panel B: Non-cognitive skills								
Dep. var.:	SDQ	Internalizing	Externalizing	Openness	Conscientiousness	Extraversion	Agreeableness	Neuroticism
Family exposure to conflict	0.20**	0.06	0.25***	0.01	-0.23*	0.19**	-0.20**	0.17**
	(0.09)	(0.08)	(0.10)	(0.08)	(0.12)	(0.08)	(0.09)	(0.09)
First-stage F-statistic	64.3	57.7	63.1	50.5	48.8	46.7	51.3	50.6
Mean of dep. var.	0	0	0	0	0	0	0	0
SD of dep. var.	1	1	1	1	1	1	1	1
N obs.	4,089	4,118	4,097	4,172	4,186	4,204	4,188	4,183
Individual-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
School-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Locality-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The standard errors are reported in parentheses and clustered at the locality level. The individual-level controls include a female dummy for children and parents, dummies for children's and parents' age, dummies for parental educational levels, and indicators for missing values for these covariates. The locality-level variables contain the unemployment rate, the poverty rate, the proportion of the locality under area C, the presence of the separation wall, and indicators for UNRWA school and type of locality (rural, urban, or camp). * Significant at 10%; ** significant at 5%; and *** significant at 1%.

3.6 Discussion and Conclusion

In this study, we answer two related questions: does a family's exposure to violent political conflict affect the educational attainment of its children not only in the short but also in the long run? If so, can we identify important channels that could be addressed to mitigate the adverse effects of political conflicts on educational outcomes?

While several studies from a variety of different countries have shown short-term consequences of exposure to conflict on children's educational achievement, less is known about a causal relationship in the long run. We provide new evidence that household exposure to conflict during the Second Intifada has long-term impacts on the human capital of students in the West Bank. Specifically, we examine the effect of house searches or occupation by the Israeli Army between 2000 and 2005 on students' grade point averages in primary school (grades 5 to 9) in 2013.

Our identification strategy exploits the variation in the locality-level number of Palestinian fatalities during the Second Intifada as an arguably exogenous determinant of a family's exposure to conflict-related events. According to our estimates, one additional event reduces its children's GPA by approximately 30 percent of a standard deviation of the grade point average distribution. This result is quantitatively robust to a number of specification changes, such as different definitions of the exposure variable, using a categorical instead of a continuous instrument, including Israeli fatalities as well in our instrument, or using GPAs in different school years. We also show that the effect of exposure to conflict is concentrated at the bottom and in the middle of the GPA distribution. In contrast, only small insignificant effects can be shown for the likelihood of being in the top quartile of the distribution.

With regard to causal channels, we estimate the effect of exposure to violence on detailed measures of cognitive and non-cognitive skills. We find no effect of exposure on performance in a long and thorough cognitive skills (IQ) test. In contrast, important non-cognitive correlates of educational achievement, such as externalizing behavior problems and conscientiousness, appear to be affected. This finding provides an interesting mirror image of the findings on the effect of early education programs. For instance, with regard to the Perry Preschool Program, Heckman et al. (2013) concluded: "Although Perry did not produce long-run gains in IQ, it did create persistent improvements in personality skills. The Perry program substantially improved externalizing behaviors (aggressive, antisocial, and rule-breaking behaviors)" (p. 2053). It almost appears as if exposure to conflict acted in the same way – with a negative sign: although

exposure is not detrimental to IQ, it leads to worse personality skills, which in turn affect educational attainment and other future outcomes.

Several limitations of our study are worth mentioning. Although we have no theoretical prior regarding the direction in which OLS would be biased compared with the true causal effect of exposure, the size of our 2SLS coefficients may raise concerns about the validity of our results. Large 2SLS compared with OLS estimates are quite common in applied research, and three explanations can be put forward. The first is measurement error in the explanatory variable, which (if classical) attenuates the OLS coefficients. Clearly, if some households that have experienced violence do not report this in our survey, whereas others over-report events, and if misreporting is uncorrelated with the error term, the OLS estimates would be biased towards zero. However, it seems to be at least equally plausible to assume that misreporting is in some way related to unobserved determinants of student achievement. The second explanation is that the IV approach identifies (a weighted average of) complier-specific causal effects, which can potentially be larger than the OLS estimates. It is plausible that, at least among always-takers (households that are prone to conflict events regardless of the level of conflict in the locality), the effect is smaller than among compliers (households that are only affected if the level of conflict in the locality is high). Whether this also holds for never-takers is unclear. The third explanation – potentially damaging to the IV approach – is that the exclusion restriction does not hold. Of course, this cannot be ruled out entirely in our setting. To address this concern partially, we report the reduced-form coefficients for all the specifications in Tables (3.B.2) and (3.B.3) in the Appendix. These results clearly show that the locality-level conflict intensity during the Second Intifada is associated with worse educational attainment more than seven years later and that this association is robust to a number of specification changes. Thus, even if the exclusion restriction does not hold, there is robust evidence that the violent political conflict has long-term consequences for educational attainment mediated through non-cognitive skills. This reduced-form analysis is similar to what most of the literature has undertaken when data on individual experience of conflict are lacking (see, for instance, Brück et al., 2014).

Finally, in terms of policy recommendations, our study suggests that children whose families have been exposed to conflict should be identified and invited to participate in interventions that are designed to improve social skills and self-control. Such interventions are likely to lead to better educational attainment at school and possibly better labor market outcomes. When this is not possible during a conflict, children should be the main focus of interventions in the post-conflict recovery period.

Appendix

A Description of the measures of non-cognitive skills

Table 3.A.1: Strengths and Difficulties Questionnaire (SDQ)

For each item, please mark the box for not true, somewhat true, or certainly true. It would help us if you answered all the items as best as you can even if you are not absolutely certain or the item seems daft! Please give your answers on the basis of the child's behavior over the last six months.

	Panel A: Internalizing problems
Emotional symptoms	... often complains of headaches, stomachaches, or sickness
Emotional symptoms	... worries or often seems worried
Emotional symptoms	... often fights with other children or bullies them
Emotional symptoms	... is nervous or clingy in new situations, easily loses confidence
Emotional symptoms	... fears, easily scared
Peer relationship problems	... is rather solitary, prefers to play alone
Peer relationship problems	... has at least one good friend
Peer relationship problems	... is generally liked by other children
Peer relationship problems	... is picked on or bullied by other children
Peer relationship problems	... gets along better with adults than with other children
	Panel B: Externalizing problems
Conduct problems*	... often fights with other children
Conduct problems	... often loses temper
Conduct problems	... generally well behaved, usually does what adults request
Conduct problems	... often lies or cheats
Conduct problems	... steals from home, school, or elsewhere
Hyperactivity/inattention	... restless, overactive, cannot stay still for long
Hyperactivity/inattention	... constantly fidgeting or squirming
Hyperactivity/inattention	... easily distracted, concentration wanders
Hyperactivity/inattention	... can stop and think things out before acting
Hyperactivity/inattention	... good attention span, sees work through to the end

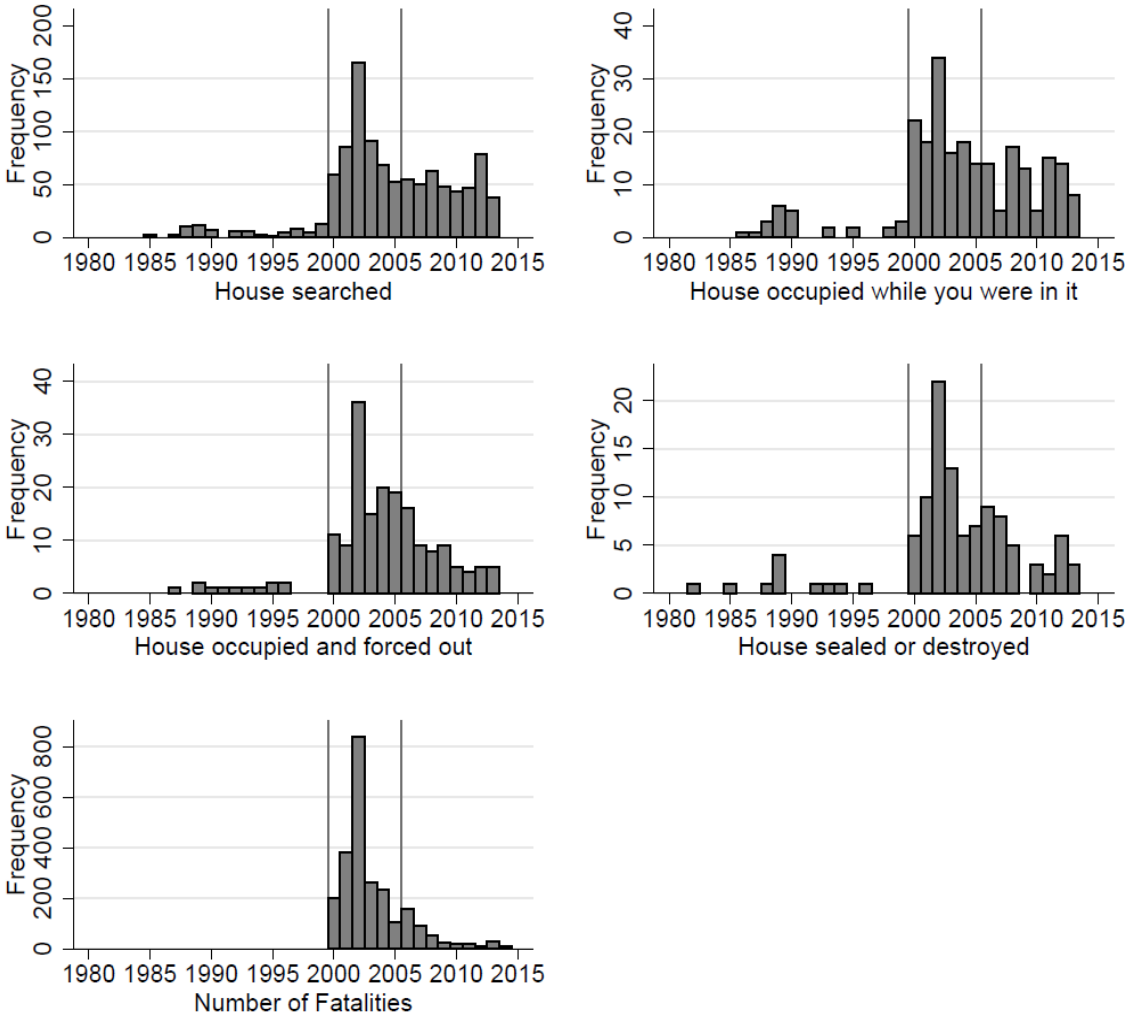
Notes: Parents were asked to state how much they agreed with each statement about their child on a 3-point scale ("not true," "somewhat true," "certainly true"). Both internalizing and externalizing problems are defined on a 0 to 20 scale. The total score for the SDQ is given by the sum of the sub-scores for internalizing and externalizing problems (on a 0 to 40 scale) and does not include the prosocial behavior score (Goodman, 1997). * This conduct problem was accidentally omitted from the instrument; that is, the scale representing conduct problems consisted only of four items and was scaled up to a maximum of 10.

Table 3.A.2: Big Five Personality Questionnaire (15-item version)

Below are some statements that may or may not describe what your child is like. For each statement, please indicate how much you agree or disagree that it describes your child. I see my child as someone who ...	
	(Dimension)
1. Is talkative	Extraversion
2. Does things carefully and completely	Conscientiousness
3. Is original, comes up with new ideas	Openness
4. Is reserved; keeps thoughts and feelings to self	Extraversion [–]
5. Has a forgiving nature	Agreeableness
6. Worries a lot	Neuroticism
7. Has an active imagination	Openness
8. Tends to be lazy	Conscientiousness [–]
9. Likes artistic and creative experiences	Openness
10. Is considerate and kind to almost everyone	Agreeableness
11. Does things efficiently (quickly and correctly)	Conscientiousness
12. Stays calm in tense situations	Neuroticism [–]
13. Is outgoing, sociable	Extraversion
14. Gets nervous easily	Neuroticism
15. Is sometimes rude to others	Agreeableness [–]

Notes: Parents were asked to state how much they agreed with each statement on a five-point Likert scale.

3.B Supplementary Tables and Figures



Source: Own calculations based on survey data.

Figure 3.B.1: Self-reported years of exposure to conflict and number of fatalities by year

Table 3.B.1: Effects of family exposure to conflict on the GPA, 2SLS estimates, alternative definitions of exposure

Specifications: (A) Raw number of events (all periods); (B) raw number of events (during Second Intifada – valid dates only); (C) raw number of events (Second Intifada + missing dates); (D) raw number of events (missing dates only);I) raw number of events (pre-Second Intifada); (F) raw number of events (post-Second Intifada); (G) exposure severity (all periods); (H) exposure severity (Second Intifada only); (I) binary exposure: house occupied or worse; (J) exposure score based on principal component analysis; and (K) number of distinct events during the Second Intifada (with dates more than 6 months apart).

	Specification										
	(A)	I	(I(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	
Family exposure to conflict	-5.95***	-10.80***	-5.74***	-12.26***	158.69	-4575	-5.09***	-5.05***	-18.82***	-6.02***	-11.87***
	(1.78)	(3.36)	(1.60)	(4.33)	(113.87)	(251,609	(1.53)	(1.44)	(5.39)	(1.69)	(3.35)
First-stage F-statistic	28.23	67.62	46.12	9.93	1.71	0	24.03	35.77	52.13	49.2	27.02
Mean of dep. var.	67.83	67.83	67.83	67.83	67.83	67.83	67.83	67.83	67.83	67.83	67.83
SD of dep. var.	17.63	17.63	17.63	17.63	17.63	17.63	17.63	17.63	17.63	17.63	17.63
N obs.	4,235	4,235	4,235	4,235	4,235	4,235	4,235	4,235	4,235	4,235	4,235

Notes: The standard errors are reported in parentheses and clustered at the locality level. The individual-level controls include a female dummy for children and parents, dummies for children's and parents' age, dummies for parental educational levels, and indicators for missing values for these covariates. The locality-level variables contain the unemployment rate, the poverty rate, the proportion of the locality under area C, the presence of the separation wall, and indicators for UNRWA school and type of locality (rural, urban, or camp). * significant at 10%; ** significant at 5%; and *** significant at 1%.

Table 3.B.2: Robustness checks, reduced-form estimates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Categorical	Distribution			Earlier years		All	Province	In school	
	instrument	Top 75%	Top 50%	Top 25%	GPA 10/11	GPA 11/12	fatalities	Fixed effects	During Second I.	After Second I.
Fatalities (in hundreds)	—	-0.04**	-0.05***	-0.01	-1.58***	-1.30***	-1.86***	-1.43	-1.80*	-2.06***
		(0.02)	(0.02)	(0.01)	(0.49)	(0.49)	(0.54)	(0.93)	(1.05)	(0.76)
Mean of dep. var.	—	0.75	0.5	0.25	72.7	70.5	67.9	67.8	65.8	69.2
SD of dep. var.	—	0.4	0.5	0.4	16	15.9	17.6	17.6	17.8	17.4
Individual-level controls		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
School-level controls		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Locality-level controls		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N obs.	—	4,235	4,235	4,235	4,206	4,231	4,235	4,235	1,737	2,498

Notes: The standard errors are reported in parentheses and clustered at the locality level. The individual-level controls include a female dummy for children and parents, dummies for children's and parents' age, dummies for parental educational levels, and indicators for missing values in these covariates. The locality-level variables contain the unemployment rate, the poverty rate, the proportion of the locality under area C, the presence of the separation wall, and indicators for UNRWA school and type of locality (rural, urban, or camp). * Significant at 10%; ** significant at 5%; and *** significant at 1%.

Table 3.B.3: Effects of family exposure to conflict on children's cognitive and non-cognitive skills, reduced-form estimates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Cognitive skills								
Dep. var.:	Total	Numeracy	Figures	Verbal				
Fatalities (in hundreds)	0.02	-0.01	0.04	0				
	(0.06)	(0.07)	(0.06)	(0.06)				
Mean of dep. var.	0	0	0	0				
SD of dep. var.	1	1	1	1				
N obs.	4,235	4,235	4,235	4,235				
Panel B: Non-cognitive skills								
Dep. var.:	SDQ	Internalizing	Externalizing	Openness	Conscientiousness	Extraversion	Agreeableness	Neuroticism
Fatalities (in hundreds)	0.42**	0.06	0.33***	0	-0.07**	0.05**	-0.06**	0.05**
	(0.17)	(0.09)	(0.11)	(0.02)	(0.03)	(0.02)	(0.03)	(0.03)
Mean of dep. var.	0	0	0	0	0	0	0	0
SD of dep. var.	1	1	1	1	1	1	1	1
N obs.	4,089	4,118	4,097	4,172	4,186	4,204	4,188	4,183
Individual-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
School-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Locality-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The standard errors are reported in parentheses and clustered at the locality level. The individual-level controls include a female dummy for children and parents, dummies for children's and parents' age, dummies for parental educational levels, and indicators for missing values of these covariates. The locality-level variables contain the unemployment rate, the poverty rate, the proportion of the locality under area C, the presence of the separation wall, and indicators for UNRWA school and type of locality (rural, urban, or camp). * Significant at 10%; ** significant at 5%; and *** significant at 1%.

CHAPTER 4

Class Size, Cognitive Abilities, Bullying, and Violent Behavior. Evidence from West Bank Schools

4.1 Introduction

Educationalists, economists, and policy makers recognize the importance of schooling in shaping human capital. Economists emphasize several inputs in the educational production function as indicators of school quality, such as teacher qualifications and school resources. Obviously, class size is one of these indicators. The impact of class size on the outcome of a child's cognitive ability is still one of the major concerns of researchers due to the adverse results found in the economics literature. Class size can have a direct (short-run) effect on students' achievement, well-being, and cognitive and non-cognitive outcomes (Dee & West, 2011; Jakobsson, Persson, & Svensson, 2013). It might also lead to indirect (long-run) impacts on other outcomes, such as educational attainment and wages (Fredriksson, Öckert, & Oosterbeek, 2013).

The observed class sizes may not be exogenous to students' outcomes, since the class size may depend on the choices made by parents or school administrators. Economists have suggested two approaches to dealing with the endogeneity problem associated with class size. The first one is a randomized experiment, in which students are randomly assigned to classes of different size to create exogeneity of the class size variation (Krueger, 1999). The second approach is to implement quasi-experimental identification strategies that require the exploitation of exogenous variations in class size. These exogenous variations could come from the enrollment cohort (Angrist & Lavy, 1999) or population variations in previous years (Hoxby, 2000). Numerous studies have adopted the second approach, and their findings differ significantly regarding the estimates of class size effects, varying from no effects to significant and substantial ones. Policy makers who recommend class size reduction have emphasized that small classes, in general, are associated with increased student achievement, since the teacher can give more individualized attention in smaller classes. On the other hand, its opponents see class size reduction as an expensive policy, since teachers' salaries constitute the vast majority of schools' non-capital expenses and there is no guarantee of improved achievement.

Several empirical studies have highlighted the crucial role of schooling in the development of almost all cognitive abilities (Carlsson, Dahl, Öckert, & Rooth, 2015; Nisbett, 2009). Cognitive skills, as measured by standard intelligence tests, have a remarkable impact on the labor market and subsequent later-life outcomes. However, while the literature has investigated the causal relationship between class size and students' achievements in general, policy makers are also interested in whether or not class size reduction helps to mitigate problems such as bullying and violent

behavior, which are growing in schools (Eriksen, Nielsen, & Simonsen, 2012; PCBS, 2013). Bullying and violent behavior among peers are an observed phenomenon in all cultures, and they are common in adolescent school students. These problems have costly consequences. The adverse circumstances in which education takes place in West Bank schools do not contribute to solving this problem.[36] Bullying among peers leads to psychological suffering, low self-esteem, and isolation, which are detrimental to learning and academic performance (Moura, Cruz, & Quevedo, 2011). Moreover, recent studies have indicated an association between bullying and suicidality among adolescents (Abdeen et al., 2018; Sarzosa & Urzúa, 2015). The effects of class size are stronger for ill-behaved children than for well-behaved children (Lazear, 2001), and a common view holds that bullying problems are a consequence of large classes and schools (Smith, 1999).

However, previous studies measuring both the impact of schooling on cognitive abilities and the classroom behavioral problems have been conducted primarily in stable settings in Western countries. Other contexts of schooling may have different outcomes, such as schools in the West Bank. Public and UNRWA schools in the West Bank represent distinct schooling contexts. For instance, UNRWA schools are designed to accommodate children from refugee camps until grade 9. In general, the class size in these schools (as well as other governmental schools) is large compared with that in Western countries. The UNRWA believes that the costs of reducing the class size exceed the benefits, while other educational policies, such as improving teacher training and the quality of education, would be a better investment (UNRWA, 2014). Therefore, UNRWA schools have raised the maximum class size from 45 students per class to 50 students, while the maximum class size in governmental schools is still 40.

This study attempts to investigate the effect of class size on student standardized cognitive tests scores as well as bullying and violent behavior. In so doing, it adds to the sparse literature on class size effects from less developed countries, particularly the West Bank. I employ the survey data collected in 2013 from approximately 6000 students in grades 5 to 9 in West Bank schools in the context of a cooperative research agreement funded by the German Research Foundation (DFG). An important advantage of this database is that it provides a large amount of student-level observations rather than class-level observations as well as other school and locality-level covariates.

[36] More than 20 percent of students enrolled in West Bank schools are exposed to peers' and teachers' violent behavior inside schools (PCBS, 2013).

Moreover, some of these data are administrative, thereby giving rise to no or only slight measurement error in the actual average class size, enrollment, and students' age.

In this study, I use the maximum class size rule to create a regression discontinuity (RD) relation between cohort enrollment size and class size. Further, the econometric approach provides evidence for no discontinuities in the relationship between enrollment and students' household background at cutoff points induced by a maximum class size rule, which violates the RD assumptions. The results reported in this chapter show that class size affects self-reported bullying–victim and violent behavior, while there is no evidence that class size affects students' cognitive abilities in primary schools, except students in grade 6. Further, I point to peer relations and mental health problems, extracted from the impact supplement and follow-up questions in the Strengths and Difficulties Questionnaire (SDQ), as a potential mechanism through which class size affects children's self-reported bullying–victim instances and violent behavior.

The chapter proceeds as follows. Section (4.2) reviews the literature on the class size effects on achievement. Section (4.3) describes the relevant institutional features of the Palestinian schooling system, while Section (4.4) describes the data. Section (4.5) continues with the description of the identification strategy and the empirical approaches. The main results are reported in section (4.6); section (4.7) suggests the potential mechanism, while section (4.8) concludes the chapter.

4.2 Related Literature

Over more than a decade, a growing literature has attempted to estimate the link between class size and student achievements. Class size is an endogenous variable and could correlate with other unobserved factors. For example, parents from higher socioeconomic backgrounds may put their children in schools with smaller classes or the school principals may put weaker students in smaller classes. Researchers have adopted a quasi-experimental approach to isolate the effect of class size from other determinants of pupil outcomes to account for the endogeneity problem in the class size effect. Despite substantial research on class size, much about this relation is still unknown. Below, I present a brief review of some of these studies according to their main conclusion.

The first stream of studies found, in general, that smaller classes are associated with increased students' achievements, usually measured by standardized tests in multiple subjects, such as mathematics and reading. Akerhielm (1995) found that class size has a significant negative impact on student achievement. However, this study was criticized, since the identification strategy that the

researcher employed only addressed the potential bias due to sorting within schools and not that attributed to parental tastes for education. Krueger's (1999) study analyzed the Tennessee Student Teacher Achievement Ratio (STAR) as a form of controlled experiment and concluded that, in the first year of elementary schools, students who attended small classes (13–17 students) outperformed their classmates assigned to regular classes (22–25 students) by 4 percentile points. Therefore, the advantage of attending small classes expands by about 1 percentile point per year in subsequent years. He also found that class size has a larger effect on minority students and those enrolled in free-lunch programs.

Angrist and Lavy (1999) employed Maimonides' rule to create an exogenous variation in class size in Israeli public schools. According to this rule, if the size of an enrollment cohort in a school exceeds 40, an extra class should be created. This rule creates regression discontinuities (RDs) in the relation between cohort enrollment size and class size. However, the actual class size does not exactly match that predicted by the rule, which provides a source of exogenous variation in class size. Angrist and Lavy found a significant negative class size effect on pupils' achievement in the fourth and fifth grades but not in the third grade, which indicates the issue of the cumulative nature of class size effects. Numerous more recent studies have implemented this approach similarly in related contexts. Gary-Bobo and Mahjoub (2013) applied the maximum size rule to French junior schools and obtained a small but significant and adverse effect of class size on the probabilities of educational success in grades 6 and 7, but this effect seems to vanish in higher grades. Bonesrønning (2003) found significant effects in lower-secondary schools in Norway. In addition, the further examination recommended that the impact differs among student subgroups and that the advantages of small classes are larger in schools with a high proportion of pupils who come from intact families. In Denmark, Browning and Heinesen (2007) employed Maimonides' rule to investigate the impact of class size on years of education and the completion of upper-secondary school as an alternative outcome. They found a marginally significant negative effect of class size. Moreover, Bingley, Jensen, and Walker (2005) used the Danish data to compare siblings who experienced different class sizes to control for different unobserved outcomes, such as a family background effect; they found that class size reduction in junior-high school significantly increases the students' years of education, but the effect is too small to justify the public costs. In developing countries, other studies have applied the same technique and found a negative impact of class size on student outcomes. Urquiola (2006) investigated the class effect in Bolivia by focusing on

schools in a rural area with only 1 or 2 classes and found a negative effect of class size on test scores. Moshoeshoe (2015) used the two-stage least-square and instrumental variable quantile regression methods on grade 6 students' math and reading test scores in Lesotho to estimate respectively the mean and the distributional effect of class size. He found strong evidence of a putative class size effect on reading but not on math achievement.

However, Urquiola and Verhoogen (2009) raised some concerns regarding Angrist–Lavy's regression discontinuity approach. They provided evidence that Chilean private schools, seeking to maximize their profits, manipulate enrollment to avoid adding a classroom, and households sort themselves across schools in response to this situation. Thus, their empirical evidence demonstrates that this behavior invalidates the RD design. Therefore, their data suggest that students after the cutoffs (smaller class size) consistently come from a stronger background, which means that RD estimates overestimate the effect of class size on students' achievements. These findings were extended by Cohen-Zada, Gradstein, and Reuven (2009). After using the rich individual-level data set in secondary public schools in Israel, they concluded that IV estimates of class size effect are likely to be seriously biased. Thus, the success of the RD design hinges on the institutional details of the context in which it is applied.

The second stream of literature found that class size has either no or a positive effect on students' outcomes. Hoxby (2000) used demographic variation to identify the class size effect. She exploited the idea that, after correcting for a trend in school districts, cohort sizes can be larger or smaller in some years than others, creating a source of exogenous variation. Using data on elementary school pupils in the state of Connecticut, she did not find any statistically significant effect of class size on student achievement, and her estimates were precise enough to rule out even a modest effect. Leuven, Oosterbeek, and Rønning (2008) exploited a quasi-experimental method to estimate the effect of class size on student performance at the end of lower-secondary school in Norway. They found that the maximum class size rule and population variation identification give very similar estimates. Their results consistently point to a lack of any impact of class size on achievement; for instance, they found an effect as small as 1.5 percent of a standard deviation for a 1-student change in class size during 3 consecutive years. Asadullah (2005) used the variation in the average pupil–teacher ratio in Bangladeshi schools as an IV. The policy there allows secondary school principals to recruit an extra teacher whenever the class size exceeds 60. He found strong positive class size effects on students' achievements. Denny and Oppedisano (2013) used the data

collected in 2003 from the Program for International Student Assessment (PISA) for the United States and the United Kingdom. They applied the IV strategy and controlled for school fixed effects to address the potential bias due to between-school sorting. Their results demonstrate that an increase in class size leads to an improvement in students' mathematics score. Only the results for the United Kingdom are statistically significant. However, Moshoeshoe (2015) indicated major concern regarding the positive or lack of effect of class size on students' achievements suggested by Asadullah (2005), Denny and Oppedisano (2013), and Leuven et al. (2008). In fact, there is an important common denominator in these studies in that they all use secondary school students' data, which could explain their results. Those students, in general, have a longer listening span, are less disruptive in class, and can learn more on their own compared with younger primary school students. Therefore, the class size effects are likely to be swapped. Lazear (2001) explained the difficulty in finding class size effects as being due to the possibility that the optimal class size for well-behaved students may be larger than the optimal class size for ill-behaved students. The observed relation of educational outcome to class size is small or even positive for well-behaved children, while the class size effects are larger for children with behavioral problems.

With regard to Palestinian schools, to the best of my knowledge, no particular study has been conducted to explore the effect of class size on students' achievements apart from that of Altinok and Kingdon (2009). This study used TIMSS data in 45 countries. Its results show the statistically significant effect of class size for 16 countries, but the effect is negative only in 10 of them, including Palestine, and the effect size is slight in most cases. Their findings are in line with other studies that have found a little evidence of the adverse effect of larger classes on student achievement. They concluded that the class size effects are smaller in developed countries than in developing countries. In addition, this impact is smaller in regions with higher teacher quality.

4.3 Institutional Settings

Compulsory education in Palestine covers 10 years, starting at age 6, and it consists of 2 stages: the preparatory stage or lower basic level (grades 1 to 4) and the empowerment stage or basic level (grades 5 to 10). There are 3 supervising authorities covering education in the West Bank: the Government, the United Nations Relief and Works Agency (UNRWA), and private schools. These types of schools differ in their individual and school characteristics. UNRWA schools are located in Palestinian refugee camps and provide primary education to refugees until grade 9. The Pales-

tinian Ministry of Education and Higher Education (MoEHE) is the official body in charge of the educational process in schools and formulating the educational policies. Further, all schools follow the same national curriculum, provided by the MoEHE, and apply the same evaluation criteria (UNESCO, 2011). More than 70 percent of Palestinian students are enrolled in governmental schools, 23 percent in UNRWA schools, and less than 3 percent in private schools (PCBS, 2017). Most of the students attend the closest school to their residence. According to the ministry regulations, registering children in schools that report to a different educational governorate from the parents' local address is not allowed. The school sample used in this study consists of both governmental and UNRWA schools. Both types lack resources, infrastructure, and adequate classroom space. Teachers suffer from overcrowded classes, a lack of discipline, and low salaries. They also lack motivation and professional commitment, and many of them have a second job (Jabr & Cahan, 2014). Each class is taught by a different teacher depending on the subject; the teacher rotates among classrooms (MoEHE, 2016b).[37]

In general, the average class size is large compared with that in other countries.[38] The recent statistics show that the average class size in Palestinian elementary schools is 27.8 and 32 students/class in public and UNRWA schools, respectively (PCBS, 2017). According to the MoEHE regulations, the school principal can open a new section for the same grade in the case that the number of enrolled students exceeds 40 per cohort. This rule is not strictly implemented in all public schools due to extra hiring costs and space availability. Unlike the public schools, and despite the fact that the UNRWA follows the same educational regulations, the maximum class size in UNRWA schools was 45 students and has recently been increased to 50 students. In addition, the teachers' workload in UNRWA schools is 28 classes per week, while it is 22 classes per week in governmental schools.

[37] Any academic year consists of two semesters, and marks are divided equally between the two semesters. All courses are graded based on a scale ranging from 0 to 100. The passing grade is 50. Students who obtain a score lower than 50% in 3 subjects or less are required to sit a make-up exam, and if they fail 4 subjects or more, they repeat the same grade based on the allowed repetition rate (MoEHE, 2016b).

[38] For example, see Altinok and Kingdon (2009). They investigated the effect of class size in 45 countries. The average class size in Palestine (39.52) was among the largest sizes in their sample.

In September 2015, teachers in the West Bank led the largest mass protests in Palestine in recent years due to their pay scale staying the same when other governmental sectors' pay scale increased. The Palestinian Authority allocates approximately 20 percent of its annual budget to the MoEHE, salaries representing the largest proportion of this budget (MoFP, 2016). The MoEHE has suggested several solutions to improve students' performance rather than reducing the class size. At the beginning of 2014, the UNRWA announced the possibility of postponing the starting date of the first semester of the 2014/15 academic year due to the staff strike, which continued for more than two months as a result of the UNRWA's new policy of merging classes (UNRWA, 2015). Many reports have documented that parents of UNRWA school students objected to this policy, which adds more students to each class. According to parents, this can weaken the quality of education. The UNRWA justified its merging policy by citing the fact that class size itself is not a key determinant of good quality. If the class size is around 40–45 students, reducing it is not correlated with a significant improvement in students' achievements. Most importantly, a minimum reduction in class size has a substantial impact on the overall education costs (UNRWA, 2014).

4.4 Data

This study employs the survey data collected during the academic year 2012/2013 on approximately 6,000 students enrolled in grades 5 to 9 in gender-segregated primary schools in the West Bank and East Jerusalem. This rich data set was collected as part of a cooperative research agreement between Al-Quds University, Hebrew University, and the University of Wuppertal and was funded by the German Research Foundation (DFG). The survey covered 100 primary schools selected randomly and stratified according to region (north, center, and south) and school supervisory authority (60 government and 40 UNRWA). Then 12 students were selected randomly from each grade (5–9), which yielded 60 students/school. Those students were asked to complete standardized cognitive ability tests administrated in class. The intelligence abilities test was designed to measure 3 major cognitive aspects (verbal, numerical, and figural). Each group has several subtests covering a wide range of item contents (analogies, series, vocabulary, and inference). The subtests

were initially selected and adapted to the Arab culture.[39] The tests consisted of 181 items computed as the percentage of correctly answered questions. The cognitive test score was the first outcome variable, and it has an arithmetic mean of 60.7 and a standard deviation of 16.7 score points.

Of particular importance in the context of this study are bullying and fighting inside the school (violent behavior). The second outcome, conduct problems proxied by self-reported bullying and violent behavior, may be influenced by class size. These data are drawn from the Health Behavior in School-Aged Children (HBSC) survey answered by students. According to the literature, bullying[40] was measured by asking students 2 questions: 1) How often have you been bullied? 2) How often have you taken part in bullying another student at school in the past couple of months? The response options ranged from never to 1–2 times, 2–3 times, once a week, and several times a week. Then, the final outcomes were converted into 3 binary variables, bullying others only, victim only, and bully–victim (those who are both bullies and victims). Violent behavior was measured by asking students the following question: During the past 12 months, how many times were you injured by other students and had to be treated by a doctor or nurse or paramedic? The answers to this question were provided on a scale from 0 to 4 times or more.

The data set includes the administrative database provided by the MoEHE on student age, gender, and school grades in each subject for three subsequent academic years (2011–2013). The main explanatory variable used in this study, class size, was obtained from these administrative records, which register all the schools participating in the survey and the number of classes per grade. For each student, I combine this information with the enrollment data to calculate the average class size at the grade level as

$$\text{average class size} = \text{enrollment}/\text{no. of classes}.$$

Thus, I have data on the average class size per grade and not the actual class size (except when schools have exactly one class in a grade). The advantage of the average class size is that it eliminates the biases resulting from within-school sorting, while there is a possibility of measurement

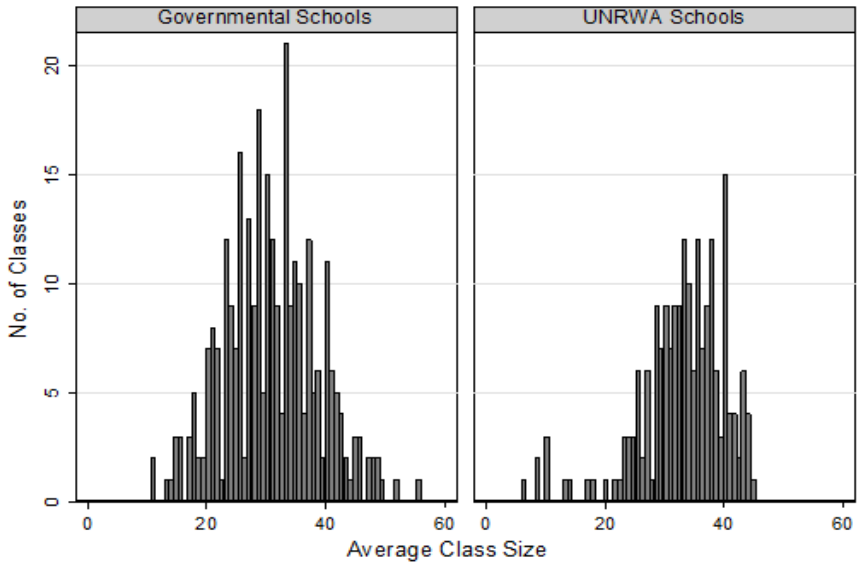
[39] The subtests were selected and adapted from established tests of general ability: the Cognitive Ability Test (CAT; Thorndike, Hagen, & Lorge, 1971), Milta – a Hebrew version of the Lorge–Thorndike Test (Ortar & Shachor, 1980), Standard Progressive Matrices (Raven, 1983), and the Cattell and Cattell (1960) Culture Fair Intelligence Test.

[40] A student is characterized as being bullied or victimized when he or she is exposed, repeatedly and over time, to negative actions on the part of one or more other students (Olweus, 1997).

error that might underestimate the impact of class size, which will be addressed in the identification strategy. Figure (4.1) shows the distribution of the average class size in grades 5–9 in both types of schools. The average class size in governmental schools is 30.7, while it is 33.4 in UNRWA schools.

Additionally, these administrative records allow me to include the students' grade point average (GPA) during the previous two academic years in the main analysis, which is computed as the average of six main subjects: Arabic, English, Mathematics, Science, National Education, and Religious Education.

Further, this new data set contains a large number of students' family background covariates, which are used as control variables (e.g., household structure, household monthly net income, parental education, books at home, and living standard). The students' parents provided these data through a paper-and-pencil questionnaire.



Source: Own calculations based on survey data.

Figure 4. 1: Distribution of the average class size

The school characteristic variables include educational facilities, adequate stationery, the availability of qualified teachers, teachers' commitment, and the school educational climate and were obtained from the school principal survey. This instrument adopted the same items as those used in the Trends in International Mathematics and Science Study (TIMSS).

I also control for some contextual data related to school locality.[41] The locality controls include the locality type (rural, urban, or refugee camp), the poverty rate based on a 2009 consumption survey,[42] the population per locality in 2013, the proportion of a locality under area C,[43] and whether the locality is affected by the separation wall.[44] The primary source of this information is the Palestine Central Bureau of Statistics (PCBS).

Finally, the data set includes detailed information on students' physical and mental health and teacher/peer relations in school. These data are drawn from the HBSC survey and student background questionnaires answered by households. I interpret this information as a likely channel through which class size may affect children's behavior. Section (2.7) provides more details about these questions and the way in which these questions are used to indicate behavioral problems.

To reduce bias due to omitted variables and to avoid reducing the sample size due to missing values of control variables, as well as increasing the precision of the estimates, some control variables with missing values are substituted by mean values, and an indicator for such missing values is created. In the final analysis, and after imposing some restrictions according to the suggested identification strategy, the sample ends up with approximately 4,700 students in grades 5 to 9 distributed across 416 different classes and enrolled in 91 schools located in 71 distinct localities throughout the West Bank. Table (4.1) presents a summary of the statistics of the dependent and control variables. Due to the sampling requirement, female students are overrepresented in the sample (67 percent).

Next, to check the potential endogeneity problems, I perform regressions to account for the class size variation between and within schools. Table (4.A.1) in the appendix presents the results

[41] "Locality" is the smallest administrative unit defined by the PCBS. There are 528 localities in the West Bank.

[42] This is the most recent available survey, conducted by the World Bank and PCBS and issued in 2013.

[43] Area C: Areas in the West Bank are still under full Israeli military and civil control based on the Oslo Accords of 1993, while the Palestinian Authority (PA) has civil and security control in area A. The PA has civil autonomy but no security control in area B (Vishwanath et al., 2014). Communities in area C are living in difficult life circumstances due to the lack of major services. For more details, see www.btselem.org/topic/Area_c.

[44] The Israeli West Bank barrier or wall is a separation barrier built by the Israeli Government in the West Bank along the 1949 Armistice Line known as the "Green Line" (B'Tselem, 2012). The barrier divides Palestinian communities, encircles some, and isolates others from their surroundings, while separating East Jerusalem from the rest of the West Bank (UNESCO, 2014).

of the regressions of average class size in grades 5 to 9 on the individual, locality, and school level of controls. The results with the school fixed effect are presented in the last column. Locality attributions and class size are highly correlated, as indicated in all the columns. The presence of the separation wall is associated with an increase in class size by 1.8 students. The result could be attributed to the fact that the separation barrier reduces the mobility abilities for those people who live in densely populated localities plagued by the wall. Both the poverty rate and the locality's proportion in area C have a significant adverse impact on class size. Usually, schools in poor communities and marginalized areas are less attractive to parents due to their lack of educational resources. Additionally, communities in area C are characterized as having inadequate primary services and suffer from unfortunate life conditions (UNESCO, 2014).

Table 4. 1: Descriptive statistics

Variable	Mean	Std Dev.	Min.	Max.
Panel A: Individual-level observations: 4,664				
Cognitive tests score (child)	60.65	16.66	0.55	94.48
Female child	0.66	0.47	0	1
Refugee status	0.42	0.49	0	1
High school diploma (father)	0.28	0.45	0	1
College degree (father)	0.19	0.39	0	1
High school diploma (mother)	0.30	0.46	0	1
College degree (mother)	0.15	0.35	0	1
Living standard scale (10 points)	3.53	2.27	0	9
Net monthly income (NIS) (5-point scale)[45]	1.66	1.38	1	5
Books at home (5-point scale)[46]	1.52	1.23	1	5
No. of student's siblings	4.38	2.98	0	18

Continued on next page ...

[45] The scale is: (1)<NIS 1500; (2) NIS 1500–NIS 2499; (3) NIS 2500–NIS 3999; (4) NIS 4000–NIS 5000; and (5) >NIS 5000.

[46] The scale is: (1) 0–10 books; (2) 11–25 books; (3) 26–100 books; (4) 101–200 books; (5) >200 books.

... **Table 4.1** continued

Number of rooms (above median)	0.54	0.50	0	1
School average 2010/11	71.89	16.07	23.33	99.42
School average 2011/12	69.69	16.00	18.50	99.83
Panel B: Class-level observations: 416				
Average class size	30.59	7.02	6	44.5
Cognitive test score (class)	60.62	11.28	27.98	85.31
Panel C: School-level observations: 91				
UNRWA school	0.45	0.50	0	1
School lack of resources (18-point scale)	6.02	4.47	0	17
School educational atmosphere total (40-point sale)	26.95	3.54	17	38
Problems among teachers (6-point scale)	1.73	1.64	0	6
Panel D: Locality-level observations: 71				
Presence of the separation wall	0.376	0.484	0	1
Percentage of the locality in area C	0.303	0.316	0	1
Poverty headcount rate	0.194	0.131	0	0.5035
Population per locality	24,735	48,168	237	195,733
Urban locality	0.416	0.493	0	1

Panel E: Descriptive Statistics for the Secondary Outcomes and Mechanism

Variable	**Observations**	**Mean**	**Std Dev.**	**Min.**	**Max.**
Bully–victim	4,313	0.24	0.42	0	1
Bully–Act	4,297	0.2	0.4	0	1
Fight in school and Injury during past 12 months	4,272	0.93	1.26	0	4
SDQ impact: overall difficulties	3,619	1.53	0.70	1	4
School Teacher Support	4,253	3.94	1.76	1	10
Peer Relations	4,316	5.50	2.35	1	15

In column 5 in Table (4.A.1) in the appendix, I add the cohort fixed effect to the specification; both school- and locality-level controls do not change and remain significant. The class size is likely to be smaller in grade 9, which represents the final level in the preparatory stage. School principals tend to distribute grade 9 students into small classes, since those students tend to be more sociable and interactive as they see themselves as superior to others. Parents may also decide to move their children to larger schools that contain a secondary level. The results in Table (4.A.1) in the appendix suggest that students from disadvantaged localities attend smaller classes. Moreover, students from more affluent families and students in grade 9 tend to attend smaller classes. If the selective placement in small and large classes were disregarded, the precise estimate of class size on achievement would be biased. In the next section, I will address the strategy to deal with this problem.

4.5 Identification Strategy

4.5.1 Econometric Model

The empirical specification for the model is presented below. The model assumes that the outcome variable (cognitive score, bullying, and violent behavior) of student *i*, enrolled in school *k* and town *l* (Y_{ikl}), is generated by the following equation:

$$Y_{ikl} = \alpha + \delta\, CS_{kl} + \beta\, X_{ikl} + \vartheta\, S_{kl} + \omega\, T_l + \varepsilon_{ikl} \qquad (4.1)$$

where X_{ikl} is a vector of observable attributes of a student's individual-level controls, including sex, a dummy for the month of birth,[47] refugee status, a dummy for the student grade, household characteristics, such as parental level of education measured in three categories (less than, with, or more than a high school diploma), household income, the household living standard index (10

[47] The month of birth determines children's school entry age. The School Entry law could affect child outcomes other than through educational attainment. For example, Bedard and Dhuey (2006) indicated that older children in the same classroom may be treated differently (e.g., be placed in more advanced programs) or experience fewer social problems. Cascio and Schanzenbach (2007) pointed out that entrance start dates are correlated with school performance, grade repetition, and diagnoses of learning disabilities.

points),[48] the number of books and rooms at home, and the number of siblings. S_{kl} is a vector of observable school-level controls and includes the school type (UNRWA vs. governmental school), school resource index, teacher characteristics, and school climate index, as reported by school principals. stands for town-level variables, like population and poverty rate, locality type (urban vs. rural or camp), the presence of the separation wall, and the proportion of the locality under area C. *CS* is the average class size that student *i* attended during the 2012/2013 academic year, and ε_{ikl} denotes all the other determinants of achievement, such as the unobserved attributes of the student, parents, school, and locality. The coefficient of interest is δ, the class size effect. *Y* is the outcome variable representing the student cognitive scores, bullying, and violent behavior. All the standard errors are clustered at the school level.

As indicated before, the endogeneity problem may produce biased OLS estimates of the class size effect, and the exogenous source of variation in class size is needed for reliable identification. The available data set provides information only on the average class size within the grade rather than the actual class size. In these data, there are 2 thresholds for the maximum class size number: 40 and 45 students/class in public and UNRWA schools, respectively. Following the literature, I exploit the maximum class size rule in the regression discontinuity design induced by Angrist and Lavy (1999) to predict the average class size to be a non-linear and discontinuous function of enrollment. The number of classes in grade *j* at school *k* in year *t* can be described by (f_{jkt}):

$$\text{In governmental schools}: \left(f_{jkt}\right) = int\left[\frac{\mathrm{N_{jkt}}-1}{40}\right] + 1 \quad (4.2)$$

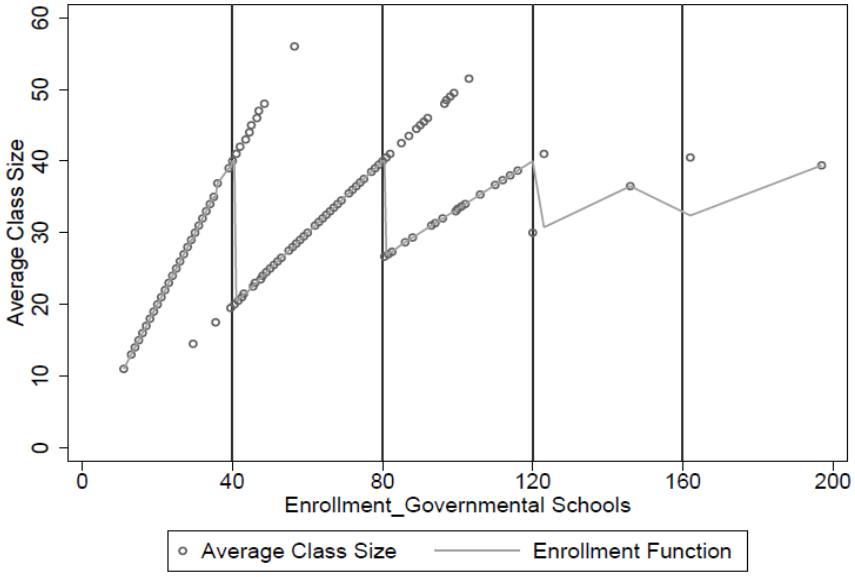
$$\text{In UNRWA schools}: \left(f_{jkt}\right) = int\left[\frac{\mathrm{N_{jkt}}-1}{45}\right] + 1 \quad (4.3)$$

where N_{jkt} is the total enrollment in grade *j* in school *k* in year *t* and *int* (x) is the largest integer smaller than or equal to *x*.

Figures (4.2.a) and (4.2.b) plot the theoretical class size and the actual average class size against the cohort enrollment. The actual average class size is very close to the predicted one in UNRWA schools and the majority of governmental schools, except in a few cases, as shown in

[48] The household living standard index represents whether a household owns a TV, mobile phone, DVD player, air conditioner, car, computer, central heating, washing machine, or refrigerator.

Figure (4.2.a). This indicates that these schools do not have the resources to follow the maximum class size rule. However, the graph shows that there is no good variation to identify class size effects, as no variation is yielded in the first stage when the actual average class size is instrumented by the theoretical class size induced by equations (4.2) and (4.3). Focusing on those schools that comply with the maximum size rule only produces no differences in the class size coefficient between OLS and 2SLS estimates. Therefore, I restrict the sample to those classes that comply with the maximum class size rule. Then, I estimate the effect of class size with the same specification as in equation (4.1) by using the reduced form, since in this case the theoretical and average class size should be the same.[49] As a result, 473 observations distributed over 20 governmental schools in 43 classes are excluded from the main analysis.[50]

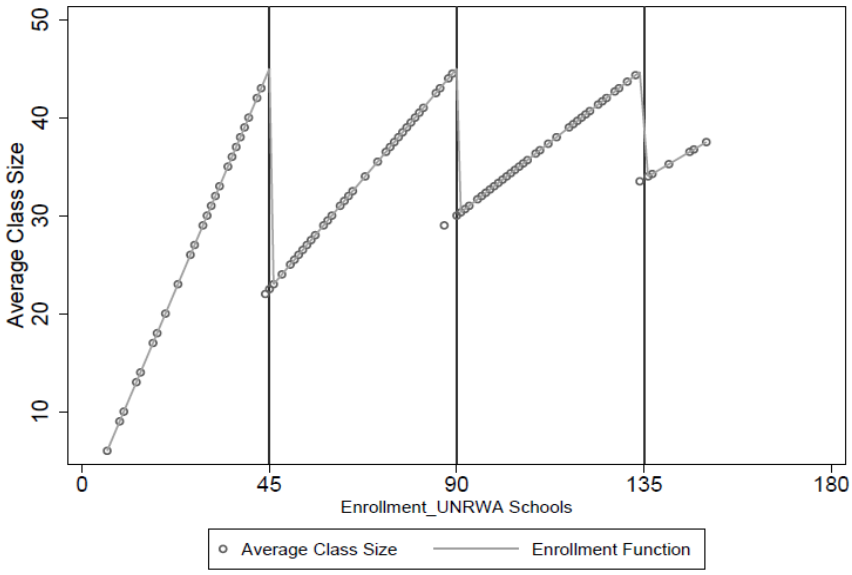


Source: Own calculations based on survey data and school enrollment.

Figure 4.2. a: Average and predicted class size, governmental schools

[49] The restricted sample contains only schools that comply with the maximum class size rule, since instrumenting the actual average class size with the theoretical average class size yields no variation in the first stage. I apply an OLS regression rather than 2SLS since the two provide the same results. One of the limitations of this approach is increasing the margin of error due to the decreasing sample size. In addition, the adopted identification strategy is valid only for a restricted sub-sample; therefore, the results may be less conclusive and might affect the external validity. However, this depends on the size of the affected sample, which is very small in the current case.

[50] Table A.4 represents the differences in observed variables (in particular on the school level) between schools that comply and schools that do not comply with the maximum class size rule.



Source: Own calculations based on survey data and school enrollment.

Figure 4.2. b: Average and predicted class size, UNRWA schools

4.5.2 Threats to Validity

However, this identification strategy risks being influenced by unobserved school choice (specifically omitted variables) and the possibility of parents sorting across regions in search of better services, including schools. To deal with these potential problems, I control for a variety of school covariates using the principal survey to construct school educational indicators. These indicators contain three indexes that capture many school characteristics and reflect the education climate: (1) an educational atmosphere index, such as teacher job satisfaction, curriculum, parental support, positive involvement in the educational process, and so on; (2) problematic behaviors of teachers, such as late school arrivals and unjustified absenteeism; and (3) a school resource index, for example adequate stationery, the availability of qualified teachers, educational space, and heating/cooling and lighting systems.

Regarding the threat of cross-regional movements, the West Bank is characterized as being geographically fragmented (Vishwanath et al., 2014), diminishing the capacity for internal and external mobility. The presence of the separation wall, existing in many area C localities within West Bank territories, restricts movement, causing political and economic instability. This in turn ruptures West Bank communities. The most recent available mobility report from the PCBS (2010a)

confirms that the majority of West Bank residents (more than 90 percent) have the same residency as their birthplace.[51]

Another threat to validity is sorting near cutoffs. The RDD design induced by the maximum class size rule assumes that the predicted class size is unrelated to the student or school characteristics. This assumption is violated in private schools (Urquiola & Verhoogen, 2009) as well as in public schools (Cohen-Zada et al., 2009) when higher socio-economic status (SES) households sort themselves into higher-quality schools as a response to school administration when they try to manipulate enrollment to avoid adding additional classrooms. Therefore, RD estimates overestimate the effect of class size on student outcomes, since the students after the cutoffs come from higher SES backgrounds. Such sorting seems to be unlikely in the West Bank, where students are required to attend the closest school to their residence and mobility across school districts is rare. Moreover, to deal with that issue, I estimate the RD model based on Urquiola and Verhoogen's (2009) specification, which can be written as follows:

$$Y_{is} = \gamma E(CS_S|N_s) + \alpha(N_s) + \mu_{is} \qquad (4.4)$$

$$E(CS_S|N_s) = \partial 1(N_s \geq C_u) + b(N_s) \qquad (4.5)$$

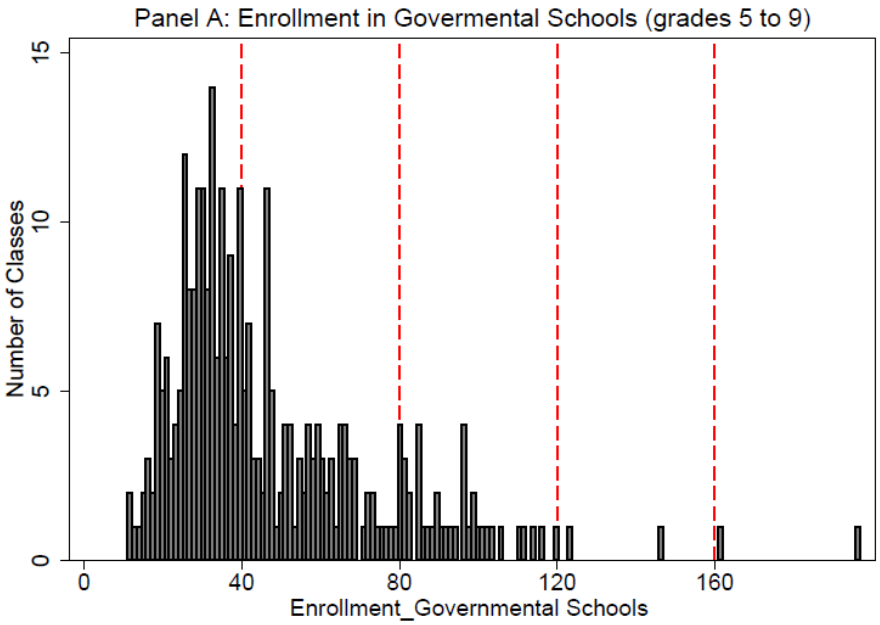
where *i* and *s* indicate individual and school, respectively. Y_{is} is the outcome of an individual student enrolled in school *s*. *E*(*CS*s) is the average class size in school *s*, N_s is the grade enrollment, C_u is the value of the class size cutoff (i.e. 40 in governmental schools and 45 in UNRWA schools), and a(.) and b(.) are flexible functions of enrollment. Figure (4.3) presents a histogram of enrollment in grades 5–9 in both governmental and UNRWA schools. The histogram does not show any pattern in which the numbers of class sections are stacked exactly at the cutoff point, except in a few cases in the public schools at the first and the second cutoff point. The analysis will focus on the two first cutoff points, since there are not enough class sections after the third cutoff. In general, the enrollment is not high in both types of schools, which gives the estimation more precision, since Maimonides' rule better explains the class size effect at low levels of enrollment

[51] Other researchers have indicated the low mobility in the West Bank, for example Di Maio and Nandi (2013) and Mansour and Rees (2012).

(Angrist, Battistin, & Vuri, 2017). Furthermore, the non-high enrollment level reduces the possibility of manipulation of the forcing variable, enrollment, in this case.

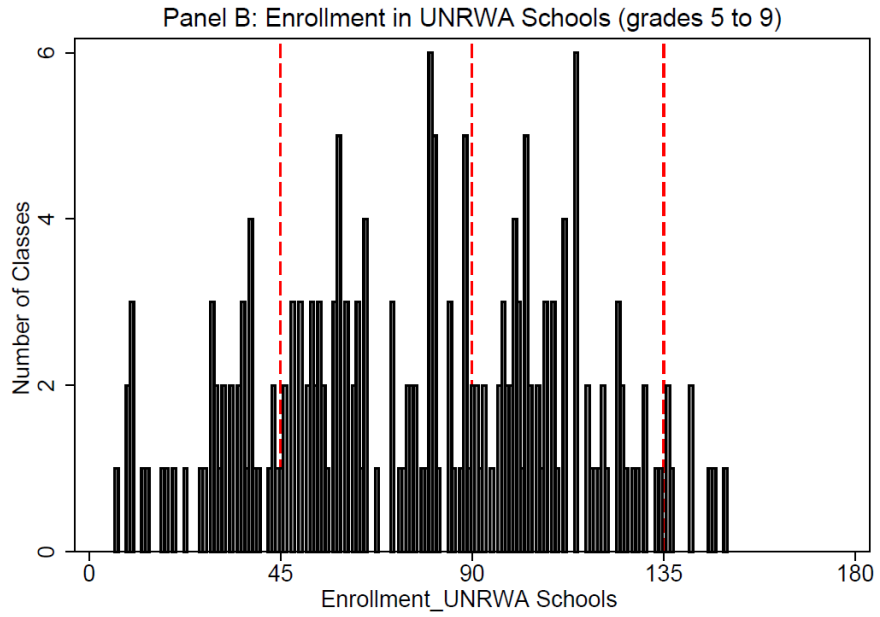
Like Urquiola and Verhoogen (2009), Table (4.2) presents regressions on household characteristics with the indicator variables for the class size cutoffs and enrollment. (I use dummies indicating whether enrollments are above each of the cutoff points and piecewise linear splines for enrollments used.) The results provide evidence that there is no significant jump at the first or second enrollment cutoff for the selected covariates (mother's education, household income, and household standard of living index). Moreover, Table (4.A.5) in the appendix provides additional evidence using RD estimates induced by Calonico, Cattaneo, and Titiunik (2014) to verify that there is no violation of RDD assumptions with regard to the sorting of household characteristics at the cutoff points. These results are consistent with the visual evidence obtained from Figures (4.4.1.a, 4.4.1.b, 4.4.2.a, and 4.4.2.b), which confirm that mothers' schooling and the household standard of living index are not significantly different before or after the cutoff points in both types of school.

The main estimation assumes that controlling several levels of covariates, including school characteristics and locality level controls, and excluding schools that severely deviate from the maximum class size rule, are sufficient to correct the biases of selective placement into schools with different class sizes.



Source: Own calculations based on school enrollment.

Figure 4.3. a: Enrollment in governmental schools



Source: Own calculations based on school enrollment.

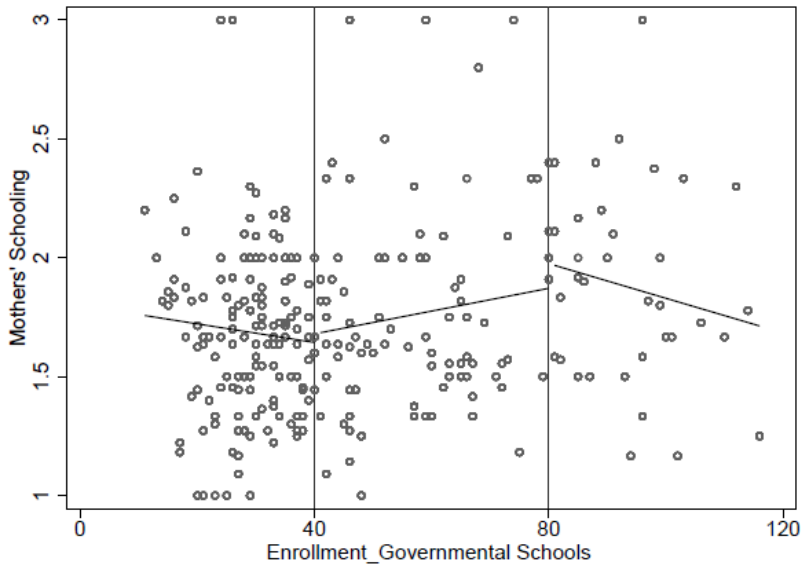
Figure 4.3. b: Enrollment in UNRWA schools

Table 4. 2: Behavior of selected variables around enrollment cutoffs

	(1)	(2)	(3)
Dep. var.:	Moth. edu.	Income	Living standard
Panel A: Governmental schools			
1{N≥41}	0.024	0.356	0.017
	(0.129)	(0.283)	(0.364)
1{N≥81}	-0.230	0.060	-0.299
	(0.200)	(0.222)	(0.295)
N	-0.004	-0.016	-0.002
	(0.006)	(0.012)	(0.009)
(N−41)×1{N≥41}	0.007	0.005	0.004
	(0.009)	(0.015)	(0.017)
(N− 81)×1{N≥81}	0.001	0.014	0.009
	(0.006)	(0.011)	(0.016)
Constant	1.797***	2.682***	4.317***
	(0.184)	(0.382)	(0.301)
Observations	1,961	1,927	2,089
R-squared	0.004	0.008	0.002
Panel B: UNRWA schools			
1{N≥46}	-0.039	0.148	0.003
	(0.168)	(0.209)	(0.319)
1{N≥91}	0.085	0.047	-0.066
	(0.101)	(0.162)	(0.245)
N	0.007	-0.005	0.013
	(0.008)	(0.012)	(0.012)
(N−46)×1{N≥46}	-0.008	0.004	-0.015
	(0.009)	(0.013)	(0.014)
(N−91)×1{N≥91}	0.003	-0.002	-0.005
	(0.005)	(0.008)	(0.010)
Constant	1.427***	1.467***	2.071***
	(0.102)	(0.267)	(0.413)
Observations	1,582	1,525	1,630
R-squared	0.011	0.002	0.006

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, and * p<0.1.

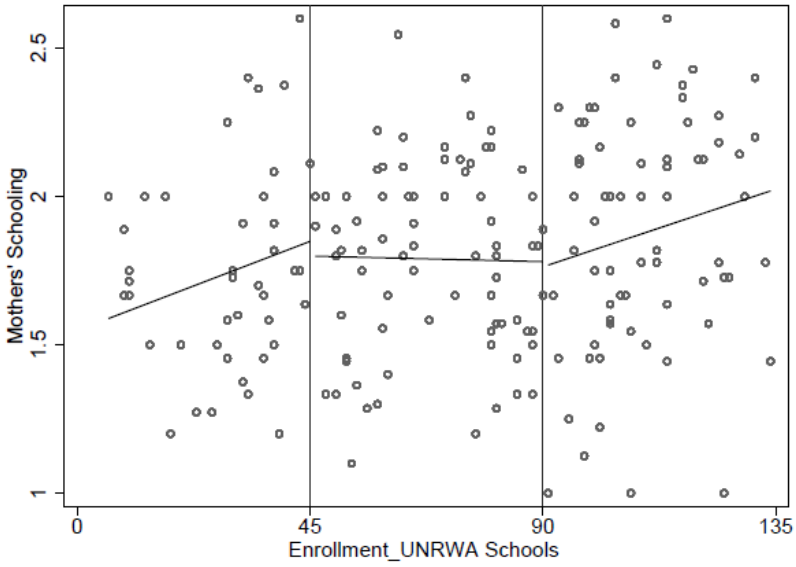
N denotes the enrollment function.



Source: Own calculations based on survey data and school enrollment.

Figure 4.4.1.a: Enrollment and mothers' schooling, government schools

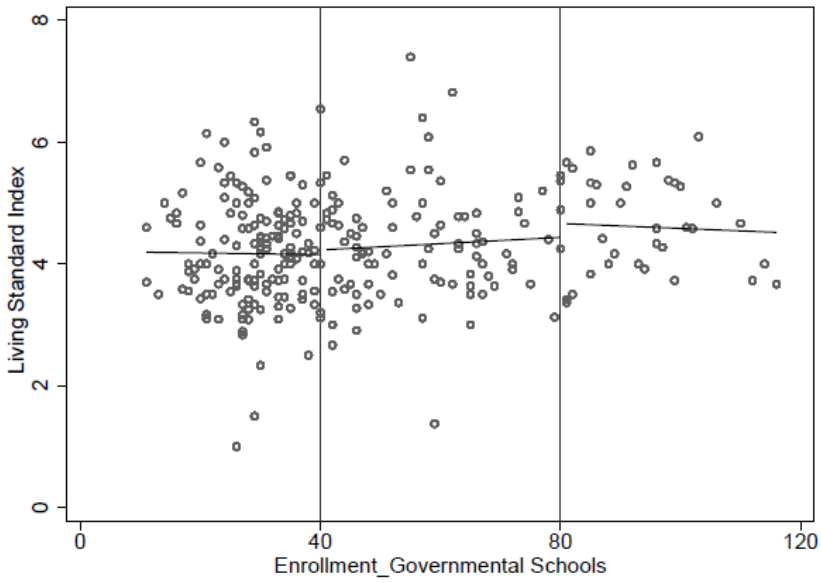
Mothers' schooling is measured on a three-level scale: (1) less than high school diploma (12 years), (2) high school diploma, and (3) college degree.



Source: Own calculations based on survey data and school enrollment.

Figure 4.4.1.b: Enrollment and mothers' schooling, UNRWA schools

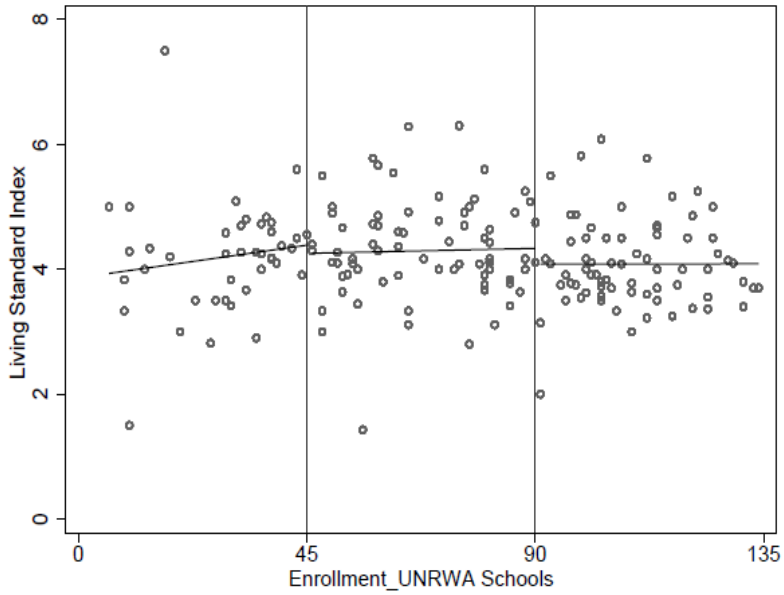
Mothers' schooling was measured on a three-level scale: (1) less than high school diploma (12 years), (2) high school diploma, and (3) college degree.



Source: Own calculations based on survey data and school enrollment.

Figure 4.4.2.a: Enrollment and students' living standard index, government schools

(Whether students' household owns a TV, mobile phone, DVD player, air conditioner, cars, etc.)



Source: Own calculations based on survey data and school enrollment.

Figure 4.4.2. b: Enrollment and students' living standard index, UNRWA schools

(Whether students' household owns a TV, mobile phone, DVD player, air conditioner, cars, etc.)

4.6 Results

4.6.1 Cognitive Test

The estimates of class size effects based on the identification strategy illustrated in the previous section are presented in Table (4.3). Each reported coefficient comes from the various specifications. The results in all the columns indicate the negative correlation between class size and cognitive abilities. Column (1) represents the effect of class size without any control except the enrollment function, which suggests an insignificant negative relation. Columns (2) and (3) are obtained from a specification with individual and locality controls; the estimates are negative but still insignificant. The result in column (4) is obtained after adding school-level controls. The estimates increase but remain statistically insignificant. Column (5) reports the results from specifications that also include performance in the previous two academic years. Including controls produces small negative class size estimates that are statistically insignificant. Table (4.2) suggests that reducing the average class size by one pupil has no significant impact on a student's cognitive test score. Figure (4.5.a) plots the average class cognitive test scores against enrollment. The absence of a jump in scores at cutoffs in data from governmental schools suggests that class size reduction leaves the scores unchanged. However, Figure (4.5.b) shows a significant reduction in the average class score after the first and second cutoffs in UNRWA schools.

Table (4.A.2) in the appendix also reports the effect of other control variables on students' cognitive abilities. Overall, females, refugees, and UNRWA school students outperform males, non-refugees, and public school students. The results are dramatically negatively affected by the locality poverty index. As expected, cognitive ability is strongly related to students' grade and school performance.

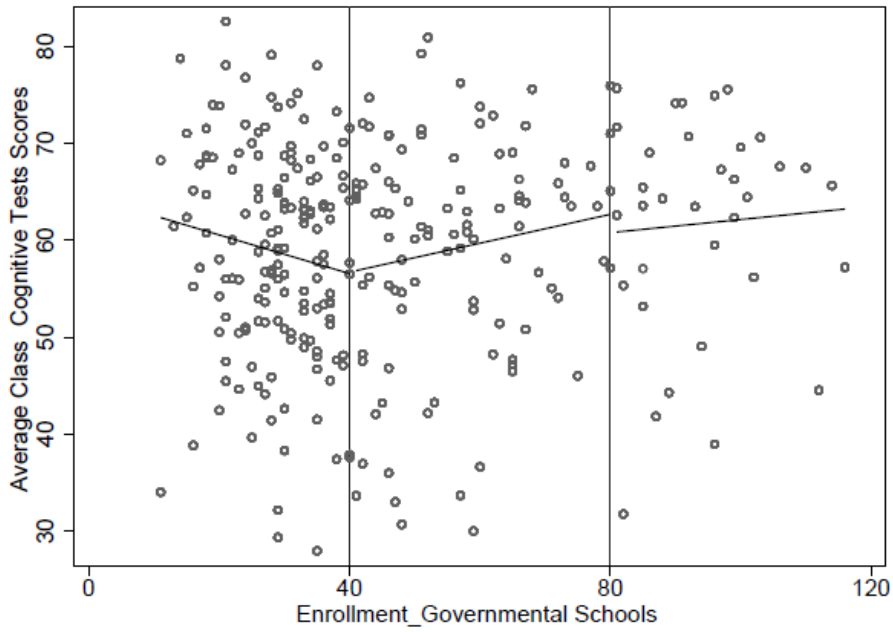
There are strands in the literature indicating that the class size effect varies across subjects and grades in terms of the sign and size of the estimates. Table (4.4) demonstrates that class size in general has a negative effect on students' performance in all the cognitive subtests in all the grades, but these estimates are not statistically significant. The magnitude of these estimates, however, is substantially larger and statistically significant at the 1 percent level in grade 6. The coefficient in column (3) suggests that reducing the class size by 1 student is significantly associated with higher cognitive scores by 0.4 percentage points compared with approximately 0.075 points in other grades. Table (4.4) also shows that the estimate for grade 9 is greater than those obtained

in the antecedent two grades. In fact, the one common characteristic in grades 6 and 9 is that these two grades represent the final stage in their level. Traditionally, schooling in Palestine is divided into three stages: elementary (grades 1–6); preparatory (grades 7–9); and secondary (grades 10–12). Seniority affects conduct, especially for those who are moving to a higher stage. Students in these grades are wont to feel superior to students in lower grades and tend to be more sociable in class and less controllable. Furthermore, moving to the next stage may cause huge levels of uncertainty and anxiety (Hofstede, 1983) and may lead to aggressive behavior, such as bullying.

Table 4. 3: Class size and students' cognitive test scores

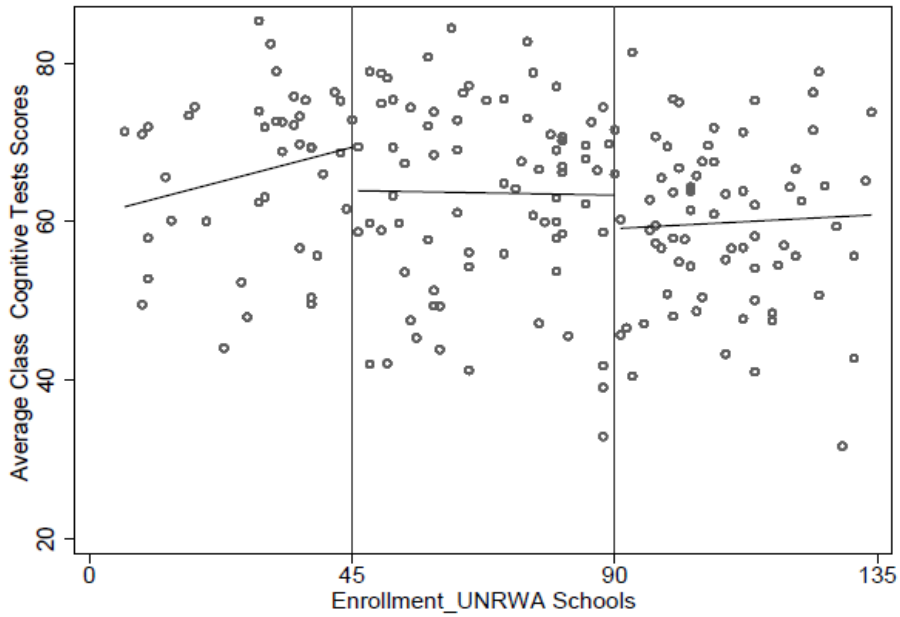
Dep. var.: cognitive tests	(1)	(2)	(3)	(4)	(5)
Average class size	-0.007	0.053	-0.047	-0.096	-0.075
	(0.100)	(0.084)	(0.072)	(0.069)	(0.066)
Enrollment	0.007	-0.027	-0.012	-0.015	-0.027
	(0.026)	(0.020)	(0.022)	(0.023)	(0.022)
Constant	60.484***	38.931***	49.100***	40.288***	9.091
	(2.889)	(4.027)	(4.572)	(7.640)	(7.792)
Observations	4,664	4,664	4,664	4,664	4,642
R-squared	0.000	0.257	0.288	0.305	0.467
Mean of dep. var.	60.65	60.65	60.65	60.65	60.65
Std err. of dep. var.	16.66	16.66	16.66	16.66	16.66
Individual-level controls	NO	YES	YES	YES	YES
Locality-level controls	NO	NO	YES	YES	YES
School-level controls	NO	NO	NO	YES	YES
School GPA in 2011/2012	NO	NO	NO	NO	YES

Notes: The robust standard errors clustered at the school level are reported in parentheses. The individual-level controls include sex, dummies for the month of birth and refugee status, household income, father's and mother's education, the standard of living scale with 9 points, the number of books at home, the number of rooms above the median per locality, the number of siblings, and the student grade. The locality-level controls contain the poverty rate, the proportion of the locality under area C, the presence of the separation wall, the population in 2013, and the locality type (dummy for urban). The school-level controls are the school resource scale, school learning atmosphere and problems among teachers, and school type (UNRWA or governmental). The school GPA includes the school GPA for the 2010/2011 and 2011/2012 academic years. *** p<0.01, ** p<0.05, and * p<0.1.



Source: Own calculations based on survey data and school enrollment.

Figure 4.5. a: Enrollment and average class cognitive tests scores, government schools



Source: Own calculations based on survey data and school enrollment.

Figure 4.5. b: Enrollment and average class cognitive tests scores, UNRWA schools

Table 4. 4: OLS estimates: the effect of class size on cognitive tests per grade

	(1)	(2)	(3)	(4)	(5)	(6)
Grade	All	5	6	7	8	9
All cognitive test parts	-0.075	0.051	-0.392***	-0.067	0.054	-0.198
	(0.066)	(0.131)	(0.145)	(0.119)	(0.139)	(0.137)
Numerical tests	-0.032	0.070	-0.378*	0.168	0.101	-0.231
	(0.097)	(0.186)	(0.190)	(0.161)	(0.213)	(0.212)
Figural tests	-0.102	0.064	-0.464**	-0.121	-0.004	-0.192
	(0.082)	(0.171)	(0.177)	(0.142)	(0.168)	(0.153)
Verbal tests	-0.069	0.037	-0.348***	-0.095	0.080	-0.192
	(0.062)	(0.124)	(0.128)	(0.118)	(0.128)	(0.130)
No. of observations	4,642	918	916	927	924	957
Enrollment	YES	YES	YES	YES	YES	YES
Individual-level controls	YES	YES	YES	YES	YES	YES
School-level controls	YES	YES	YES	YES	YES	YES
Locality-level controls	YES	YES	YES	YES	YES	YES
Student GPA in 2011 and 2012	YES	YES	YES	YES	YES	YES

Notes: The robust standard errors clustered at the school level are reported in parentheses. The individual-level controls include sex, dummies for the month of birth and refugee status, household income, father's and mother's education, the standard of living scale with 9 points, the number of books at home, the number of rooms above the median per locality, the number of siblings, and the student grade. The locality-level controls contain the poverty rate, the proportion of the locality under area C, the presence of the separation wall, the population in 2013, and the locality type (dummy for urban). The school-level controls are the school resource scale, school learning atmosphere and problems among teachers, and school type (UNRWA or governmental). The school GPA includes the school GPA for the 2010/2011 and 2011/2012 academic years. *** p<0.01, ** p<0.05, and * p<0.1.

4.6.1.1 Heterogeneous Class Size Effects on Cognitive Test Scores

I will now investigate whether this insignificant effect of class size reduction reported in the main results will have a different effect on the cognitive results for specific sub-groups. There is evidence that the gains from small classes are largest for students from disadvantaged backgrounds, as indicated by Angrist and Lavy (1999) and Krueger (1999). Other researchers have emphasized that the outcome of the class depends on the teacher characteristics (Woessmann & West, 2006) and student achievement records (Konstantopoulos, 2008).

Table (4.5) presents the results for specific groups using the same specification as in equation (4.1). The first sub-group is classified according to gender; the results differ substantially from the results for girls and boys together but are still statistically insignificant. Column (3), panel A suggests that boys benefit more from class size reduction than girls. As for the second sub-group, I divide the students into two groups according to their school achievement in the previous academic year (2011/2012). Column 4 indicates that class size has a larger negative influence on students with a lower-than-average GPA (>70 percent) but no significant effect on the opposite group. Subgroups 4, 5 and 6 in Panel B are classified according to the locality type, teacher problem index, and school type, respectively. All of the reported estimates are statistically insignificant. Notably, the class size reduction has approximately zero effect on UNRWA students, which is consistent with the UNRWA claim that there is no evidence to support a class size reduction policy. To conclude, Table (4.5) does not provide evidence in favor of heterogeneous class size effects. The only exception is for students with low academic achievement profiles and those from disadvantaged backgrounds, who benefit the most from a reduction in class size.

Table 4. 5: Effect of class size on sub-groups

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A						
Dep. var.: cognitive tests	Child gender		School GPA in 2012		Mother's education	
	Girls	Boys	<70	>70	<12 years	>12 years
Class size	-0.045	-0.132	-0.164*	0.008	-0.097	0.044
	(0.044)	(0.153)	(0.091)	(0.063)	(0.069)	(0.083)
Enrollment	-0.074	-0.015	-0.026	-0.031	-0.023	-0.044*
	(0.052)	(0.027)	(0.025)	(0.022)	(0.023)	(0.024)
Observations	3,095	1,547	2,397	2,240	3,960	682
R-squared	0.515	0.412	0.382	0.403	0.455	0.507
Mean of dep. var.	67.13	63.18	60.53	54.48	67.13	59.77
Std err. of dep. var.	13.95	14.81	16.7	16.73	13.95	16.60
Panel B						
	Locality type		Teacher's prob. index		School type	
	Urban	Rural/camp	Equal to 0	0> and <6	UNRWA	GOV
Class size	0.043	-0.115	-0.049	-0.112	-0.001	-0.071
	(0.107)	(0.091)	(0.064)	(0.089)	(0.081)	(0.093)
Enrollment	-0.015	-0.044	-0.069**	-0.031	-0.088***	0.014
	(0.027)	(0.042)	(0.033)	(0.024)	(0.029)	(0.031)
Observations	1,937	2,705	1,057	3,585	2,065	2,577
R-squared	0.504	0.462	0.561	0.467	0.446	0.489
Mean of dep. var.	55.79	59.53	60.18	62.04	66.19	62.80
Std err. of dep. var.	18.83	16.93	17.01	15.83	15.71	16.15
Individual-level controls	YES	YES	YES	YES	YES	YES
Locality-level controls	YES	YES	YES	YES	YES	YES
School-level controls	YES	YES	YES	YES	YES	YES
School GPA in 2011/2012	YES	YES	YES	YES	YES	YES

Notes: The robust standard errors clustered at the school level are reported in parentheses. The individual-level controls include sex, dummies for the month of birth and refugee status, household income, father's and mother's education, the standard of living scale with 9 points, the number of books at home, the number of rooms above the median per locality, the number of siblings, and the student grade. The locality-level controls contain the poverty rate, the proportion of the locality under area C, the presence of the separation wall, the population in 2013, and the locality type (dummy for urban). The school-level controls are the school resource scale, school learning atmosphere and problems among teachers, and school type (UNRWA or governmental). The school GPA includes the school GPA for the 2010/2011 and 2011/2012 academic years. *** p<0.01, ** p<0.05, and * p<0.1.

4.6.2 Effect of Class Size on Bullying and Violent Behavior

Table (4.A.6) in the appendix shows the results of the marginal effect based on the model as outlined in equation (4.1) estimated using the probit model. Class size does not seem to be associated with any statistically significant effect on bullying indicators for perpetrator or perpetrator/victim characteristics, while the results reveal a significant relation to the students' self-reported indication of being bullied by others. The result in Table (4.6), column (3) suggests that increasing the class size by 1 student increases the predicted probability of the student having been bullied during the past 2 months by 0.009 points. After adding the school fixed effect to control for between-school endogeneity, the probability increases to 0.0135 with higher precision power. Next, I investigate the effect of class size on students' self-reported probability of being bullied using a different specification, as illustrated in Table (4.6), panel (A). Columns (1) to (5) include a linear function of the forcing variable, "enrollment," while column (6) presents the result of the quadratic function of enrollment and adds the school fixed effect to the model. The estimate is a very precisely estimated 0 and reveals a significant effect of class size. The size of the estimation is remarkably similar when controlling for student self-reporting as a bully. Column (6) demonstrates that a 10-student class size increase will increase the probability of a student being bullied by 13 percent, which corresponds to 0.55 percent of the mean.

In the second part of Table (4.6), I present the results for the effect of class size on violence among peers. All the estimations (columns 1 to 6) confirm that larger classes increase violence among students. However, the precision of these estimations varies according to each specification. Column (4) shows the results under a full set of controls, including the school fixed effect. The coefficient suggests that a 10-student class size increase is associated with increasing average student engagement in fighting during the past 12 months and needing medical treatment 0.10 times. After including the quadratic function of enrollment in the estimation, shown in column (6), the coefficient does not change; however, here the precision power is lower (with 10 percent significance).

Table 4.6: Effect of class size on behavioral problems

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A, dep. var.: bullying victim. Probit estimation						
Class size	0.00902*	0.00818*	0.00944**	0.0135**	0.0131**	0.0129**
	(0.00514)	(0.00451)	(0.00427)	(0.00636)	(0.00623)	(0.00616)
Bullying act			1.374***		1.381***	1.381***
			(0.0613)		(0.0657)	(0.0658)
Observations	4,313	4,292	4,224	4,290	4,222	4,222
Mean of dep. var.	0.236	0.236	0.236	0.232	0.232	0.232
Std err. of dep. var.	0.425	0.425	0.425	0.422	0.422	0.422
Panel B, dep. var.: violent behavior. OLS estimation						
Class size	0.0127***	0.0101**	0.00923**	0.0109**	0.00947*	0.00975*
	(0.00453)	(0.00390)	(0.00387)	(0.00542)	(0.00551)	(0.00536)
Being bullied			0.464***		0.468***	0.468***
			(0.0610)		(0.0601)	(0.0601)
Observations	4,223	4,202	4,202	4,202	4,202	4,202
R-squared	0.004	0.055	0.078	0.087	0.109	0.110
Mean of dep. var.	0.918	0.918	0.918	0.918	0.918	0.922
Std err. of dep. var.	1.255	1.255	1.255	1.255	1.255	1.256
Enrollment	YES	YES	YES	YES	YES	YES
Enrollment squared	NO	NO	NO	NO	NO	YES
Individual/locality controls	NO	YES	YES	YES	YES	YES
School-level controls	NO	YES	YES	NO	NO	NO
School F.E.	NO	NO	NO	YES	YES	YES
Bullying act/victim	NO	NO	YES	NO	YES	YES

Notes: The robust standard errors clustered at the school level are reported in parentheses. The controls include: individual-level controls, sex, dummies for the month of birth and refugee status, household income, father's and mother's education, the standard of living scale with 9 points, the number of books at home, the number of rooms above the median per locality, the number of siblings, and the student grade. The locality-level controls contain the poverty rate, the proportion of the locality under area C, the presence of the separation wall, the population in 2013, the locality type (dummy for urban), and the school GPA for the 2010/2011 and 2011/2012 academic years. The school-level controls are the school resource scale, school learning atmosphere and problems among teachers, and school type (UNRWA or governmental). *** p<0.01, ** p<0.05, and * p<0.

Focusing more narrowly on the discontinuity cutoff, as in Urquiola and Verhoogen (2009) and Van der Klaauw (2002), Table (4.7) presents the OLS[52] results for five student enrollment bands around the first and second cutoffs. I add an indicator for whether schools' enrollment is above or below the respective cutoff to investigate the effect of class size around each discontinuity. Panels A and B present the results for the violent behavior outcome for the two schooling systems, while the victim of bullying outcome is presented in panels C and D. The first two columns include all the controls in equation (4.1), while the school fixed effect is added in columns (3) and (4). Columns 3 and 4 reveal that the effect of class size on self-reported conduct problems is positive for both types of school and significant in some cases even after adding the school fixed effect. The only exceptions are the results for self-reported victims of bullying for UNRWA schools, which yield a negative relation.[53]

Based on the RDD validity, as Table (4.2) demonstrates, there is reason to interpret the consistent estimates produced in Tables (4.6) and (4.7) as a causal effect of class size on the self-reporting of violent behavior and self-reported indication of being a victim of violence. The next section attempts to propose a mechanism that might serve as a mediator channel related to the context of this study.

[52] The probit model and OLS yield similar outcomes for the bullying victim outcome. The probit model does not work effectively in UNRWA schools.

[53] The same analysis is performed for the main outcome (cognitive test scores) and the results are presented in Table (4.A.3) in the appendix. The estimates of the effect of class size on students' cognitive test scores are uniformly negative, although they are not statistically significant.

Table 4.7: Within five student-enrollment band regressions: Class size, violent behavior and victims of bullying

Dep. var. violent behavior	(1)	(2)	(3)	(4)
cutoff	1st	2nd	1st	2nd
Panel A: Governmental schools				
Dep. var.: Violent behavior	(40 students)	(80 students)	(40 students)	(80 students)
Enrollment (N)	36≥N≥45	76≥N≥85	36≥N≥45	76≥N≥85
Class size	0.016	0.895	-0.030***	0.895
	(0.010)	(0.676)	(0.010)	(0.676)
Observations	426	68	426	68
R-squared	0.170	0.507	0.206	0.507
Panel B: UNRWA schools				
Dep. var.: Violent behavior	(45 students)	(90 students)	(45 students)	(90 students)
Enrollment (N)	41≥N≥50	86≥N≥95	41≥N≥50	86≥N≥95
Class size	0.043***	0.053***	0.043***	0.069
	(0.002)	(0.014)	(0.002)	(0.047)
Observations	155	197	155	197
R-squared	0.248	0.329	0.248	0.352
Panel C: Governmental schools				
Dep. var.: Bullying victim	(40 students)	(80 students)	(40 students)	(80 students)
Enrollment (N)	36≥N≥45	76≥N≥85	36≥N≥45	76≥N≥85
Class size	0.002	0.638	0.007**	0.638
	(0.003)	(0.388)	(0.003)	(0.388)
Observations	427	67	427	67
R-squared	0.186	0.594	0.222	0.594
Panel D: UNRWA schools				
Dep. var.: Bullying victim	(45 students)	(90 students)	(45 students)	(90 students)
Enrollment (N)	41≥N≥50	86≥N≥95	41≥N≥50	86≥N≥95
Class size	-0.001	-0.007**	-0.001	-0.012
	(0.002)	(0.002)	(0.002)	(0.009)
Observations	156	195	156	195
R-squared	0.359	0.257	0.359	0.271
Controls	YES	YES	YES	YES
School FE	NO	NO	YES	YES

Notes: The robust standard errors clustered at the school level are reported in parentheses. The controls include the same covariates in Table (4.6). *** p<0.01, ** p<0.05, and * p<0.1.

4.7 Possible Mechanisms

The characteristics of school children who are victims of bullying are associated with symptoms in the domains of emotion, behavior, hyperactivity, and peer relationships (Moura et al., 2011). A strand of literature has also suggested that personality traits might contribute to typical bullying and aggressive behavior (Tani, Greenman, Schneider, & Fregoso, 2003). Eriksen et al. (2012) suggested that the perception of teachers is a mechanism channel through which bullying could affect victims' school achievements. Teachers perceive bullied children to be particularly weak in terms of academic skills. This perception affects teachers' confidence in and willingness to invest in victims and bullies. They also view bullied children as having worse moods and worse social competencies.

In this section, I will propose two transmission channels that may arise through which class size can affect the self-reporting of being bullied and engagement in violent behavior. The first group contains mental health attributes assessed by SDQ[54] questions as part of the parental background questionnaire. The second group discusses student peer/teacher relations. Students' peer relations were measured using an index established by three survey choices: "The students in my class enjoy being together"; "Most of the students in my class are kind and helpful"; and "Other students accept me as I am." Meanwhile, the teacher support index was obtained through two self-reported survey questions: "When I need extra help from the teachers I can get it"; and "My teachers are interested in me as a person." The answers to each question were rated on a 5-point scale (strongly agree, agree, neither agree nor disagree, disagree, and strongly disagree). Then, the total points were considered as a final measurement for each index (on a 15-point scale for peer rela-

[54] The Strengths and Difficulties Questionnaire (SDQ) is a brief behavioral screening questionnaire about 3–16-year-olds. There are currently three self-reported versions of the SDQ in the following categories: children, parents, and teachers. Each version includes between one and three of the following components: 25 items on psychological attributes, an impact supplement, and follow-up questions (Goodman, 1997; Goodman et al., 2010). In this study, I employ the parent reported version and the first two components of the questionnaire: 25 items on psychological attributes and the impact supplement. These extended versions of the SDQ ask whether the respondent thinks the young person has a problem and if so enquire further about chronicity, distress, social impairment, and burden to others (Goodman, 1999). For a detailed description of the SDQ, see http://www.sdqinfo.com/.

tions and a 10-point scale for teacher support); more points indicate worse peer relations and teacher support.

Table (4.8) shows the results of the probit and OLS regressions of self-reported victims of bullying and engagement in violent behavior from the SDQ total scores, scores for internalizing and externalizing problems, and the impact supplement component of the SDQ questionnaire,[55] as well as peer relations and students' self-reported teacher support. The results in Table (4.8) obtained from the same specification are used in equation (4.1). I also control for school fixed effects and employ the quadratic function of the forcing variable "Enrollment." Columns (1) and (3) present twelve separate regressions, in which each proposed mediating variable is included one at a time. Even so, both mental health indicators on the one hand and students' relations and teacher support on the other hand are strongly related to the two outcome conduct problems. Notably, the SDQ impact supplement coefficient is larger (more than two times) than the other mediator coefficients. Columns (2) and (4) in Table (4.8) show the results when the two mediator channels are jointly included. The SDQ's internalizing and externalizing components are still strong predictors of the two outcomes. The sizable influence of the SDQ impact supplement starts to vanish when victimization of bullying is the outcome, while it becomes smaller but still has a significant effect on self-reported violent behavior. In addition, teacher support still has a remarkable impact on self-reported victimization of bullying and violent behavior.

[55] Parents were asked "In general, do you think that your child has difficulties in one or more of the following areas: emotion, concentration, behavior, harmony, and dealings with others?" The answers to this question were provided on a 4-point scale indicating zero difficulties, a few difficulties, clear difficulties, and severe difficulties.

Table 4. 8: Potential mechanism

	(1)	(2)	(3)	(4)
	Probit estimation		OLS estimation	
Dep. var.	Victim of bullying		Violent behavior	
SDQ total	0.0124***		0.0102***	
	(0.00465)		(0.00386)	
N	3,687		3,686	
SDQ internalizing	0.0116	0.00392	0.0267***	0.0251***
	(0.00889)	(0.0108)	(0.00722)	(0.00839)
N	3,687		3,686	
SDQ externalizing	0.0220***	0.0189**	0.00464	-0.00527
	(0.00681)	(0.00865)	(0.00545)	(0.00745)
N	3,687		3,686	
SDQ impact supplement difficulties	0.0911**	0.0309	0.0897***	0.0590*
	(0.0385)	(0.0441)	(0.0292)	(0.0341)
N	3,519		3,515	
Peer relation	0.0252**	0.0171	0.00220	-0.0109
	(0.0106)	(0.0120)	(0.0104)	(0.0108)
N	4,474		4,434	
School teacher support	0.0470***	0.0354*	0.0334***	0.0291**
	(0.0143)	(0.0183)	(0.0115)	(0.0136)
N	4,347		4,366	
Enrollment	YES	YES	YES	YES
Enrollment squared	YES	YES	YES	YES
Controls	YES	YES	YES	YES
School FE	YES	YES	YES	YES
Observations		3,354		3,356
R-squared				0.104
Mean of dep. var.	0.239	0.230	0.924	0.907
Std err. of dep. var.	0.427	0.421	1.258	1.245

Notes: The robust standard errors clustered at the school level are reported in parentheses. The controls are the same as in the other specifications, as indicated in equation (4.1). *** p<0.01, ** p<0.05, and * p<0.

Next, to demonstrate whether these channels are on the causal path from class size to students' conduct problems proxied by self-reported victims of bullying and violent behavior, I estimate the same specification as in model (4.1) with student peer relations, teacher support, and SDQ components as outcomes. The results from Table (4.9) suggest that peer relations and student mental health, obtained by the SDQ impact supplement questions, are the possible transmission mechanism explaining the positive correlation between class size and conduct problems.

Table 4. 9: Class size effect on teacher support, peer relations, and SDQ

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. var.:	Peer relation	School teacher support	SDQ total	SDQ internalizing	SDQ externalizing	SDQ impact supplement difficulties
Class size	0.0192*	-0.00970	-0.000812	0.00273	0.00160	0.00559**
	(0.0113)	(0.00740)	(0.0204)	(0.0121)	(0.0146)	(0.00264)
Observations	4,434	4,366	3,686	3,708	3,689	3,605
R-squared	0.054	0.093	0.144	0.103	0.149	0.128
Enrollment	YES	YES	YES	YES	YES	YES
Enrollment squared	YES	YES	YES	YES	YES	YES
Controls	YES	YES	YES	YES	YES	YES
School FE	YES	YES	YES	YES	YES	YES
Mean of dep. var.	5.530	3.972	12.55	6.114	6.540	1.527
Std err. of dep. var.	2.328	1.786	5.587	3.098	3.537	0.690

Notes: The robust standard errors clustered at the school level are reported in parentheses. The individual-level controls include sex, dummies for the month of birth and refugee status, household income, father's and mother's education, the standard of living scale with 9 points, the number of books at home, the number of rooms above the median per locality, the number of siblings, and the student grade. The locality-level controls contain the poverty rate, the proportion of the locality under area C, the presence of the separation wall, the population in 2013, the locality type (dummy for urban), and the school GPA for the 2010/2011 and 2011/2012 academic years. The school-level controls are the school resource scale, school learning atmosphere and problems among teachers, and school type (UNRWA or governmental). *** p<0.01, ** p<0.05, and * p<0.

Table (4.10) presents a further explanation of the SDQ impact supplement question. If the child or parent answered "yes" to the question, "Overall, I think that the child has difficulties in one or more of the following areas: emotions, concentration, behavior, or being able to get on with other people," then 5 further questions were posed about the severity of these difficulties. Taken together, the 5 questions concerning overall distress and social impairment can be used to generate an impact score that ranges from 0 to 10.[56] The impact supplement provides an important estimate of the burden of the problems, which is an essential part of the diagnostic criteria in the current diagnostic classification system. Table (4.10) presents a different estimation for the SDQ impact supplement and shows that an increase in class size is significantly associated with an increase in these difficulties. Adding the school fixed effect to the estimate results in a loss of the significant power of the coefficient, but the sign is still in the right direction.

4.8 Conclusion

Of the various contributions to the literature on class size effects, some studies have found a significant relation between class size and achievement and others have not. While the literature remains inconclusive, less is known about the effect of class size on outcomes depending on non-cognitive skills, such as well-being and conduct problems. This study investigates the impact of class size on students' cognitive skills, bullying, and violent behavior in West Bank schools. I employ discontinuous regression changes in class size in governmental and UNRWA schools. I also provide evidence that the RDD assumptions are not violated due to discontinuities in the relationship between enrollment and household characteristics at cutoff points induced by a maximum class size rule. With regard to cognitive skills, the results show a small and insignificant effect of class size on pupils' achievements, except in grade 6, in which the class size has a notable adverse impact on the students' results.

[56] The impact supplement contains 5 questions: "difficulties upset or distress me"; "interfere with home life"; "interfere with friendships"; "interfere with classroom learning"; and "interfere with leisure activities." Each item has 4 options and ranges from 0 to 2, 0 indicating "not at all" or "only a little," 1 indicating "quite a lot," and 2 indicating "a great deal." The impact scores can be used as continuous variables or could be classified as normal, borderline, or abnormal. A total impact score of 2 or more is abnormal, a score of 1 is borderline, and a score of 0 is normal. For more details, see: http://www.sdqinfo.com/.

Table 4. 10: SDQ impact supplement and class size

Dep. var.: SDQ impact supplement	(1)	(2)	(3)
Outcome classification	Continuous variable	Borderline	Abnormal
Panel A: Without school fixed effect			
Class size	0.0141**	0.00372***	0.00269**
	(0.0056)	(0.0012)	(0.0011)
Mean of dep. var.	0.93	0.221	0.153
Std err. of dep. var.	1.833	0.415	0.36
Observations	3,295	3,296	3,297
Enrollment	YES	YES	YES
Enrollment squared	YES	YES	YES
Controls	YES	YES	YES
School FE	NO	NO	NO
Panel A: With school fixed effect			
Class size	0.010	0.00288	0.00205
	(0.0078)	(0.0018)	(0.0014)
Mean of dep. var.	0.930	0.221	0.154
Std err. of dep. var.	1.833	0.415	0.361
Observations	3,488	3,488	3,488
Enrollment	YES	YES	YES
Enrollment squared	YES	YES	YES
Controls	YES	YES	YES
School FE	YES	YES	YES

Notes: The robust standard errors clustered at the school level are reported in parentheses. The controls include individual-level controls, sex, dummies for the month of birth and refugee status, household income, father's and mother's education, the standard of living scale with 9 points, the number of books at home, the number of rooms above the median per locality, the number of siblings, and the student grade. The locality-level controls contain the poverty rate, the proportion of the locality under area C, the presence of the separation wall, the population in 2013, the locality type (dummy for urban), and the school GPA for the 2010/2011 and 2011/2012 academic years. The school-level controls are the school resource scale, school learning atmosphere and problems among teachers, and school type (UNRWA or governmental). *** p<0.01, ** p<0.05, and * p<0.

Additionally, the findings show no evidence in favor of heterogeneous class size effects on sub-groups. Only students with low-performance records benefit from a reduction in class size. The second part of this study concludes that class size reduction contributes to mitigating conduct problems among students measured by self-reported indication of being a victim of bullying and engagement in violent behavior. The main estimations suggest that a 10-student class size reduction will decrease the probability of a student being bullied by 13 percent and the number of instances of fighting during the past 12 months by 0.10 on average. Finally, the data set provides evidence that peer relations and data from the SDQ impact supplement questions are a potential mechanism underlying the relationship between students' conduct problems and class size.

Schools are often reluctant to implement a class size reduction policy, arguing that the increase in the overall educational costs cannot justify the small or non-existent impact on student achievement. Costs notwithstanding, recall that a lack of non-cognitive skills, such as conduct, can hurt school performance and the academic process as a whole. The findings presented above demonstrate that wider contextual characteristics, namely being bullied and fighting, are alleviated by a smaller class size. Therefore, the long-run return on mitigating behavioral problems with respect to student achievement would offset the incremental costs of decreasing the class size. The costs and benefits of a class size reduction policy should be weighed carefully, especially if the school resources are limited, the school suffers from ill-behaved pupils, or pupils come from a disadvantaged background. Much of the gain from a class size reduction policy depends on student and teacher characteristics in the contextual setting.

Appendix

Table 4.A.1: OLS regression with class size as the dependent variable

Dep. var: Average class size	(1)	(2)	(3)	(4)	(5)	(6)
Enrollment	0.125***	0.134***	0.117***	0.128***	0.127***	0.041
	(0.00250)	(0.016)	(0.015)	(0.015)	(0.015)	(0.028)
Female child		0.029	0.496	-0.113	-0.103	-1.119***
		(0.878)	(0.810)	(0.853)	(0.855)	(0.164)
Refugee dummy		-1.102	-0.851	-0.228	-0.286	-0.433
		(0.813)	(0.673)	(0.824)	(0.824)	(0.284)
Fathers' schooling						
Less than 12 years		-0.192	-0.293	-0.265	-0.226	-0.448
		(0.661)	(0.607)	(0.590)	(0.605)	(0.436)
12 years		0.120	-0.007	-0.117	-0.009	-0.188
		(0.660)	(0.610)	(0.598)	(0.618)	(0.442)
College degree		-0.192	-0.271	-0.462	-0.399	-0.484
		(0.652)	(0.602)	(0.583)	(0.592)	(0.421)
Mothers' schooling						
Less than 12 years		-0.453	-0.707	-0.275	-0.341	-0.331
		(0.725)	(0.687)	(0.672)	(0.689)	(0.497)
12 years		-0.221	-0.461	0.021	-0.047	-0.122
		(0.814)	(0.758)	(0.697)	(0.714)	(0.509)
College degree		-0.343	-0.495	-0.176	-0.331	-0.491
		(0.871)	(0.809)	(0.760)	(0.769)	(0.540)
Living standard scale (10 points)		0.093	0.105	0.074	0.106	0.024
		(0.086)	(0.075)	(0.070)	(0.068)	(0.049)
Net monthly income (NIS)		-0.264	-0.209	-0.174	-0.175	-0.061
		(0.179)	(0.136)	(0.113)	(0.112)	(0.058)
Number of books at home		-0.041	-0.114	-0.134	-0.103	-0.119
		(0.130)	(0.124)	(0.117)	(0.118)	(0.079)
No. of student's siblings		-0.044	-0.002	-0.013	0.004	0.005
		(0.067)	(0.050)	(0.047)	(0.047)	(0.028)
Number of rooms (above median)		1.110**	0.736*	0.655*	0.655*	0.127
		(0.437)	(0.375)	(0.355)	(0.360)	(0.216)
Presence of the separation wall			1.725	1.758*	1.776*	8.434***
			(1.074)	(0.982)	(0.982)	(2.004)
Percentage of the locality in area C			-4.467*	-4.296	-4.403*	-2.775**
			(2.564)	(2.624)	(2.622)	(1.323)
Poverty headcount rate			-11.888***	-12.870***	-12.862***	24.597***
			(3.238)	(3.086)	(3.098)	(3.615)
Population per locality			0.000***	0.000***	0.000***	0.000***
			(0.000)	(0.000)	(0.000)	(0.000)
Locality type (urban)			-1.227	-1.932*	-1.943*	3.887***
			(1.066)	(1.100)	(1.101)	(0.649)

Continued …

Table 4.A.1: Continued

UNRWA school				-2.203	-2.127	
				(1.351)	(1.353)	
School lack of resources (18-point scale)				-0.170**	-0.169*	
				(0.085)	(0.085)	
School educational atmosphere total (40-point scale)				0.112	0.112	
				(0.138)	(0.138)	
Problems among teachers (6-point scale)				-0.627**	-0.623**	
				(0.252)	(0.251)	
Student grade						
Student in grade 6					-0.350	-0.125
					(0.759)	(0.752)
Student in grade 7					-0.508	-0.131
					(0.757)	(0.759)
Student in grade 8					-0.921	-0.671
					(0.756)	(0.755)
Student in grade 9					-2.040**	-2.205**
					(0.873)	(0.869)
School GPA 2011						-0.006
						(0.017)
School GPA 2012						0.007
						(0.016)
Constant	24.28***	24.815***	28.787***	28.325***	28.809***	15.899***
	(0.172)	(1.258)	(1.587)	(3.809)	(3.755)	(1.576)
Observations	5,106	5,106	5,106	5,106	5,106	5,080
R-squared	0.315	0.326	0.380	0.414	0.422	0.669
Individual-level controls	NO	YES	YES	YES	YES	YES
Locality-level controls	NO	NO	YES	YES	YES	YES
School-level controls	NO	NO	NO	YES	YES	NO
Cohort FE	NO	NO	NO	NO	YES	YES
School GPA in 2011/2012	NO	NO	NO	NO	NO	YES
School FE	NO	NO	NO	NO	NO	YES

The robust standard errors clustered at the school level are reported in parentheses. *** p<0.01, ** p<0.05, and * p<0.

Table 4.A.2: Class size and students' cognitive test scores

Dep. var.: Cognitive tests	(1)	(2)	(3)	(4)	(5)
Average class size	-0.007	0.053	-0.047	-0.096	-0.075
	(0.100)	(0.084)	(0.072)	(0.069)	(0.066)
Enrollment	0.007	-0.027	-0.012	-0.015	-0.027
	(0.026)	(0.020)	(0.022)	(0.023)	(0.022)
Female child		7.691***	8.167***	7.299***	6.193***
		(1.812)	(1.709)	(1.496)	(1.387)
Refugee status		3.884***	4.545***	1.710	1.950*
		(1.363)	(1.487)	(1.075)	(1.010)
Student grade					
Student in grade 6		6.709***	6.626***	6.701***	9.270***
		(0.840)	(0.820)	(0.811)	(0.732)
Student in grade 7		10.917***	10.984***	11.037***	13.970***
		(0.812)	(0.791)	(0.790)	(0.713)
Student in grade 8		14.028***	13.994***	13.969***	17.975***
		(0.984)	(0.973)	(0.974)	(0.970)
Student in grade 9		16.413***	16.323***	16.254***	20.463***
		(0.905)	(0.894)	(0.912)	(0.951)
Fathers' schooling					
Less than 12 years		0.175	0.053	-0.012	-0.507
		(1.910)	(1.882)	(1.855)	(1.749)
12 years		2.408	1.985	1.894	-0.057
		(1.941)	(1.884)	(1.894)	(1.752)
College degree		4.031**	3.599*	3.346*	-0.036
		(1.946)	(1.907)	(1.917)	(1.811)
Mothers' schooling					
Less than 12 years		-1.346	-1.395	-1.715	-0.117
		(1.748)	(1.697)	(1.632)	(1.502)
12 years		1.017	0.688	0.277	0.481
		(1.828)	(1.748)	(1.707)	(1.594)
College degree		2.661	2.671	2.053	0.196
		(2.003)	(1.910)	(1.887)	(1.734)
Living standard index (10 points)		0.492**	0.465**	0.434**	0.163
		(0.218)	(0.191)	(0.182)	(0.169)
Net monthly income (NIS)		0.738***	0.631***	0.736***	0.446**
		(0.249)	(0.231)	(0.227)	(0.199)
Number of books at home		0.913***	0.882***	0.842***	0.291
		(0.272)	(0.263)	(0.265)	(0.237)
No. of student's siblings		-0.740***	-0.595***	-0.535***	-0.203
		(0.167)	(0.157)	(0.150)	(0.133)
Number of rooms (above the median)		0.947	0.553	0.374	-0.299
		(0.769)	(0.701)	(0.718)	(0.595)
Presence of the separation wall			-0.129	0.049	-0.354
			(1.420)	(1.379)	(1.278)
Percentage of the locality in area C			-3.978	-3.833	-4.367
			(3.224)	(2.947)	(2.906)

Continued …

Table 4.A.2: Continued

Poverty headcount rate			-30.594***	-28.463***	-23.534***
			(6.064)	(6.236)	(6.245)
Population per locality (2013)			-0.000	0.000	-0.000
			(0.000)	(0.000)	(0.000)
Locality type (urban)			-0.031	-0.259	0.245
			(1.667)	(1.649)	(1.462)
UNRWA school				4.435**	3.785**
				(1.703)	(1.560)
School lack of resources (18-point scale)				0.184	0.178
				(0.148)	(0.138)
School educational atmosphere				0.358*	0.281
				(0.185)	(0.189)
Problems among teachers				-0.528	-0.240
				(0.371)	(0.381)
School GPA 2011					0.195***
					(0.043)
School GPA 2012					0.284***
					(0.040)
Constant	60.484***	38.931***	49.100***	40.288***	9.091
	(2.889)	(4.027)	(4.572)	(7.640)	(7.792)
Observations	4,664	4,664	4,664	4,664	4,642
R-squared	0.000	0.257	0.288	0.305	0.467
Individual-level controls	NO	YES	YES	YES	YES
Locality-level controls	NO	NO	YES	YES	YES
School-level controls	NO	NO	NO	YES	YES
School GPA in 2011/2012	NO	NO	NO	NO	YES
Mean of dep. var.	60.65	60.65	60.65	60.65	60.65
Std err. of dep. var.	16.66	16.66	16.66	16.66	16.66

The robust standard errors clustered at the school level are reported in parentheses. *** p<0.01, ** p<0.05, and * p<0.

Table 4.A.3: Within-enrollment band OLS estimation, five-student interval

	Cutoff			
Dep. var.: cognitive tests	First	Second	First	Second
Panel A: Governmental schools				
	(1)	(2)	(3)	(4)
	(40 students)	(80 students)	(40 students)	(80 students)
Enrollment (N)	36≥N≥45	76≥N≥85	36≥N≥45	76≥N≥85
Class size	-0.121	-0.560	0.271*	-41.133*
	(0.244)	(0.690)	(0.143)	(14.931)
Observations	492	82	429	68
R-squared	0.002	0.051	0.574	0.825
Controls	NO	NO	YES	YES
Panel B: UNRWA schools				
	(45 students)	(90 students)	(45 students)	(90 students)
Enrollment (N)	41≥N≥50	86≥N≥95	41≥N≥50	86≥N≥95
Class size	0.353	-0.248	0.308***	0.320
	(0.303)	(0.496)	(0.026)	(0.386)
Observations	166	216	164	202
R-squared	0.036	0.008	0.662	0.652
Controls	NO	NO	YES	YES

Notes: The robust standard errors clustered at the school level are reported in parentheses. The controls include sex, dummies for the month of birth and refugee status, household income, father's and mother's education, the standard of living scale from 9 points, the number of books at home, the number of rooms above the median per locality, the number of siblings, and the student grade. The locality-level controls contain the poverty rate, the proportion of the locality under area C, the presence of the separation wall, the population in 2013, and the locality type (dummy for urban). The school-level controls are the school resource scale, school learning atmosphere, and problems among teachers. The school GPA includes the school GPA for the 2010/2011 and 2011/2012 academic years. *** p<0.01, ** p<0.05, * p<0.1.

Table 4.A.4: Schools that comply/do not comply with the maximum class rule characteristics

	Obs.	Mean	S.D.	Min.	Max
Panel A: Schools that comply with the maximum class size rule					
Cognitive tests score (child)	4664	60.62	11.28	27.98	85.31
Cognitive tests score (class)	4664	60.65	16.66	0.55	94.48
Class size	4664	30.59	7.02	6	44.5
UNRWA school	4664	0.45	0.50	0	1
School lack of resources (18-point scale)	4664	6.02	4.47	0	17
School educational atmosphere total (40-point scale)	4664	26.95	3.54	17	38
Problems among teachers (6-point scale)	4664	1.73	1.64	0	6
Panel B: Schools that do not comply with the maximum class size rule					
Cognitive tests score (child)	473	59.69	12.01	31.77	75.97
Cognitive tests score (class)	473	59.69	17.01	2.76	90.06
Class size	473	43.41	3.69	40	56
UNRWA school	473	0.00	0.00	0	0
School lack of resources (18-point scale)	473	5.82	4.76	0	15
School educational atmosphere total (40-point scale)	473	26.40	2.51	22	31
Problems among teachers (6-point scale)	473	1.74	1.68	0	6

Table 4.A.5: RD regressions for pre-treatment covariates

Cutoff	First	Second	First	Second	First	Second	First	Second
Dep. var.	Mother's edu.	Mother's edu.	Living stan-dard	Living stan-dard	Mother's edu.	Mother's edu.	Living stan-dard	Living standard
	Panel A: Governmental schools				Panel B: UNRWA Schools			
Cutoff value	40	80	40	80	45	90	45	90
RD_ estimate	0.284	0.0320	0.437	0.647	0.0617	0.145	-0.106	0.208
Effective observations	681	504	724	723	348	703	357	835
Left of c	498	381	529	558	165	340	167	366
Right of c	183	123	195	165	183	363	190	469
Total observations	2253	2253	2404	2404	1739	1739	1797	1797
Robust 95% CI	[-.07; .78]	[-.5; .35]	[-.52; 1.61]	[-.32; 1.74]	[-.38; .61]	[-.14; .47]	[-1.1; 1.06]	[-.33; .85]
Kernel type	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
BW type	CCT	CCT	CCT	CCT	CCT	CCT	CCT	CCT
Conventional std error	0.176	0.179	0.432	0.455	0.215	0.131	0.455	0.257
Conventional p-value	0.107	0.858	0.311	0.155	0.774	0.270	0.815	0.420
Robust p-value	0.100	0.728	0.314	0.176	0.638	0.301	0.968	0.391
Order loc. poly. (p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Order bias (q)	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
BW loc. poly. (h)	8.456	23.443	8.638	33.691	10.850	19.960	10.892	24.124
BW bias (b)	13.109	33.322	12.191	52.140	17.472	29.931	15.938	38.509

Table 4.A.6: Effect of class size on bullying

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. var:	Victim		Bully		Bully–victim	
Class size	0.00818*	0.0135**	0.00330	0.0100	-0.000579	0.00290
	(0.00451)	(0.00636)	(0.00600)	(0.00826)	(0.00562)	(0.00722)
Enrollment	0.000276	-0.000434	0.00122	0.000538	0.00100	0.000475
	(0.00115)	(0.00244)	(0.00146)	(0.00400)	(0.00145)	(0.00301)
Constant	0.752*	0.259	0.494	-0.423	0.918**	0.315
	(0.392)	(0.278)	(0.424)	(0.327)	(0.402)	(0.301)
Observations	4,292	4,290	4,224	4,201	4,224	4,201
Individual-level controls	YES	YES	YES	YES	YES	YES
Locality-level controls	YES	YES	YES	YES	YES	YES
School-level controls	YES	NO	YES	NO	YES	NO
School GPA	YES	YES	YES	YES	YES	YES
School FE	NO	YES	NO	YES	NO	YES
Mean of dep. var.	0.232	0.232	0.123	0.122	0.195	0.195
Std err. of dep. var.	0.422	0.422	0.328	0.328	0.396	0.396

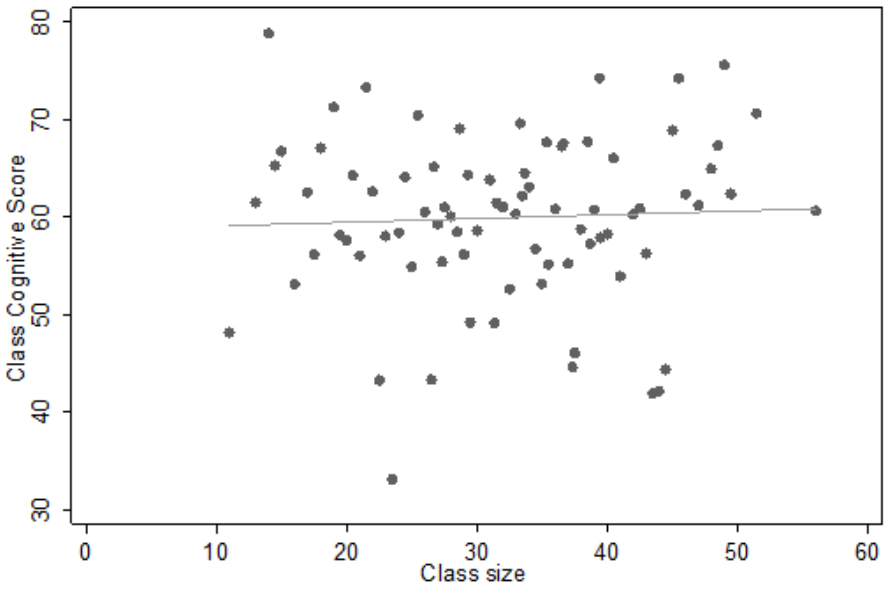
Notes: The robust standard errors clustered at the school level are reported in parentheses. The controls include sex, dummies for the month of birth and refugee status, household income, father's and mother's education, the standard of living scale with 9 points, the number of books at home, the number of rooms above the median per locality, the number of siblings, and the student grade. The locality-level controls contain the poverty rate, the proportion of the locality under area C, the presence of the separation wall, the population in 2013, and the locality type (dummy for urban). The school-level controls are the school resource scale, school learning atmosphere, and problems among teachers. The school GPA includes the school GPA for the 2010/2011 and 2011/2012 academic years. *** $p<0.01$, ** $p<0.05$, and * $p<0.1$.

Table 4.A.7: OLS estimation, quartile distribution

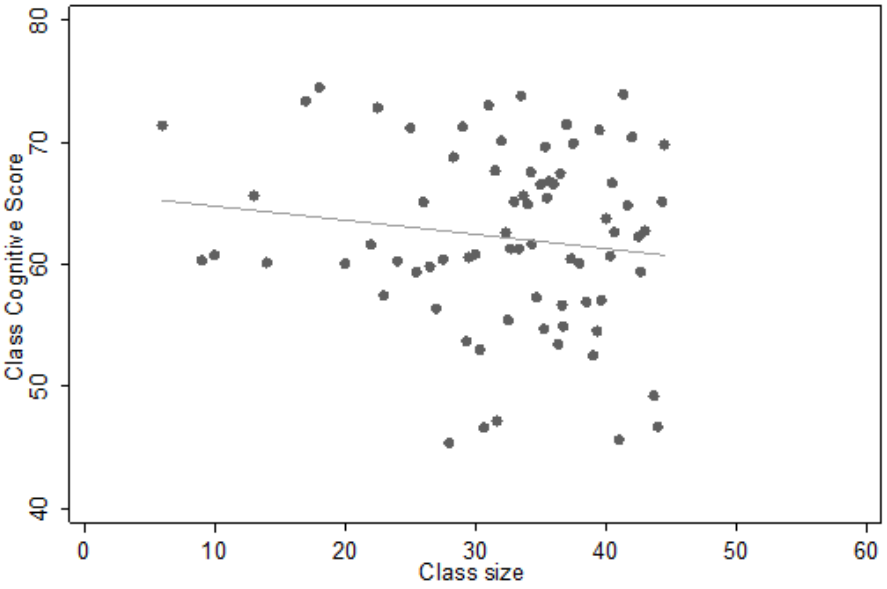
	(1)	(2)	(3)
	Distribution		
Dep. var.: Cognitive tests	Top 25%	Top 50%	Top 75%
Average class size	-0.058	-0.019	-0.077**
	(0.038)	(0.034)	(0.039)
Enrollment	-0.031***	-0.028**	-0.024**
	(0.012)	(0.012)	(0.009)
Constant	-7.835**	7.004**	25.330***
	(3.555)	(3.345)	(3.552)
Observations	4,642	4,642	4,642
Mean of dep. var.	60.65	60.65	60.65
Std err. of dep. var.	16.66	16.66	16.66
Individual-level controls	YES	YES	YES
Locality-level controls	YES	YES	YES
School-level controls	YES	YES	YES
School GPA in 2011/2012	YES	YES	YES

Notes: The robust standard errors clustered at the school level are reported in parentheses. The controls include sex, dummies for the month of birth and refugee status, household income, father's and mother's education, the standard of living scale with 9 points, the number of books at home, the number of rooms above the median per locality, the number of siblings, and the student grade. The locality-level controls contain the poverty rate, the proportion of the locality under area C, the presence of the separation wall, the population in 2013, and the locality type (dummy for urban). The school-level controls are the school resource scale, school learning atmosphere, and problems among teachers. The school GPA includes the school GPA for the 2010/2011 and 2011/2012 academic years. *** p<0.01, ** p<0.05, and * p<0.1.

Panel A: Governmental Schools

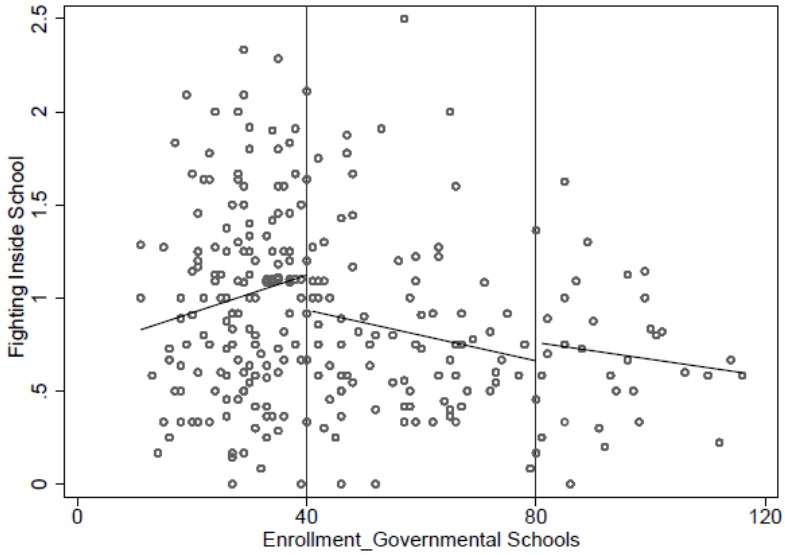


Panel B: UNRWA Schools



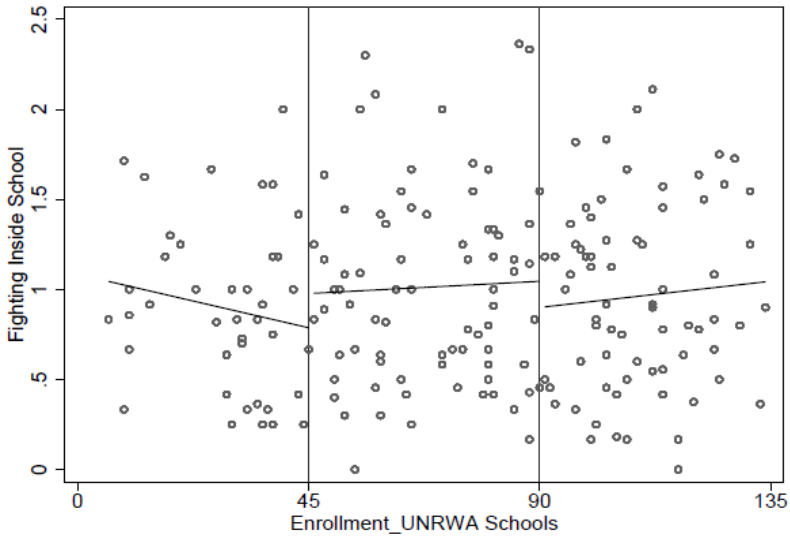
Source: Own calculations based on survey data.

Figure 4.B.1: Class size and average class cognitive tests scores relationship



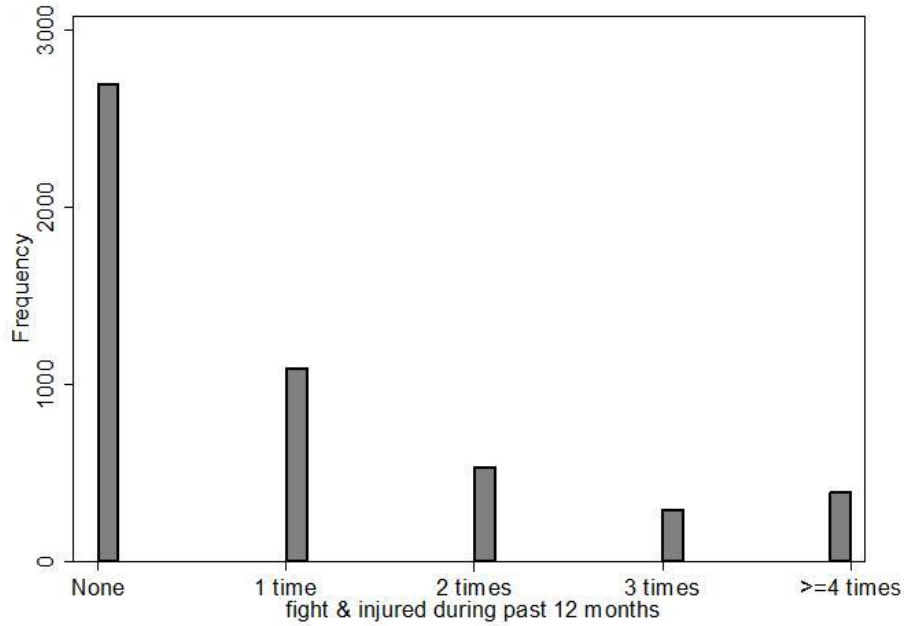
Source: Own calculations based on HBSC survey and school enrollment

Figure 4.B.2.a: Enrollment and violent behavior, governmental schools



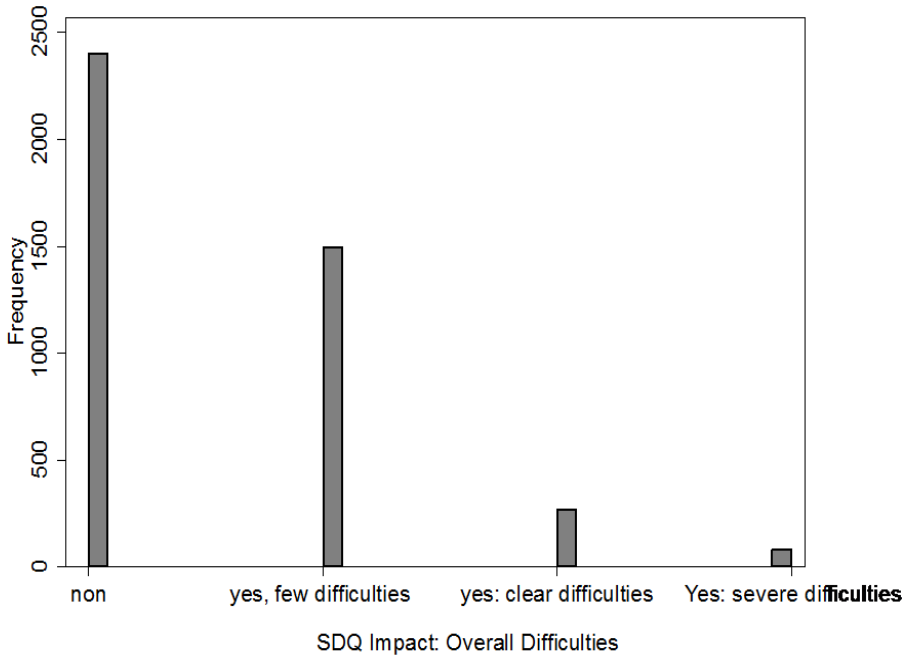
Source: Own calculations based on HBSC survey and school enrollment.

Figure 4.B.2.b: Enrollment and violent behavior, UNRWA schools



Source: Own calculations based on the HBSC survey.

Figure 4.B.3: Violent behavior distribution



Source: Own calculations based on the Parental Questionnaire.

Figure 4.B.4: SDQ follow-up question

Mothers/parents were asked: "In general, do you think that your child has difficulties in one or more of the following areas: emotion, concentration, behavior, harmony, or dealings with others?"

Chapter 5

Wage Differential between Palestinian Non-refugees and Palestinian Refugees in the West Bank and Gaza

5.1 Introduction

Economists have pointed to various factors that may account for the main reasons behind the difference in earnings. They have also focused on labor market discrimination as a cause of the inequality among groups classified by gender, ethnicity, and other characteristics. Discrimination against individuals hurts labor market outcomes, including job opportunities, promotions, and earnings – of which the level is hard to measure (Kaas & Manger, 2012). Although controlling for educational and other socio-economic characteristics among different groups could explain several individual wage differentials, part of this earning gap could not be explained. Therefore, it has been attributed to labor market discrimination (Altonji & Pierret, 2001; Black, Haviland, Sanders, & Taylor, 2006). This chapter will focus on the wage differential in the Palestinian labor market among refugees and non-refugees. According to the United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA),[57] Palestinian refugees are defined as anyone whose "normal place of residence was Palestine during the period 1 June 1946 to 15 May 1948 and who lost both home and means of livelihood as a result of the 1948 conflict." This definition has expanded to include the children or grandchildren of such refugees, and they are eligible for agency assistance if they are registered with the UNRWA, living in the area of the UNRWA's operations, and in need (UNRWA, 2017).[58]

Palestinian refugees represent 41.2 percent of the total Palestinian population living in Palestine. In general, the living conditions of Palestinian refugees are worse than those of non-Palestinian refugees. According to the monthly household real consumption patterns in Palestine, the poverty index among refugees reached 31.2 percent in 2011 compared with 21.8 percent for non-refugees. Furthermore, there is a clear difference in levels of unemployment among refugees and non-refugees (33.7 percent versus 22.3 percent, respectively). It is also significant that the

[57] The United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA) was established in late 1949 following the 1948 Arab–Israeli conflict to carry out direct relief and works programs for Palestinian refugees.

[58] Today, some 5 million Palestine refugees are eligible for services from the United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA). Nearly one-third of the registered Palestine refugees, more than 1.5 million individuals, live in 58 recognized Palestine refugee camps in Jordan, Lebanon, the Syrian Arab Republic, the Gaza Strip, and the West Bank, including East Jerusalem. For more details, see www.unrwa.org.

education level among Palestinian refugees is higher than that among non-refugees, with a higher female participation rate in the labor force (PCBS, 2015).[59]

The Palestinian labor market has experienced various structural changes, many of which are not to the advantage of its workers. First, the skilled labor force faced a decrease in the return to schooling due to an increase in the educated labor supply after 1980 following an increase in the number of colleges and universities (Angrist, 1995). Then, the economy was destroyed as a result of the outbreak of the First and the Second Palestinian Intifada in the periods 1987–1993 and 2000–2005, respectively (Daoud, 2005). A relatively small improvement occurred after the establishment of the Palestinian National Authority (PNA) in 1994 (MAS, 2014). The restrictions on labor movements by the Israeli authority led to significant adverse effects on Palestinian wages, with a sharp increase in unemployment (Mansour, 2010; Miaari & Sauer, 2011). Finally, since 2006, the PNA has experienced a reduction in the volume of financial aid, which represents the vast majority of the Palestinian budget (Sarsour, Naser, & Atallah, 2011). The Palestinian labor market is characterized by an excess labor supply in relation to the demand. Hence, unemployment is high. The low female participation rate (Miaari, 2009) and the high growth rate of public employment[60] are due to weaknesses in the private sector in terms of absorbing the enormous increase in worker numbers; this is also a result of the restrictions on movements, investments, exports, and imports as well as the high population growth (Daoud & Shanti, 2016).

After a thorough search for relevant studies regarding the differences between Palestinian non-refugees' and Palestinian refugees' wages, to the best of my knowledge, only two studies refer to that issue. Angrist (1998) employed Labor Force Survey data for the period 1992–1995 and suggested that the first and second generations of refugees earned less than non-refugees in both the West Bank and the Gaza Strip. He pointed to the fact that, after the establishment of the PNA in 1994, the gap for the second generation of refugees in the West Bank shrunk; the overall pattern suggests that refugees' gaps have been closing. In the Gaza Strip, the second generation of refugees earned no less than other workers after 1992. Daoud (2005) found that refugees

[59] According to the PCBS (2015), the percentage of Palestinian refugees aged 15 years and over who obtained a bachelor's degree or higher reached 13.7 percent of the total refugees against 11.6 percent for non-refugees, while the rate of female participation in the labor force of refugees living in Palestine reached 20.9 percent against 18.4 percent for non- refugees.

[60] However, hiring in the public sector has recently been capped to only 3,000 per year (MAS, 2014).

earned 3–4 percent less than non-refugees in 1999 and 2001, before and after the Second Palestinian Intifada.

This study takes the earlier works as a starting point and aims to make several contributions. First, it estimates the wage differential among Palestinian non-refugees and Palestinian refugees in the West Bank and Gaza Strip and describes its dynamics between 1999 and 2012. Second, it aims to discover how much of this wage gap can be explained by differences in individuals' characteristics and how much is due to the return of these characteristics across the two population groups. Third, it discusses the impact of some individual wage determinant variables, such as gender, education, experience and seniority, working in Israel, and employment sector, on the observed wage gap between the two groups and the extent to which this observed gap varies between skilled and unskilled workers in the West Bank and Gaza.

The current study argues that the pattern in the wage differential in the West Bank is in favor of non-refugees during all the observation periods. This trend can be explained by both a change in the relative prices of observed characteristics of non-refugee and refugee workers and the workers' characteristics. The greater effect, however, can be attributed to the workers' characteristics until 2005, when the Second Intifada ended, while the unexplained part makes a larger contribution to explaining the wage gap after the Second Intifada. The wage gap has a larger significant impact on unskilled than skilled laborers and greater prevalence in the private sector. In the Gaza Strip, the wage gap is always in favor of refugee workers, and most of this gap is explained by workers' human capital components, the "endowment effect."

The results of this chapter have important policy implications regarding wage equity. The existence of wage inequality poses challenges for policy makers in terms of providing appropriate legislation that prevents wage discrimination. Furthermore, the Palestinian community is required to invest in new resources to absorb the population growth, mainly since Palestinian refugees are often more educated and have higher fertility rates than their non-refugee Palestinian counterparts (PCBS, 2015). The results also indicate the role of education in reducing the wage gap between Palestinian non-refugees and Palestinian refugees. Investment in education will also reduce the Palestinian labor market's dependency on employment in Israel, since the wages in the domestic labor market were negatively affected during the closure period by the increase in the labor supply (Daoud & Sadeq, 2014; Mansour, 2010; Miaari & Sauer, 2011). Additionally, workers with low educational attainment earn higher salaries than educated laborers employed locally, leading to reduced economic returns to schooling.

The remainder of this chapter is structured as follows. Section (5.2) presents the data used in this work and provides some descriptive statistics of the sample. It also documents the overall wage gap trend among Palestinian non-refugees and Palestinian refugees during the study period. Section (5.3) examines workers' characteristics and occupational differences during and after the Second Intifada. Section (5.4) provides the model and empirical analysis. The results are presented in Section (5.5), and Section (5.6) shows the robustness checks, followed by the conclusion.

5.2 Data

The study employs the Palestinian Labor Force Survey (PLFS) conducted by the Palestinian Central Bureau of Statistics (PCBS) on a quarterly basis over the years 1999–2012. Each household that participated in the PLFS was interviewed twice consecutively, left for two quarters, then interviewed again for two quarters. The sample is restricted to those who were wage employees aged from 15 to 65 and classified within the labor force according to the PCBS. The refugee status was identified based on the respondent's answer regarding whether s/he is registered as a refugee.[61] For the purpose of the analysis, I employee the log of workers' daily wages, which are calculated by dividing the monthly income by the days worked per month. Table (5.1) reports the descriptive statistics of the main variables used in this chapter. The registered refugees represent 48 percent of the total observations; 69 percent of the observations live in the West Bank, and the remaining 31 percent live in the Gaza Strip. Despite the fact that refugees represent approximately half of the sample, only 19 percent of the total sample lives in camps. The majority of the sample is male, since the Palestinian labor market is characterized by a low participation rate of females.

Figure (5.1) shows the wage differential trend between non-refugees and refugees in the Palestinian territories from 1999 to 2012. The unadjusted wage gap increased until 2000 and sharply decreased during the second Intifada (2000–2005). This gap continued to expand after the Second Intifada, except in 2009, when the wage gap was at its minimum level. However, this gap took a different direction when the sample was split between the West Bank and Gaza. The geo-

[61] More than 1.7 million Palestinian refugees are not registered with the UNRWA (MIFTAH, 2003). In the sample utilized, more than 92 percent of the refugees are registered with the UNRWA. Including both officially registered refugees and non-registered refugees in the analysis does not change the results in the robustness check section.

graphic and administrative segmentation between the two regions is very pronounced and poses a significant constraint on growth. Each operates with its own labor market characteristics, labor demand, and wage levels (MAS, 2014). Gaza is facing more unstable economic conditions due to continuous border closures and higher unemployment rates. The overall conflict intensity in the Gaza Strip is higher than that in the West Bank due to the effect of three tough military operations in the years 2008–2009, 2012, and 2014. Since 2007, Gaza has been governed by a different authority, and, most importantly, the percentage of the refugee population in Gaza is higher than the West Bank percentage.[62] Figure (5.2.a) and Figure (5.2.b) show the different patterns of wage distribution in the two regions. In the West Bank, the share of refugees in the lower wages is higher than that of non-refugees; when the daily log wage starts to increase, the percentage of non-refugees becomes higher than that of refugees. The vertical lines show that refugee workers have lower unadjusted log wage means than non-refugee workers. In Gaza, the opposite case applies.

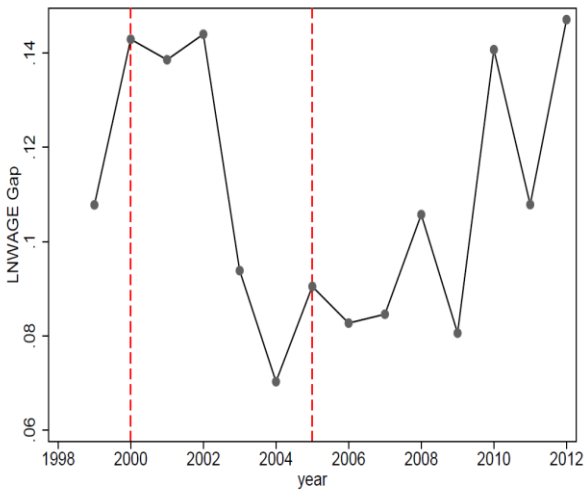
Next, looking at the wage gap over the years in the two regions, Figure (5.3) depicts the trend and the different directions of the wage gap between the two population groups in the West Bank and the Gaza Strip. In the West Bank (the solid line), the unadjusted wage gap reached its minimum (2 percent) in 2003 during the second Intifada and the maximum value occurred in 2009 (12 percent), the wage gap always favoring non-refugees. In Gaza, the wage gap represents the annual average difference between Palestinian refugees and Palestinian non-refugees' log daily wage. The former always enjoy a positive wage premium over the later. The wage gap in Gaza increased at a continuous rate during the period of interest and reached 22 percent in 2007, then decreased to 17 percent in 2012. In the following section, I will shed light on the differences between worker characteristics and occupational differences in the two groups in Gaza and in the West Bank.

[62] The data show that the proportion of the population of refugees in Palestine in 2014 is estimated at 41.2 percent of the total Palestinian population living in Palestine and indicate that 25.2 percent of the population in the West Bank consists of refugees, while the percentage of refugees in the Gaza Strip is about 66.8 percent (PCBS, 2015).

Table 5.1: Descriptive statistics

Panel A: Workers' characteristics		
	Mean	**SD**
Daily wage (NIS)	77.795	44.453
Log wage	4.157	0.739
Years of school	11.236	4.001
University degree (0/1)	0.360	0.480
Experience	17.688	11.215
Male	0.839	
Employment in Israel (0/1)	0.170	
Private sector employment (0/1)	0.564	
Refugee status (0/1)	0.479	
Registered refugee (0/1)	0.435	
Married (0/1)	0.438	
Panel B: Regional and geographical characteristics		
	Mean	**SD**
West Bank	0.689	
Locality affected by the wall (1/0)	0.102	0.303
Percentage of the locality under area C	0.049	0.128
Locality type		
Urban	0.503	
Rural	0.305	
Camp	0.192	
Panel C: Sectoral and occupational distribution		
Sectors	**%**	
Agriculture	0.053	
Manufacturing	0.127	
Construction	0.167	
Commerce	0.099	
Transport	0.032	
Service	0.522	
Occupations	**%**	
Manager	0.026	
Technical	0.339	
Service	0.145	
Skilled agric.	0.007	
Craft worker	0.160	
Machine operation	0.074	
Elementary	0.249	
Observations	**224,794**	

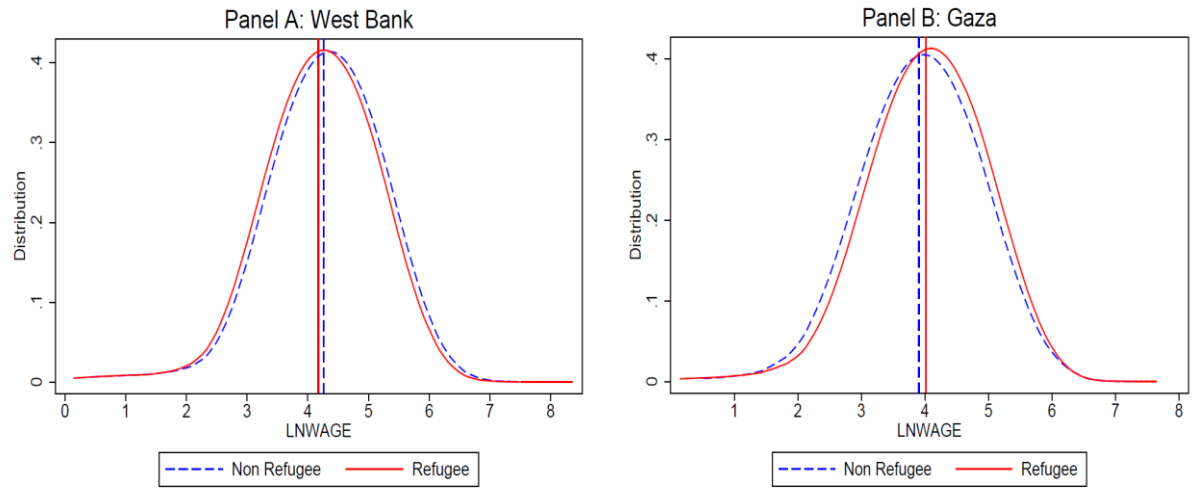
Note: The sample is restricted to those individuals who are classified as being within the labor force during the period 1999–2012.



Source: Own calculations based on PCBS data.

Figure 5. 1: Wage gap between Palestinian refugees and Palestinian non-refugees, 1999–2012

Note: The wage gap represents the annual average difference between Palestinian non-refugees and Palestinian refugees' wages in the West Bank and the Gaza Strip between the first quarter of 1999 and the fourth quarter of 2012. The two dashed lines represent the beginning and the end of the Second Palestinian Intifada (starting in the fourth quarter of 2000 and ending in the second quarter of 2005).

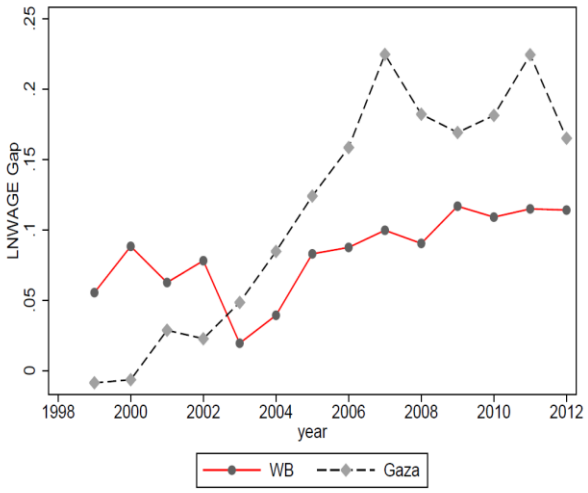


Source: Own calculations based on PCBS data.

Figure 5. 2: The distribution of log daily wages for refugee and non-refugee workers in the West Bank and Gaza, 1999–2012

Note: The vertical line represents the mean of the unadjusted log wage for each group.

The distribution is obtained by kernel density estimates, bandwidth=0.7.



Source: Own calculations based on PCBS data.

Figure 5. 3: Wage gap over the period (1999–2012) in the West Bank and Gaza

Note: The solid line represents the wage gap between non-refugees and refugees in the West Bank, while the dashed line represents the differences between Palestinian refugees and Palestinian non-refugees in Gaza.

5.3 Workers' Characteristics and Occupational Differences

Table (5.2) summarizes the means of the potential wage determinants for the period 1999–2012 for Palestinian refugees and Palestinian non-refugees in the West Bank and Gaza, respectively. Panel (A) shows the labor force attributes, while Panel (B) presents the sectoral and occupational distribution for each group. The log real daily wage by refugee status is pooled for years in the period of interest. In the West Bank, the observed log real wage is higher for non-refugees, and the pooled wage gap is approximately 9 percent. In this table, I use two measures to control the educational background of labor market participants – years of schooling and tertiary degree – of which Palestinians in the two groups have similar levels of education. The participation of males is over-represented, with similar distributions (80 percent in the West Bank for the two groups). The two groups have the same experience and marital status and a similar ratio of workers in the private sector. The main factor that might explain the wage difference to the favor of non-refugees is that the percentage of non-refugees working in Israel is higher than that observed among refugee workers (approximately one-third), since employment in Israel provides a wage premium over the local labor market. Refugees tend to be found more in the refugee camps, while non-refugees have similar distributions between urban and rural areas. Panel (B) shows the

occupational differences between the two groups in the West Bank and Gaza. The motivation for adding this table is that the wage differential literature has emphasized that the earning gap is generated not only by individual differences but also by systematic variation in the occupational structure, which serves to accentuate or exacerbate the effects of discrimination (Grodsky & Pager, 2001; O'Neill, 2003; Swed, 2014). The differences in occupational choices are represented across six different sectors and seven occupational groups. The descriptive analysis shows similar distributions of the sector choice among Palestinian non-refugees and Palestinian refugees in the West Bank with the exception of two sectors: construction and services. The percentage of non-refugees in construction is higher than the refugees' share in the same sector by 5 percent. This is consistent with the results obtained in panel (A), since construction represents the main sector for Palestinian employment in Israel, where non-refugees have a larger percentage of employment than refugees. One of the explanations for this distribution is likely to be related to the restricted labor mobility imposed during and after the Second Intifada on refugee camps. Notably, during the period of interest, the largest share of both population groups is found in the service sector, with a greater proportion of refugees. Columns (3) and (4) show that the unconditional mean wages are higher for Palestinian refugees than for non-refugees in Gaza. This unadjusted wage gap is approximately 11 percent. Palestinian refugees in Gaza are better educated than non-refugees and have more experience. Similar to the West Bank, the share of non-refugee workers in Israel is larger than the refugees' share. The average occupational status of refugees in Gaza is similar to that of non-refugees, the only exception being found in technical occupations, in which the share of refugee workers is greater than that of non-refugees.

Table 5. 2: Descriptive statistics: Differences between non-refugees and refugees in the West Bank and Gaza

	West Bank		Gaza	
	Non-refugees	**Refugees**	**Non-refugees**	**Refugees**
Differences in socio-economic characteristics				
Daily wage (NIS)	85.55	78.41	61.44	67.44
Log wage	4.262	4.173	3.907	4.017
Years of school	10.945	10.900	11.319	12.144
University degree	0.329	0.326	0.358	0.458
Male	0.830	0.807	0.914	0.861
Experience	17.303	17.887	17.935	18.225
Married	0.406	0.411	0.474	0.519
Work in private sector	0.681	0.625	0.447	0.301
Work in Israel	0.244	0.187	0.057	0.039
Urban	0.500	0.372	0.901	0.477
Rural	0.489	0.222	0.073	0.081
Camp	0.011	0.406	0.026	0.442
Sectoral and occupational differences				
Sectors				
Agriculture	0.050	0.048	0.089	0.049
Manufacturing	0.163	0.138	0.079	0.058
Construction	0.226	0.172	0.098	0.062
Commerce	0.114	0.128	0.080	0.049
Transport	0.030	0.032	0.046	0.029
Service	0.417	0.482	0.608	0.753
Occupations				
Manager	0.028	0.026	0.022	0.022
Technical	0.298	0.313	0.355	0.443
Service	0.110	0.118	0.208	0.221
Skilled agric.	0.007	0.005	0.012	0.009
Craft worker	0.197	0.172	0.118	0.087
Machine operation	0.086	0.079	0.070	0.047
Elementary	0.275	0.287	0.214	0.170
N	107,159	47,623	19,915	50,095

Source: Data collected by the Labor Force Survey (1999–2012) conducted by the PCBS.

5.4 Empirical Model

Following the literature, I conduct wage regression analysis to capture the wage differences between non-refugees and refugees in the Palestinian territories with a dummy variable for the refugee group. In the following model, workers' wages are a function of their demographic, human capital, and socio-economic characteristics and are specified as follows:

$$Ln\, W_{itj} = \alpha + \delta R_{itj} + \beta X_{itj} + d_j + q_t + e_{itj} \qquad (5.1)$$

where $Ln\, W_{itj}$ is the logarithm of the daily wage of worker *i* in quarter *t* in district *j*. A dummy variable R_{itj} takes the value of one if respondent *i* in quarter *t* in district *j* is defined as a registered refugee and zero otherwise, and it captures the wage differential for refugees. X_{itj} captures the demographics, socio-economics, and job classification. d_j stands for district fixed-effect dummies to control for cross-district differences, which vary little over time. q_t represents the time (quarter) fixed effect. Finally, the term e_{itj} stands for the error term. The regressor vector X_{itj} includes gender, experience, and experience squared to account for life cycle wage earnings, years of schooling, personal status (a dummy takes the value one if the worker is married and zero otherwise), and a set of industry sector dummies to account for any cross-industry wage differences.

I also add seven occupational dummies to account for distinct profession–skill differences and a variable takes the value one if the worker works in Israel and zero otherwise. Further, the estimation includes a set of locality type dummies to account for the wage differences between urban areas, rural areas, and refugee camps. In addition, the estimation includes a dummy variable to show whether the locality has been affected by the West Bank separation wall[63] and the proportion of the locality under area C.[64] Time (quarter) dummies are added to capture any time

[63] The Israeli West Bank barrier or wall is a separation barrier built by the Israeli Government in the West Bank along the 1949 Armistice Line known as the "Green Line" (B'Tselem, 2012). The barrier divides Palestinian communities, encircles some, and isolates others from their surroundings while separating East Jerusalem from the rest of the West Bank (UNESCO, 2014).

[64] Area C: Areas in the West Bank are still under full Israeli military and civil control based on the Oslo Accords of 1993, while the Palestinian Authority (PA) has civil and security control in area A. The PA has civil autonomy but no security control in area B (Vishwanath et al., 2014). Communities in area C are living in difficult life

variation shocks in the region. All the standard errors are clustered at the locality level (worker's locality of residence).

However, the OLS procedures as specified above do not control for workers' unobserved characteristics, such as their innate ability, which might affect the wage differences across workers. To estimate the extent to which any wage differential between Palestinian non-refugees and Palestinian refugees is attributed to unobserved worker characteristics, I employ the Oaxaca–Blinder (1973) decomposition technique, which separates the wage gap into an explained part based on the observed characteristics (workers' endowment effect) and an unexplained part (unobserved workers' characteristics). The wage decomposition equation is specified as follows:

$$Ln\, W_{R=0} - Ln\, W_{R=1} = \left(\bar{X}_{R=0} - \bar{X}_{R=1}\right)\beta_{R=0} + \bar{X}_{R=0}(\beta_{R=0} - \beta_{R=1}) + \left(\bar{X}_{R=0} - \bar{X}_{R=1}\right)(\beta_{R=0} - \beta_{R=1}) \qquad (5.2)$$

The left-hand term is the difference in mean log wages between non-refugees and refugees in Palestinian territories during the period of interest. The right-hand side consists of three parts. The first term is the human capital component of the overall wage gap; it is the difference in the distribution of average characteristics between workers according to their refugee status estimated in equation (5.1) (the endowment effect). The second and third parts together represent the unexplained component of the overall wage gap. The second term refers to the wage differential that is attributed to differences in the estimated coefficients of both models (it measures the expected change in refugee workers' wages if they have non-refugee workers' attributes). The third part is an interaction term that accounts for the difference in endowment and coefficient effects.

The validity of the Oaxaca decomposition method depends largely on whether the model captures all the dimensions in which the skills of the two groups differ (Borjas & Van Ours, 2010). One can argue that the estimation model seldom observes all the components that make up a worker's human capital, for example ability and the quality of education. In fact, the majority of Palestinian refugees enroll in UNRWA schooling systems, which provide free primary education until grade 9 (UNESCO, 2011). The UNRWA schools adopt the same national curriculum

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circumstances due to the lack of major services. Workers from area C also experience a wage penalty compared with other workers from localities in areas A and B (Fallah & Daoud, 2015).

as the host country, and, in spite of the adverse circumstances in which Palestinian refugee students live, they achieve higher than average learning outcomes compared with other governmental school students, as indicated by the World Bank (Abdul-Hamid, Patrinos, Reyes, Kelcey, & Varela, 2015). Another factor that might affect the wage gap is the selection bias, and economists have dealt with this using the standard two-step estimation method proposed by Heckman (1974), which attempts to control for the selection by modeling what determines it.[65] In the current study, the main coefficient (refugees' status) is an exogenous factor and is obtained only through paternal inheritance.

5.5 Results

5.5.1 OLS Results

Table (5.3) summarizes the OLS results from the estimation in equation (5.1). Panels (A) and (B) show the effect of being a refugee on workers' earnings in the West Bank and Gaza, respectively. The results present the estimations for the pooled sample of all 14 years. All the estimations include district and quarter fixed effect. The results in Table (5.3) are obtained using different specifications to explore the extent to which workers' characteristics explain any refugee workers' wage differentials. The findings in Panel (A) suggest that the status of being a refugee has a negative impact on workers' earnings even after controlling for workers' observable demographic characteristics. Adding the working in Israel dummy (in column 3) reduces the impact of the refugee status coefficient from 9 percent to 5 percent. Consistent with several works in the literature about the labor market in Palestine (Fallah, 2017; Fallah & Daoud, 2015; Mansour, 2010; Miaari, 2009), the working in Israel coefficient explains many labor wages in Palestinian territories. In the employed sample, this coefficient provides a wage premium of more than 50 percent for West Bank workers and 85 percent for workers in Gaza. Column (4) presents the results after adding the set of all controls mentioned in equation (5.1) and demonstrates that the refugee coefficient still significantly reduces West Bank workers' wages by 3 percent.

[65] Heckman's two-step estimation procedure is used to estimate the probit selection equation and the wage equation with the inverse Mills ratio (Heckman, 1979).

The registered refugees' distribution in the employed sample is significantly different in the West Bank from in the Gaza Strip. While they represent 29 percent in the West Bank labor force participants, their participation in Gaza reaches 70 percent. In Gaza, the refugee coefficient shows a significant positive impact on workers' earnings during the period of interest. This coefficient reduces approximately to half after adding workers' demographic characteristics (from 10 percent to 5 percent). Column (4), in Panel (B), suggests that refugees earn 3 percent more than non-refugees with the same demographics and occupational attributes.

With regard to the control variables between the two regions, the return to education is similar for the West Bank and Gaza workers after controlling for all the demographic and occupational variables, and males enjoy higher wages in both regions.

Table 5. 3: Effect of refugee status on workers' earnings

Dep. variable: Log wage	(1)	(2)	(3)	(4)
Panel A: West Bank				
Refugee status	-0.087***	-0.090***	-0.059***	-0.032***
	(0.017)	(0.015)	(0.009)	(0.006)
Male		0.384***	0.293***	0.292***
		(0.013)	(0.010)	(0.009)
Years of education		0.039***	0.052***	0.038***
		(0.003)	(0.002)	(0.002)
Working in Israel			0.564***	0.530***
			(0.020)	(0.016)
Observations	154,703	154,694	154,694	154,657
R-squared	0.516	0.610	0.696	0.724
Panel B: Gaza Strip				
Refugee status	0.102***	0.048***	0.059***	0.028***
	(0.016)	(0.010)	(0.010)	(0.007)
Male		0.145***	0.136***	0.213***
		(0.013)	(0.014)	(0.016)
Years of education		0.073***	0.078***	0.038***
		(0.002)	(0.002)	(0.001)
Working in Israel			0.846***	1.026***
			(0.028)	(0.025)
Observations	70,010	70,010	70,010	70,010
R-squared	0.342	0.547	0.594	0.691
District fixed effect	YES	YES	YES	YES
Quarter fixed effect	YES	YES	YES	YES
Demographic controls	NO	YES	YES	YES
Locality control	NO	NO	NO	YES
Occupation dummies	NO	NO	NO	YES
Industry dummies	NO	NO	NO	YES
Sector (private/public)	NO	NO	NO	YES

Note: The robust standard errors are in parentheses and clustered at the locality level. The data were collected by the Labor Force Survey (1999–2012) conducted by the PCBS. All the regressions' specifications are based on wage equations with the regressors gender, experience, experience squared, years of schooling, marital status, urban area/refugee camp residence, percentage of the locality under area C, whether the locality was affected by the separation wall, a dummy for working in Israel, a dummy for working in the private sector, quarter and district fixed effects, and a set of occupational and industry dummies. Significance levels: *** p<0.01, ** p<0.05, and * p<0.1.

5.5.2 Wage Gap Decomposition

The previous section demonstrates that Palestinian refugees in the West Bank/Gaza earn lower/higher wages than their relative non-refugees even after controlling for a large set of observa-

ble individual, socio-economic, and geographical characteristics. Still, unobserved workers' effects might be influential. This also addresses the issue of how each group equally is paid (along similar characteristics to the relative attributes). The following section contains two types of analysis: the first one sheds light on the overall wage gap in the Palestinian territory between the two groups during the period 1999–2012 (pooled sample), while the second part presents the analysis of the wage gap on an annual basis for the West Bank and Gaza workers separately.

The first column in Table (5.4) presents the decomposition result for the West Bank workers' wage gap, while the results for Gaza workers' wage gap decomposition are presented in the second column. The decomposition output contains two parts. The first panel reports the mean predictions by groups and their difference. In the employed sample, the mean of the daily log wages for the ***West Bank*** workers is 4.262 for Palestinian non-refugees and 4.174 for Palestinian refugees, yielding a wage gap of 0.09 between the two groups. This wage gap is divided into two parts. The first part reflects the mean increase in refugees' wages if they have the same characteristics as non-refugees. This increase (0.0561) suggests that around 63 percent of the wage differential during the period (1999–2012) in the ***West Bank*** can be attributed to differences in workers' observed characteristics. The second part demonstrates the unexplained part of the wage differential between the two groups, which explains around 37 percent of the total wage gap. This part represents the second and the third term in equation (5.2), which quantifies the change in refugees' wages when applying the non-refugees' coefficients to refugees' characteristics and the interaction term that measures the simultaneous effect of differences in endowments and coefficients.

The second column in Table (5.4) describes the wage differentials between the two groups in ***Gaza***. The decomposition shows that Palestinian refugees face a positive wage premium of, on average, 11 percent. More than 78 percent of this wage gap is due to differences in workers' observed characteristics (8 percent), while the remainder (approximately 3 percent) can be interpreted as a positive wage premium due to difference in prices paid for the refugee workers' characteristics.

Table 5.4: Oaxaca–Blinder wage decomposition (1999–2012)

	(1) West Bank	(2) Gaza
Variable	***Log wage***	***Log wage***
Non-refugee	4.262***	3.907***
	(0.00223)	(0.00520)
Refugee	4.174***	4.017***
	(0.00336)	(0.00320)
Log wage differences	0.0885***	-0.109***
	(0.00404)	(0.00611)
Decomposition of the log wage difference		
Explained by differences in workers' characteristics		
Endowments	0.0561***	-0.0816***
	(0.00371)	(0.00542)
Unexplained part: Coefficients	0.0325***	-0.0276***
	(0.00257)	(0.00379)
Observations	154,690	70,010

Source: The data were collected by the Labor Force Survey (1999–2012) conducted by the PCBS. All the regressions' specifications are based on wage equations with the regressors, gender, experience, experience squared, years of schooling, marital status, urban area/refugee camp residence, percentage of the locality under area C, whether the locality was affected by the separation wall, a dummy for working in Israel, a dummy for working in the private sector, quarter and district fixed effects, and a set of occupational and industry dummies. Significance level: *** p<0.01, ** p<0.05, and * p<0.1.

The analyses in Table (5.4) present the mean wage gaps between the two groups but do not provide information about how the wage gap varies by observed characteristics. Table (5.5) shows the decomposition results for selected variables. These variables are gender, schooling, experience, and experience squared to indicate seniority, working in Israel, and working in the private sector. Male workers have a wage premium over female workers, and the gender coefficient is in favor of non-refugee workers. With regard to education, the negative value for the unexplained part of the schooling coefficient indicates that educated refugees in the West Bank are paid more than non-refugees. One of the potential explanations for this result could be the fact that the UNRWA provides refugees with many working opportunities, particularly in the education and

health service sectors, in which the salaries are determined administratively by the level of education and tenure rather than productivity (Tansel & Daoud, 2011).[66] Experience represents an important source of wage inequality. The negative value of the explained part of the experience coefficient means that the gap would increase if the two groups had equal experiences. However, this discrimination is softened by the effect of the quadratic association between experience and wages, and the accumulated experience reduces the wage gap.[67] As expected, working in Israel makes a significant contribution (more than 50 percent) to explaining the wage gap in favor of non-refugee laborers. Finally, wage discrimination against refugees tends to be more prevalent in the private sector, since much of its labor force tends to be classified as unskilled workers (Daoud & Shanti, 2016; Miaari, 2009). The analysis in Table (5.5.a) suggests that working in Israel explains much of the wage differential among different groups. For example, Swed (2014) attributed the decrease in the gender gap in Palestinian territories during the Second Intifada to males' reducing ability to access the Israeli market due to the closure policy. Notably, some refugee camps in the West Bank experienced harsher movement restrictions due to greater involvement in violent conflict with the Israeli military during the Second Intifada than those in other localities.[68] Reducing the number of workers inside Israel can also explain part of the decreasing unadjusted wage gap between non-refugees and refugees during the Second Intifada, as Figure (5.1) suggests. Palestinian employment in Israel started after the 1967 war. Part of the Israeli leadership encouraged the integration between the Palestinian and the Israeli economy to

[66] Tansel and Daoud (2011) indicated that the highest return to education in Palestine during 2004 and 2008 was observed for workers employed in non-governmental organizations (NGOs) and the UNRWA.

[67] In Figures (5.A.5.a) and (5.A.5.b), I use the STATA command specify detail (exp:exp*) to subsume experience and experience squared. Figure (5.A.5.a) shows the effect of experience and its quadratic value together and suggests that the gap would increase if non-refugee and refugee workers had equal experiences. In general, the coefficient for experience is expected to be positive (linear) and that for experience squared to be negative (non-linear). The wage increases with age as people become more experienced, but, with greater age, the wage starts to increase at a decreasing rate, and at a certain point it does not grow (reaches the optimal wage level) and then starts to fall (after retirement).

[68] During the Second Intifada, Israel took the initiative to bring the fighting to the refugee camps in Nablus and Jenin (Eiland, 2010). For example, according to Human Rights Watch (2002), during Operation Defensive Shield in 2002, more than 50 Palestinians were killed in Jenin refugee camps, since this camp served as a launch site for numerous attacks against Israeli targets.

improve the quality of life of Palestinian people. They argued that higher income and a low unemployment level would reduce Palestinian resistance to the occupation. On the other hand, this provided Palestinian access to Israeli territories, which would raise some concerns regarding the security of Israel (Gazit, 1995; Miaari, Zussman, & Zussman, 2014). The Israeli Government implemented two policies that severely affected the Palestinian labor market, substituting Palestinian labor with foreigners and imposing movement restrictions. These two factors are correlated and interdependent. Increasing the movement restriction on Palestinian laborers would reduce their ability to access the Israeli market, increase absent days, and motivate Israeli employers to substitute them with foreigner workers (Miaari & Sauer, 2011). Many factors play a significant role in creating barriers in front of Palestinian movements, such as closures, checkpoints, and curfews (Calì & Miaari, 2013), and many localities in the West Bank are categorized as area C and contained the separation wall after 2005 (Vishwanath et al., 2014). Figure (5.A.6.a) and (5.A.6.b) in the appendix show that, following the outbreak of the Second Intifada in September 2000, the number of Palestinians from both the West Bank and the Gaza Strip who were employed in Israel dropped sharply. This shock to the labor supply also had a heterogeneous impact on Palestinians' wages based on their educational attainment (skilled vs. unskilled labor) (Mansour, 2010) and employment sector (e.g., public vs. private; rural wages vs. urban wages) (Miaari, 2009). Benmelech, Berrebi, and Klor (2010) indicated that Palestinian districts that were involved in conflict with Israel experienced more adverse economic consequences (an increase in unemployment, a decrease in wages, and a reduction in the number of Palestinians working in Israel) than other districts during the Second Intifada period.

The wage gap decomposition in Gaza was in favor of refugee workers. To avoid confusion of the coefficient sign, I change the reference group to non-refugees; therefore, unlike in the West Bank, the positive wage gap in Table (5.5.b) represents the wage differential between refugees and non-refugees. The education and private sector coefficients explain most of this gap. Working in Israel gives a wage premium in Gaza to refugee workers; the wage gap will increase in favor of refugee workers if the two groups have access to the Israeli labor market. Neither experience nor accumulated experience plays a significant role in determining the wage gap between the two groups in Gaza.

Figures (5.A.5.a) and (5.A.5.b) depict the wage gap decomposition for selected variables among the two groups in the two regions for the pooled sample of all 14 years.

Table 5.5 a: Wage decomposition for selected variables in the West Bank

	(1) Differential	(2) Explained	(3) Unexplained
Non-refugee log wage	4.262***		
	(0.00223)		
Refugee log wage	4.174***		
	(0.00336)		
Log wage differences	0.0885***		
	(0.00404)		
Wage decomposition for selected variables			
Male		0.00652***	0.0528***
		(0.000629)	(0.00556)
Years of education		0.00171**	-0.0213**
		(0.000813)	(0.00996)
Experience		-0.0142***	0.0258*
		(0.00153)	(0.0131)
Experience^2		0.00542***	-0.0152**
		(0.000901)	(0.00683)
Working in Israel		0.0302***	-0.00829***
		(0.00118)	(0.00123)
Private sector		-0.00372***	0.0515***
		(0.000295)	(0.00579)
Constant			-0.00304
			(0.0307)
Total		0.0561***	0.0325***
		(0.00371)	(0.00257)
Observations	154,690		

Source: The data were collected by the Labor Force Survey (1999–2012) conducted by the PCBS. All the regressions' specifications are based on wage equations with the regressors gender, experience, experience squared, years of schooling, marital status, urban area/refugee camp residence, percentage of the locality under area C, whether the locality was affected by the separation wall, a dummy for working in Israel, a dummy for working in the private sector, quarter and district fixed effects, and a set of occupational and industry dummies. Significance level: *** p<0.01, ** p<0.05, and * p<0.1.

Table 5.5 b: Wage decomposition for selected variables in Gaza

	(1) Differential	(2) Explained	(3) Unexplained
Refugee log wage	4.017***		
	(0.00320)		
Non-refugee log wage	3.907***		
	(0.00520)		
Log wage differences	0.109***		
	(0.00611)		
Wage decomposition for selected variables			
Male		-0.0114***	-0.0696***
		(0.000619)	(0.0132)
Years of education		0.0311***	0.0234
		(0.00141)	(0.0158)
Experience		0.00931***	-0.0290
		(0.00293)	(0.0256)
Experience^2		-0.00196	0.0129
		(0.00193)	(0.0137)
Work in Israel		-0.0190***	-0.00309***
		(0.00191)	(0.000979)
Private sector		0.0523***	-0.0170**
		(0.00201)	(0.00800)
Constant			0.0278
			(0.0509)
Total		0.0816***	0.0276***
		(0.00542)	(0.00379)
Observations	**70,010**		

Source: The data were collected by the Labor Force Survey (1999–2012) conducted by the PCBS. All the regressions' specifications are based on wage equations with the regressors gender, experience, experience squared, years of schooling, marital status, urban area/refugee camp residence, percentage of the locality under area C, whether the locality was affected by the separation wall, a dummy for working in Israel, a dummy for working in the private sector, quarter and district fixed effects, and a set of occupational and industry dummies. Significance level: *** p<0.01, ** p<0.05, and * p<0.1.

Next, I analyze the wage differentials between the two groups in the West Bank and Gaza over time. The following analyses do not include observations for workers who report their place of work as Israel or Israeli settlements to avoid an estimation bias that would mask any wage diffe-

rential between non-refugees and refugees.[69] Those workers represent 17 percent of the overall sample.[70]

The figures in Table (5.6), column (3), indicate the mean (log) wage differential between the non-refugee and the refugee Palestinian workers in the West Bank (panel A) and the Gaza Strip (panel B). Column (4) represents the sum or aggregate of the endowment effect, "the explained difference," while the treatment effect, the unexplained difference, is presented in column (5). In the West Bank, the wage gap decreases over the last two years of the Second Uprising period (2003–2004) and then increases rapidly over time. This gap reaches its peak in 2009 and then decreases relatively during the following years. The analysis in panel (A) also shows that, during the Second Intifada (2001–2005), most of the wage gap is attributed to the endowment effect due to the differences in observed characteristics among the two groups. Then, after 2007, a greater weight is given to the treatment effect. Notably, before the Second Intifada, in 1999, the large positive endowment impact on refugees' characteristics is offset by the negative treatment effect component.

Furthermore, the explained part in 2011 shows a negative result, which suggests that the gap would increase if the two groups had equal observed characteristics; this could indicate wage discrimination against refugees. In most cases, both the treatment effect and the endowment effect are positive and work in the same direction to provide a remarkable wage premium to non-refugee workers over refugees. More than 50 percent of this premium, especially after the Second Intifada, is due to the treatment effect.

Panel (B) presents the wage gap between non-refugees and refugees among Gazan workers. The wage gap increases rapidly over time to the advantage of the refugees' group. Within 14 years, the wage gap increased from 6 percent in 1999 to 17 percent in 2012. After the Second

[69] A strand of the existing literature on Palestinian economics has eliminated employment in Israeli when trying to explain the wage differential in the Palestinian labor market; for example, see Fallah (2017); Fallah and Daoud (2015); and Miaari (2009).

[70] The percentage of employment in Israel varies significantly between the West Bank and Gaza. While those workers represent 22.75 percent of the West Bank sample (35,959 observations), in Gaza they only account for 4.39 percent (3,074) of observations. According to the regression results in Table (5.3), working in Israel gives Palestinian laborers, on average, a 55 percent wage premium in the West Bank and a more than 80 percent wage premium in Gaza.

Intifada, the vast majority of the wage gap is attributable to the endowment effect, while the treatment effect had more significant influence in earlier years of the study.

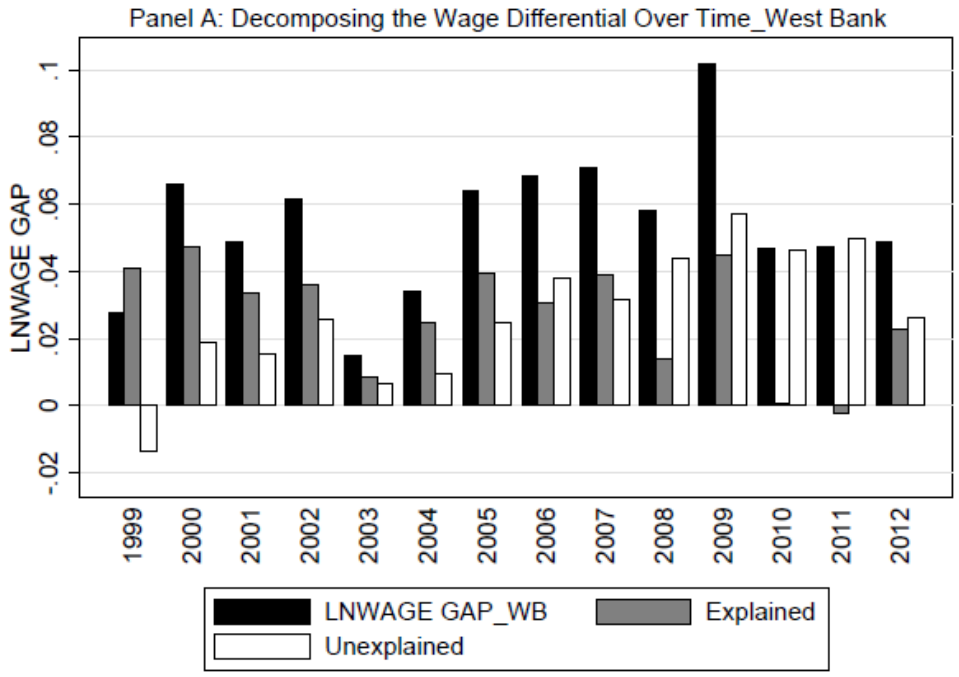
The results show that, in the pre-Intifada period, the wage gap between non-refugee and refugee workers was at its lowest level, with an opposite direction in both the West Bank and the Gaza Strip. However, in the post-Intifada period, a sharp increase is observed to the favor of refugees in the Gaza Strip. In contrast, the wage gap in the West Bank increased sharply only in 2009, then declined to the level close to that observed during the Second Intifada period. This wage gap consistently favors non-refugee workers. The results show a wage penalty for having refugee status in the West Bank, and a large part of this penalty can be attributed to the unexplained effect of wage decomposition components.

Figure (5.4) depicts the wage gap decomposition between 1999 and 2012 between the two groups in the two regions (panel A). In panel (B), the wage gap represents the wage differential between refugee and non-refugee workers in Gaza.

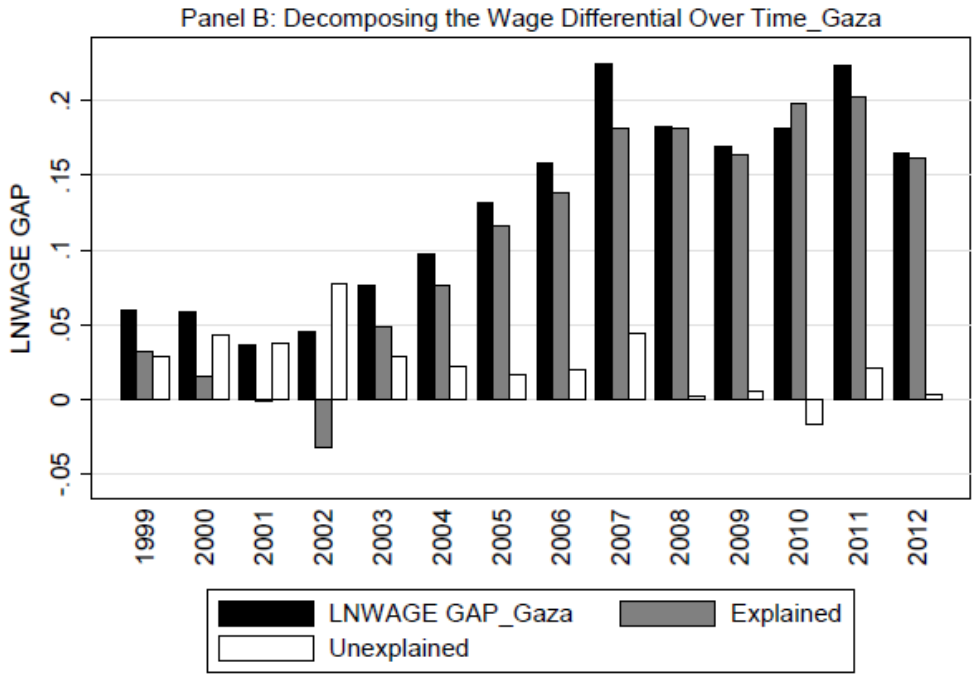
Table 5.6: Decomposing the wage differential over time

(1)	(2)	(3)	(4)	(5)	(6)	(7)
					%	
Year	**Observations**	**Log wage gap**	**Explained**	**Unexplained**	**Explained**	**Unexplained**
Panel A: West Bank						
1999	7,224	**0.028**	**0.041**	-0.014	149%	-49%
2000	9,485	**0.066**	**0.047**	**0.019**	72%	28%
2001	7,721	**0.049**	**0.033**	0.015	68%	32%
2002	5,646	**0.062**	**0.036**	**0.026**	58%	42%
2003	6,931	0.015	0.009	0.006	57%	43%
2004	6,985	**0.034**	**0.025**	0.009	73%	27%
2005	8,538	**0.064**	**0.039**	**0.025**	61%	39%
2006	8,987	**0.069**	**0.031**	**0.038**	45%	55%
2007	9,054	**0.071**	**0.039**	**0.032**	55%	45%
2008	6,847	**0.058**	0.014	**0.044**	24%	76%
2009	10,085	**0.102**	0.045	**0.057**	44%	56%
2010	10,675	**0.047**	0.001	**0.046**	2%	98%
2011	11,249	**0.048**	-0.002	**0.050**	-5%	105%
2012	10,191	**0.049**	**0.023**	**0.026**	46%	54%
Panel B: Gaza Strip						
1999	3,997	**-0.060**	**-0.032**	**-0.028**	53%	47%
2000	5,387	**-0.058**	-0.016	**-0.043**	27%	73%
2001	4,466	**-0.037**	0.001	**-0.038**	-2%	102%
2002	3,672	**-0.046**	**0.032**	**-0.078**	-70%	170%
2003	4,536	**-0.077**	**-0.048**	**-0.029**	63%	37%
2004	4,439	**-0.098**	**-0.076**	**-0.022**	78%	22%
2005	5,041	**-0.132**	**-0.116**	-0.016	88%	12%
2006	4,572	**-0.158**	**-0.138**	-0.020	87%	13%
2007	4,831	**-0.225**	**-0.181**	**-0.044**	80%	20%
2008	2,814	**-0.183**	**-0.181**	-0.002	99%	1%
2009	5,105	**-0.169**	**-0.164**	-0.005	97%	3%
2010	5,357	**-0.181**	**-0.198**	0.017	109%	-9%
2011	6,305	**-0.224**	**-0.203**	**-0.021**	91%	9%
2012	6,414	**-0.165**	**-0.162**	-0.003	98%	2%

Note: Specifications based on wage equations with the regressors gender, experience, experience squared, years of schooling, personal status, urban area/refugee camp residence, percentage of the locality under area C, whether the locality was affected by the separation wall, the quarterly fixed effect, a dummy for working in the private sector, and a set of occupational and industry dummies. The analysis does not include laborers working in Israel. The log wage gap represents the difference between non-refugee and refugee workers. Explained refers to the human capital component of the wage gap (endowment effect), and unexplained refers to the treatment effect component of the wage gap. All the items in bold typeface are statistically significant at the conventional level of 5 percent or better. *The wage gap in both regions represents the difference between the log wages of non-refugee and refugee workers.*



Note: The wage gap represents the differences between non-refugees' and refugees' salaries in the West Bank.



Note: The wage gap represents the differences between refugees' and non-refugees' salaries in Gaza.

Source: Own calculations based on PCBS data.

Figure 5. 4: Wage gap decomposition over the period 1999–2012

5.5.3 Wage Gap for Skilled and Unskilled Workers

Employment in the Palestinian territories is regulated by the applied Palestinian labor law, such as the minimum wage, anti-discrimination, equal employment opportunities, and other employees' benefits. However, the compliance rate with these regulations is higher in skilled labor jobs that require more than 12 years of education than in unskilled labor jobs (Fallah, 2016). Less skilled workers usually look for employment in Israel, since it provides better wages. Thus, less skilled wages are more adversely affected by closures than highly skilled labor (Mansour, 2010). The unskilled workers in the Palestinian labor market are homogeneous, so we would expect the wage gap to be attributed more to the treatment effect than the endowment component of the wage gap if it exists (Miaari, 2009). Table (5.7) presents the decomposition of the wage gap for the skilled; this gap, among skilled laborers in the West Bank, increased during the first two years of the Second Intifada. Then, it decreased until the last three years of the study period, when the gap became close to the unskilled workers' wage gap. Before and during the Second Intifada, the endowment effect contributed the vast majority of the wage gap among the unskilled workers in the West Bank, while most of the wage differential after 2007 is attributed to the treatment effect. A possible explanation may lie in the availability of few working opportunities for low-skilled refugee workers in their host communities. The only exception can be found in 2006 and 2007, two years after the Second Intifada was over, when the wage gap among unskilled workers reached the maximum level, and both the endowment and the treatment effect make a significant contribution to explaining this gap. In Gaza, the wage gap for both skilled and unskilled labor increased over the period 1999–2012. Similar to the West Bank, the wage gap among unskilled laborers is greater than the skilled labor wage gap but favors refugees. Unlike the West Bank, the human capital component among skilled workers made up the majority of the overall wage gap until 2006, when Hamas controlled the Palestinian Legislative Council elections then commanded the Gaza Strip overall in 2007, and then the treatment effect had a more significant impact in the following years. Most of the wage gap among unskilled workers over the years is explained by the endowment compensation and follows the pattern of the overall gross gap.

Table 5.7: Wage differential decomposition by skill group

	West Bank						Gaza Strip					
	Skilled			Unskilled			Skilled			Unskilled		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Year	Δ W	E	U	Δ W	E	U	Δ W	E	U	Δ W	E	U
1999	-0.011	**0.033**	**-0.044**	**0.052**	**0.050**	**0.002**	-0.015	**0.040**	**-0.055**	-0.026	-0.004	-0.022
2000	**0.028**	**0.025**	0.003	**0.083**	**0.054**	**0.029**	-0.009	**0.045**	**-0.054**	**-0.063**	-0.020	**-0.044**
2001	**0.054**	**0.037**	0.017	**0.039**	**0.037**	**0.002**	0.016	**0.066**	**-0.050**	**-0.075**	**-0.038**	**-0.038**
2002	-0.002	0.004	-0.006	**0.110**	**0.086**	**0.024**	0.022	**0.138**	**-0.117**	**-0.073**	-0.015	**-0.058**
2003	**-0.060**	**-0.032**	-0.028	**0.064**	**0.045**	**0.020**	0.000	**0.041**	**-0.041**	**-0.075**	**-0.050**	**-0.025**
2004	-0.011	0.005	-0.016	**0.035**	0.018	0.017	-0.008	**0.035**	**-0.043**	**-0.111**	**-0.095**	-0.017
2005	0.011	0.011	0.000	**0.071**	**0.044**	**0.027**	0.016	**0.036**	-0.020	**-0.142**	**-0.128**	-0.014
2006	0.018	-0.014	**0.032**	**0.080**	**0.039**	**0.041**	**-0.050**	0.005	**-0.054**	**-0.130**	**-0.125**	-0.005
2007	0.016	0.010	0.006	**0.095**	**0.042**	**0.054**	**-0.101**	-0.020	**-0.081**	**-0.189**	**-0.168**	-0.021
2008	0.015	0.007	0.007	**0.073**	0.008	**0.065**	**-0.118**	-0.036	**-0.082**	**-0.155**	**-0.205**	**0.050**
2009	0.001	-0.003	0.004	**0.075**	0.003	**0.073**	**-0.088**	-0.033	**-0.055**	0.024	0.004	0.020
2010	0.019	**-0.022**	0.040	**0.057**	**-0.024**	**0.080**	**-0.040**	**-0.035**	**-0.006**	**-0.160**	**-0.188**	0.028
2011	0.018	-0.002	0.021	**0.055**	0.016	**0.039**	**-0.048**	-0.013	**-0.036**	**-0.197**	**-0.188**	-0.009
2012	**0.034**	**-0.028**	0.062	**0.033**	-0.009	**0.041**	**-0.086**	**-0.042**	**-0.044**	**-0.082**	**-0.108**	0.026

Source: Author calculations using the Palestinian Labor Force Survey (PLFS) by the PCBS.

Notes: A skilled worker is defined as one with more than 12 years of schooling. The specifications are based on wage equations with the regressors gender, experience, experience squared, years of schooling, personal status, urban area/refugee camp residence, percentage of the locality under area C, whether the locality was affected by the separation wall, the quarter fixed effect, a dummy for private sector employment, and a set of occupational and industry dummies. The analyses do not include laborers working in Israel. Δ W represents the difference in the daily log wage between non-refugee and refugee workers. E refers to the explained human capital component of the wage gap (endowment effect), and U refers to the unexplained treatment effect component of the wage gap. All the items in bold typeface are statistically significant at the conventional level of 10 percent or better. *The wage gap in both regions represents the difference between the log wages of non-refugee and refugee workers.*

5.6 Robustness Checks

Table (5.8) provides additional results that are consistent with the main findings in this work. In panel (A), I include all refugees in the sample, regardless of their registration status; the number of Palestinian refugees in the working sample increases by approximately 9,800 observations.[71] I also divide the period into three periods, before, during, and after the Second Palestinian Intifada (October 2000–May 2005), since it caused a significant shock to the Palestinian labor market (Di Maio & Nandi, 2013; Mansour, 2010; Miaari, 2009).[72] All the estimations include the set of all the controls mentioned in equation (5.1) in addition to the district and quarter fixed effects. The estimations do not include observations that recorded their working place as Israel. Similar to the results obtained in Table (3.1), the findings show the same pattern of effects, except before the Second Intifada period, when the coefficient gives an insignificant negative/positive sign in the two regions. In the West Bank, and after the Second Intifada, Palestinian refugees earn about 4 percent less than non-refugees with the same demographic and socio-economic characteristics. This adverse effect is approximately twice as large as the percentage obtained during the Second Intifada periods. In Gaza, the effect of the refugee coefficient increases to 4 percent during the Second Intifada and then decreases after this period but still has a significant positive impact; it gives refugees a wage premium of 2 percent more than non-refugees after the Second Intifada.

Panel (B) shows an interaction dummy for whether the respondent is a refugee and lives in a camp. Despite the fact that Palestinian refugees have the same citizenship and legal status as non-refugees in the West Bank and the Gaza Strip, social discrimination and other forms of mistreatment towards refugees residing in camps are increasingly prevalent (Al Husseini & Bocco, 2009; PCBS, 2010b).[73] In the West Bank, the effect of the interaction dummy is significantly larger than the refugee coefficient alone. During and after the Second Intifada, the interaction coefficient increased from 5 percent to 10 percent, which is more substantial than the impact of refugee status on workers' earnings obtained in Table (5.3), panel (A). In Gaza, the sign for the interaction coef-

[71] The UNRWA does not recognize the Palestinian refugees who did not seek refugee status in one of UNRWA's fields of operations, those who chose not to register with it (Al Husseini & Bocco, 2009), and the Palestinians who lost their land and their property as a result of the 1967 war (MIFTAH, 2003).

[72] In all the calculations, the Second Intifada started in the fourth quarter of 2000 and ended in the second quarter of 2005.

[73] The perceived discrimination against refugees in the West Bank and the Gaza Strip is less than that in other countries, like Syria and Lebanon (Al Husseini & Bocco, 2009).

ficient during the three periods changes and becomes negative but insignificant. These results suggest that Palestinians living in camps have the worst living conditions of all Palestinian citizens. However, UNRWA services are provided for registered refugees regardless of their economic status (Al Husseini & Bocco, 2009). The results in panel (C) show the effect of the refugee coefficient on the unemployment status of the respondents. All the estimations are obtained by probit estimation, and the outcome variable takes the value 1 if the respondent was unemployed during the quarter of the survey and 0 otherwise. Before and during the Second Intifada, there is no significant impact of refugees' status on unemployment. After the Second Intifada, the refugee coefficient increases the individual probability of being unemployed by 15 percent in the West Bank and 6 percent in Gaza. These results are interesting, since the unemployment rate in all Palestinian territories during the Second Intifada was the highest compared with the overall rates in the years after the Second Intifada due to mobility restrictions (Mansour, 2010; Miaari et al., 2014).

Table (5.9) shows different impacts of refugees' status on earnings according to workers' gender and employment sector. In Palestine, a gender wage gap exists in favor of males (Swed, 2014). The return to schooling favors women and plays a remarkable role in decreasing the gender wage differentials (Daoud, 2005; Rizk, 2016; Swed, 2014; Tansel & Daoud, 2011). Furthermore, the less educated labor force is found to be in the private sector, since this sector is competing not only with the public sector but also with many non-governmental organizations to recruit and retain good human resources (Daoud & Shanti, 2016). During and after the Second Intifada, the Palestinian labor market experienced a rapid decrease in private sector wages; this was due to an increase in the Palestinian labor supply as a result of the sharp decline in the number of Palestinians working in Israel (Miaari, 2009). In panel (A), columns (2) and (4), the refugee status coefficient has a more adverse impact on males' earnings and on private sector wages in the West Bank than the coefficient obtained for the entire sample in Table (5.3), while the impact on females' earnings and on public sector wages is close to zero. These results are consistent with the results obtained in Table (5.7), since skilled labor is to be found more in the public sector, in which the gap in skilled laborers' wages is too small and most of this gap, if it exists, is explained by the endowment effect. In Gaza, the results are in line with the main results for the positive influence of refugees' coefficient on female/male workers' earnings in the public sector only, while this impact vanishes in private sector wages.

Panel (B) in Table (5.9) provides evidence that gender differences exist by sector of employment. In both regions, the gender differences for refugees' status are in favor of females, and they are more significant in the public than in the private sector.[74] According to Figures (5.A.1.a) and (5.A.1.b), the share of workers' distribution in the West Bank in the private sector is larger than that in the public sector for both groups. Meanwhile, in Gaza, public employment consists of a more substantial share of workers than the private sector, Figures (5.A.2.a) and (5.A.2.b). The only exception is during the pre-Second Intifada period (1999–2000), when non-refugee workers in Gaza tended to be observed more in the private sector, while refugee workers were more concentrated in the public sector, which includes employment in the UNRWA. Figures (5.A.3 and 5.A.4) in the appendix show the wage gap decomposition by gender over years in the two regions. In contrast to males' wage in the West Bank, female refugees enjoy positive wage gaps in most years, and a significant part of this wage premium reflects differences in individual human capital. In Gaza, the wage differential decomposition results for females and males show the same trend. However, even though most of the wage gap in Gaza is due to differences in workers' characteristics (the explained wage gap), differences in the prices paid for the employees' characteristics (the unexplained wage gap) are more prevalent in females' wage gap.

[74] Fallah (2017) indicated the important role of public employment in the West Bank on both tradable and non-tradable sectors through the positive impact of public employment on the number of local entrepreneurs (employers and self-employers).

Table 5. 8: Robustness checks: The effect of refugee status on wages and unemployment

	Before the Second Intifada 1999–2000		During the Second Intifada 2001–2004		After the Second Intifada 2005–2012	
	(1) West Bank	(2) Gaza	(3) West Bank	(4) Gaza	(5) West Bank	(9) Gaza
Panel A – Dependent variable: Log wage, OLS estimation						
Refugee	-0.0130	0.0245	-0.0157*	0.0392***	-0.0388***	0.0186*
	(0.0105)	(0.0193)	(0.00862)	(0.00838)	(0.00726)	(0.00955)
R-squared	0.493	0.621	0.500	0.427	0.788	0.757
Panel B – Dependent variable: Log wage, OLS estimation						
Registered refugee * lives in a camp	-0.060	-0.042	-0.053*	-0.042	-0.103***	-0.015
	(0.043)	(0.057)	(0.029)	(0.035)	(0.028)	(0.026)
R-squared	0.495	0.625	0.500	0.436	0.790	0.774
Panel C – Dependent variable: Unemployment, probit estimation						
Registered refugee	0.008	-0.042	0.021	0.015	0.151***	0.059*
	(0.053)	(0.109)	(0.042)	(0.040)	(0.025)	(0.032)
Observations	19,184	8,747	36,482	18,722	92,428	39,292

Notes: The robust standard errors are in parentheses and clustered at the locality level. The data were collected by the Labor Force Survey (1999–2012) conducted by the PCBS. All the regressions' specifications are based on wage equations with the regressors gender, experience, experience squared, years of schooling, marital status, urban area/refugee camp residence, percentage of the locality under area C, whether the locality was affected by the separation wall, an employment sector dummy, quarter and district fixed effects, and a set of occupational and industry dummies. In all the estimations, the Second Intifada started in the fourth quarter of 2000 and ended in the second quarter of 2005. The analyses do not include observations of workers who report their place of work to be Israel or Israeli settlements. Significance level: *** p<0.01, ** p<0.05, and * p<0.1.

Table 5.9: Effect of registered refugee status on wages according to employment sector and workers' gender

	West Bank				Gaza			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A – Effect of the refugee coefficient according to gender and employment sector								
	Female	Male	Public sector	Private sector	Female	Male	Public sector	Private sector
Registered refugee	0.006	-0.042***	-0.001	-0.051***	0.065***	0.026***	0.032***	0.010
	(0.011)	(0.006)	(0.008)	(0.007)	(0.014)	(0.009)	(0.008)	(0.011)
Observations	26,625	92,982	50,822	68,785	8,686	58,250	46,003	20,933
R-squared	0.695	0.703	0.754	0.681	0.687	0.702	0.711	0.554
Panel B – Effect of the refugee coefficient according to the interaction between gender and employment sector								
	Female × public	Male × public	Female × private	Male × private	Female × public	Male × public	Female × private	Male × private
Registered refugee	0.029***	-0.016*	-0.023	-0.057***	0.085***	0.026***	0.005	0.011
	(0.010)	(0.008)	(0.018)	(0.007)	(0.017)	(0.008)	(0.058)	(0.011)
Observations	14,854	35,968	11,771	57,014	7,171	38,832	1,515	19,418
R-squared	0.726	0.771	0.648	0.691	0.678	0.723	0.496	0.573

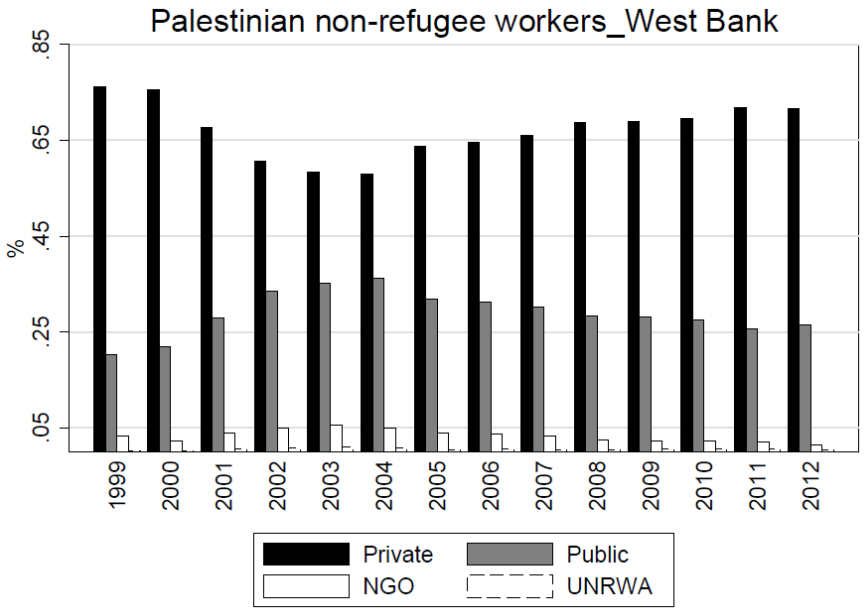
Notes: The robust standard errors are in parentheses and clustered at the locality level. The data were collected by the Labor Force Survey (1999–2012) conducted by the PCBS. All the regressions' specifications are based on wage equations with the regressors gender, experience, experience squared, years of schooling, marital status, urban area/refugee camp residence, percentage of the locality under area C, whether the locality was affected by the separation wall, an employment sector dummy, quarter and district fixed effects, and a set of occupational and industry dummies. The analyses do not include observations of workers who report their place of work as being Israel or Israeli settlements. Significance level: *** p<0.01, ** p<0.05, and * p<0.1.

5.7 Conclusion

In this chapter, I analyze the wage gap between Palestinian non-refugees and refugees in the West Bank and Gaza over the years 1999–2012. First, I quantify the unadjusted wage gap between the two groups over the period of interest. I find that the wage differential between the two groups has different directions in the two regions. Second, I explore whether this change in the wage gap can be attributed to differences in workers' characteristics, regional differences, and occupational choices. I find that part of this change could be attributed to the regional variation between Gaza and the West Bank, employment in Israel, and occupational choices. Third, I use the Oaxaca–Blinder decomposition to estimate the human capital and unexplained components of the wage gap between 1999 and 2012. In the West Bank, the wage gap has always existed and favored non-refugees. A significant part of this wage gap is explained by the larger portion of non-refugee workers in the Israeli labor market. However, this difference still exists after excluding workers employed in Israel. The wage gap is greater among low-skilled workers and in the private sector; most of this gap among unskilled workers is attributed to the unexplained part of the wage decomposition model. In Gaza, in all the periods, the wage gap is in favor of refugees. Among the skilled workers, the endowment effect makes up most of the wage gap until 2006, then most of this wage gap is attributed to the treatment effect, the "unexplained part," in the following years. The human capital components explain most of the wage differential among unskilled workers over the years 1999–2012. The results of the study indicate the importance of existing policies that encourage the absorption of refugees in the private and public sectors, especially in the West Bank. Investment in education and the expansion of public sector employment contributes to mitigating this wage gap. Palestinian refugees, particularly those who live in refugee camps, are exposed to poverty as well as other adverse life circumstances. The recent threats by the United States of America's Government to reduce aid to the UNRWA[75] will throw Palestinian refugees' future into doubt and increase their suffering.

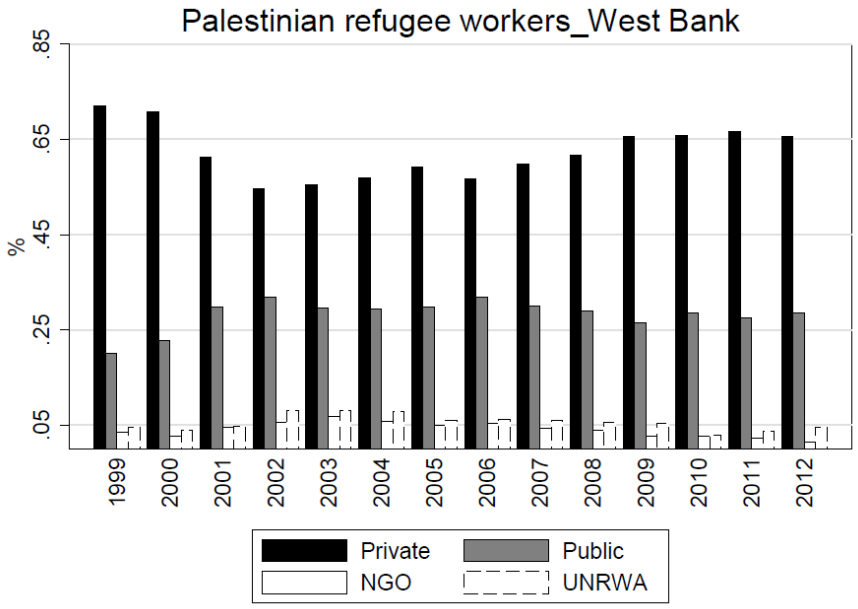
[75] For more details, see Lee (2018): http://time.com/5105444/donald-trump-palestine-refugee-funding/.

Appendix



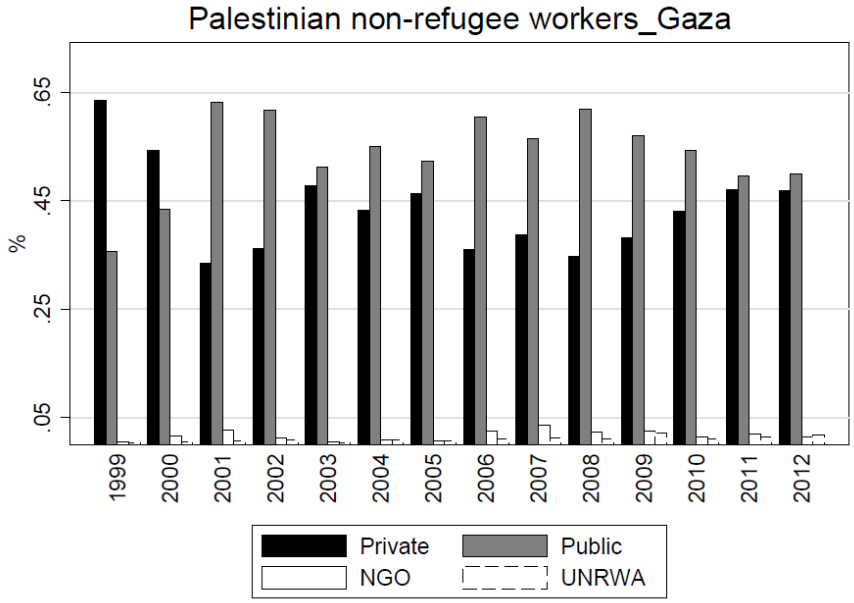
Source: Own calculations based on PCBS data.

Figure 5.A.1.a: Share of Palestinian non-refugee workers across various employment sectors in the West Bank, 1999–2012



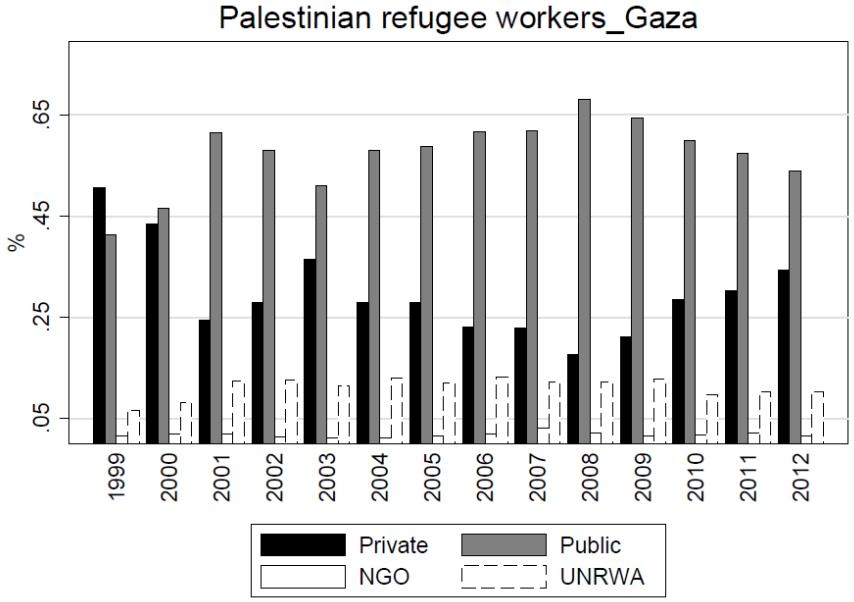
Source: Own calculations based on PCBS data.

Figure 5.A.1.b: Share of Palestinian refugee workers across various employment sectors in the West Bank, 1999–2012



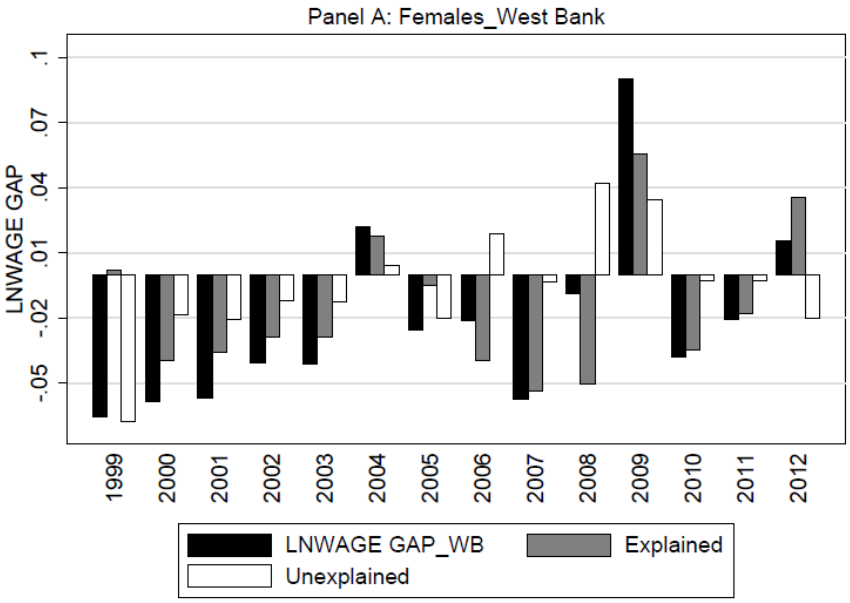
Source: Own calculations based on PCBS data.

Figure 5.A.2.a: Share of Palestinian non-refugee workers across various employment sectors in Gaza, 1999–2012

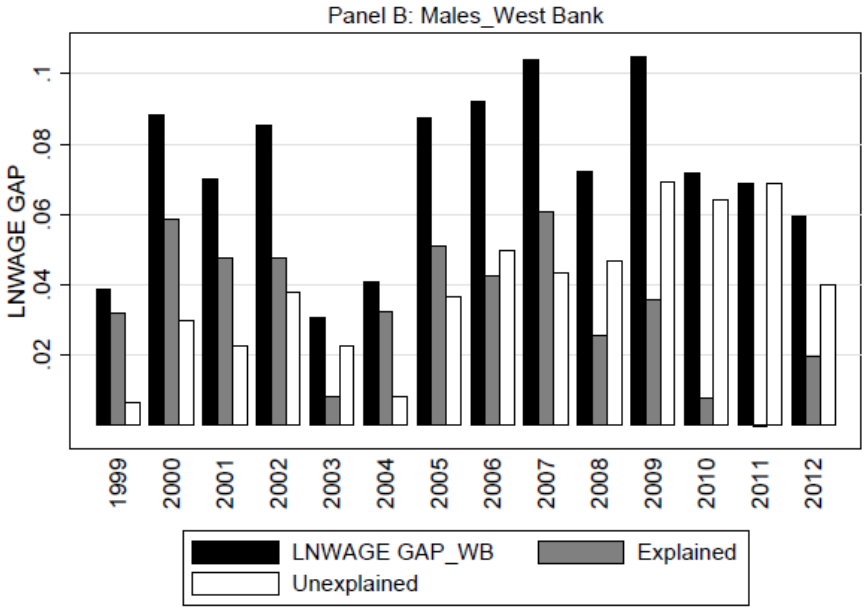


Source: Own calculations based on PCBS data.

Figure 5.A.2.b: Share of Palestinian refugee workers across various employment sectors in Gaza, 1999–2012



Notes: The analyses do not include observations of workers who report that their place of work is Israel or Israeli settlements. Number of observations: 26,629.

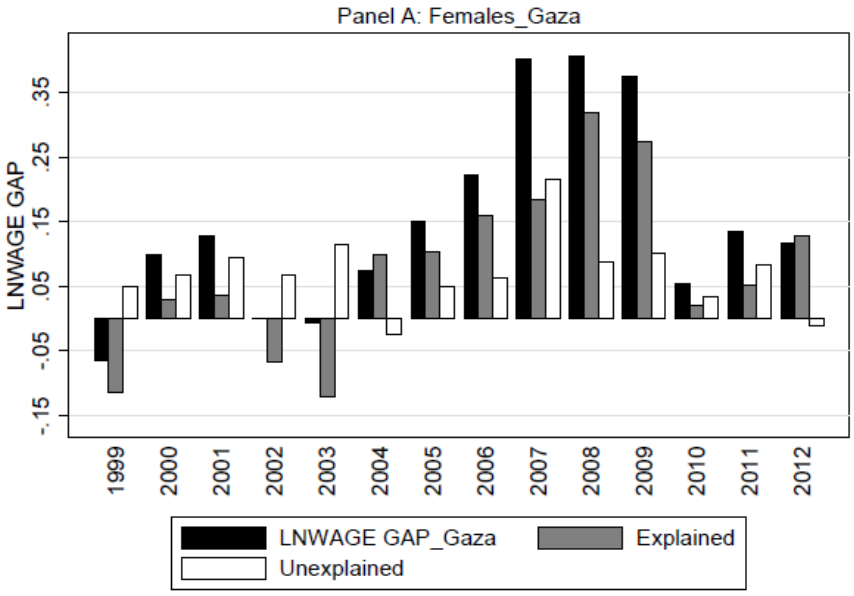


Notes: The analyses do not include observations of workers who report that their place of work is Israel or Israeli settlements. Number of observations: 92,102.

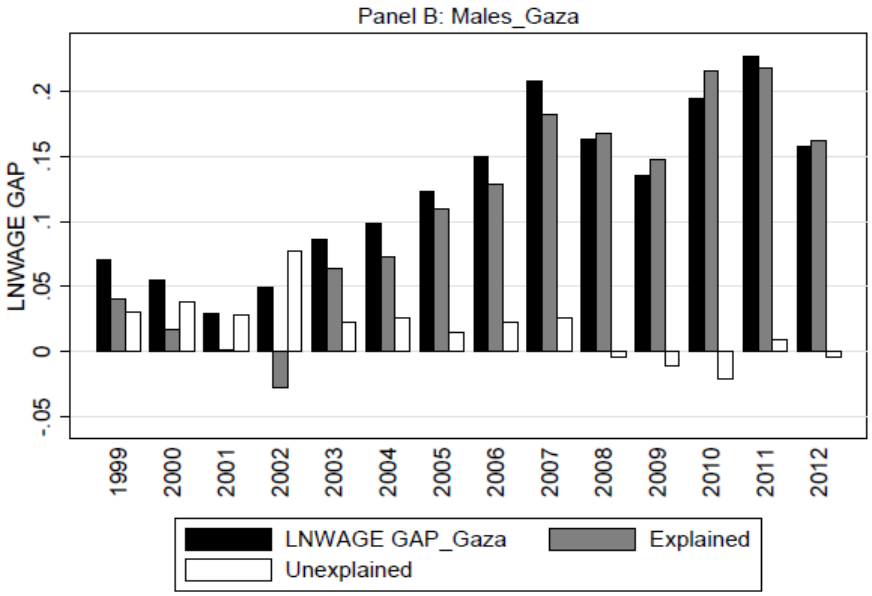
Source: Own calculations based on PCBS data.

Figure 5.A.3: West Bank–Gaza wage gap decomposition by gender over the period 1999–2012

"Wage gap=non-refugees' log wage-refugees' log wage"



Notes: The analyses do not include observations of workers who report that their place of work is Israel or Israeli settlements. Number of observations: 8686.

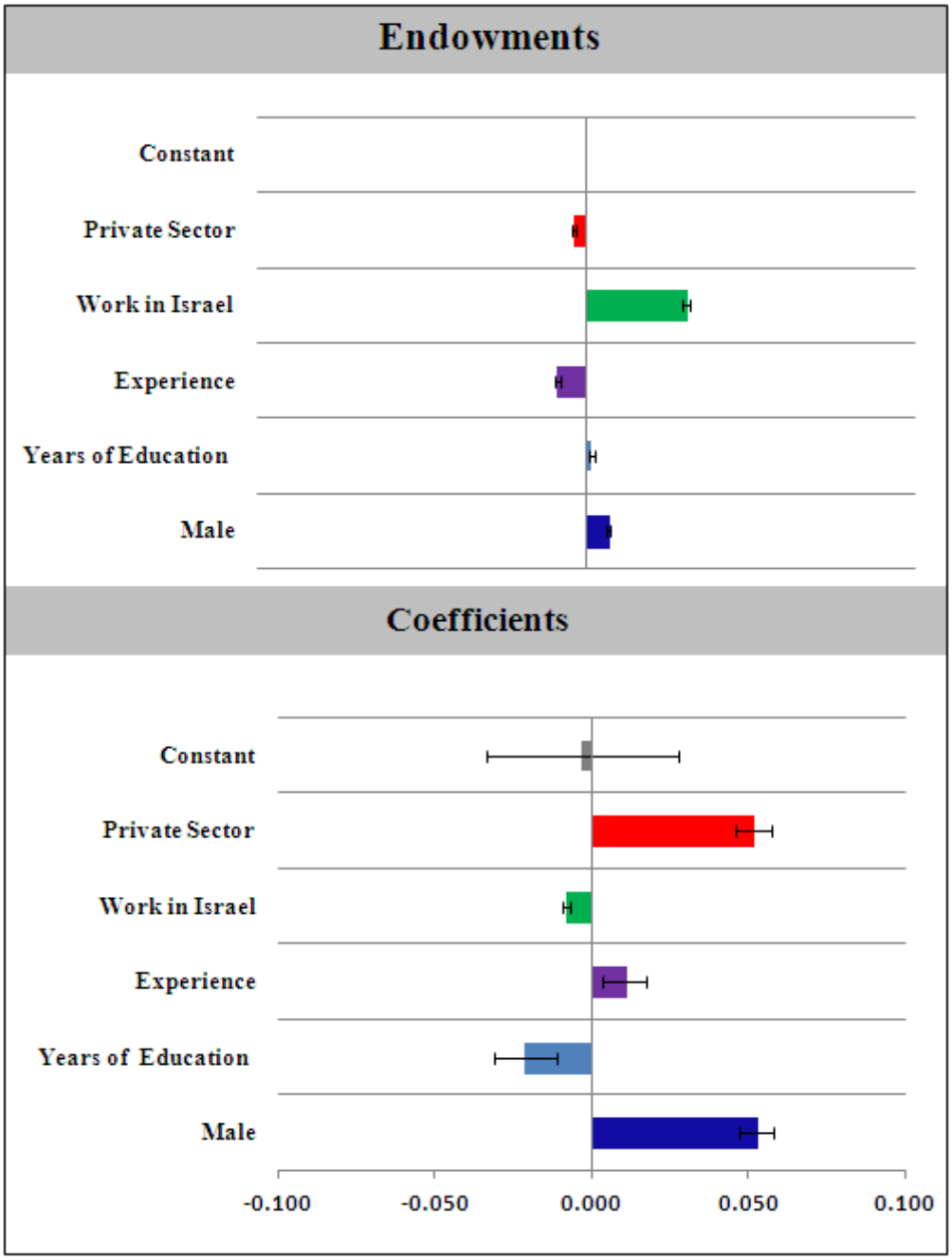


Notes: The analyses do not include observations of workers who report that their place of work is Israel or Israeli settlements. Number of observations:58,250.

Source: Own calculations based on PCBS data.

Figure 5.A.4: Gaza wage gap decomposition by gender over the period 1999–2012

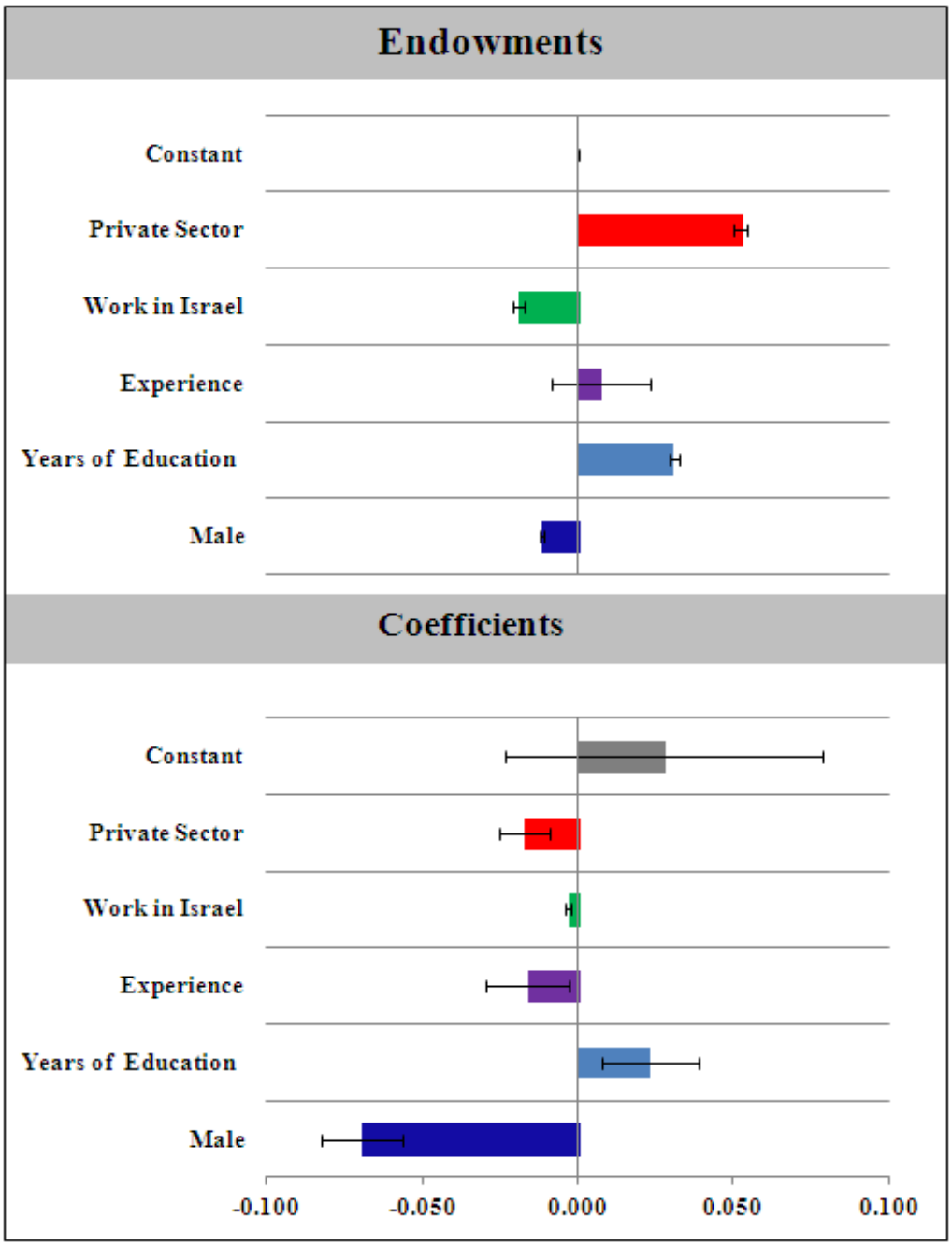
"Wage gap=refugees' log wage-non-refugees' log wage"



Source: Own calculations based on PCBS data.

Figure 5.A.5.a: Wage decomposition for selected variables in the West Bank

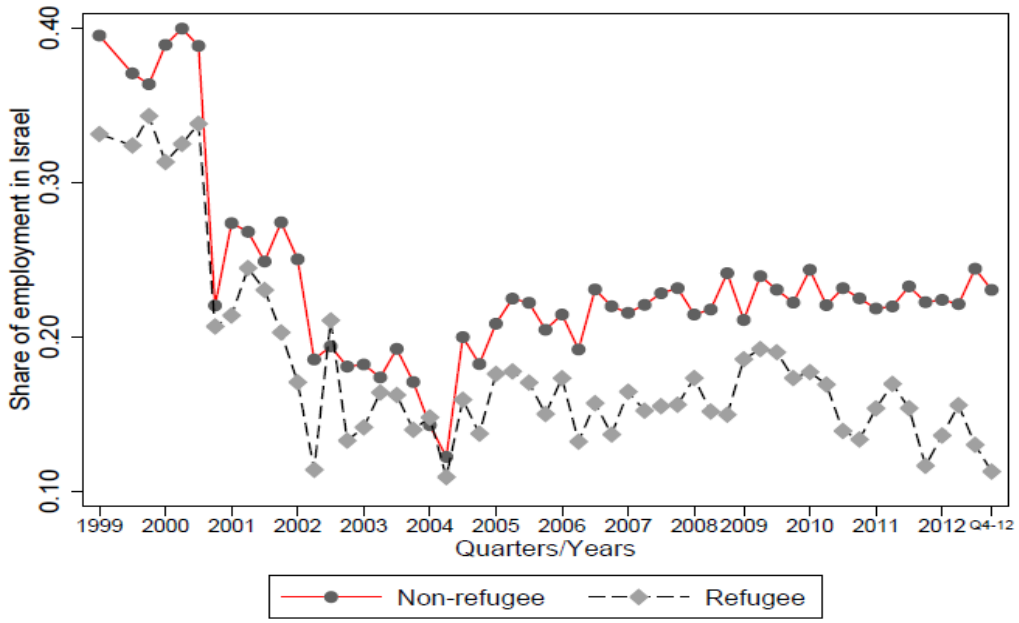
"The wage gap represents the differences between non-refugees' and refugees' salaries"



Source: Own calculations based on PCBS data.

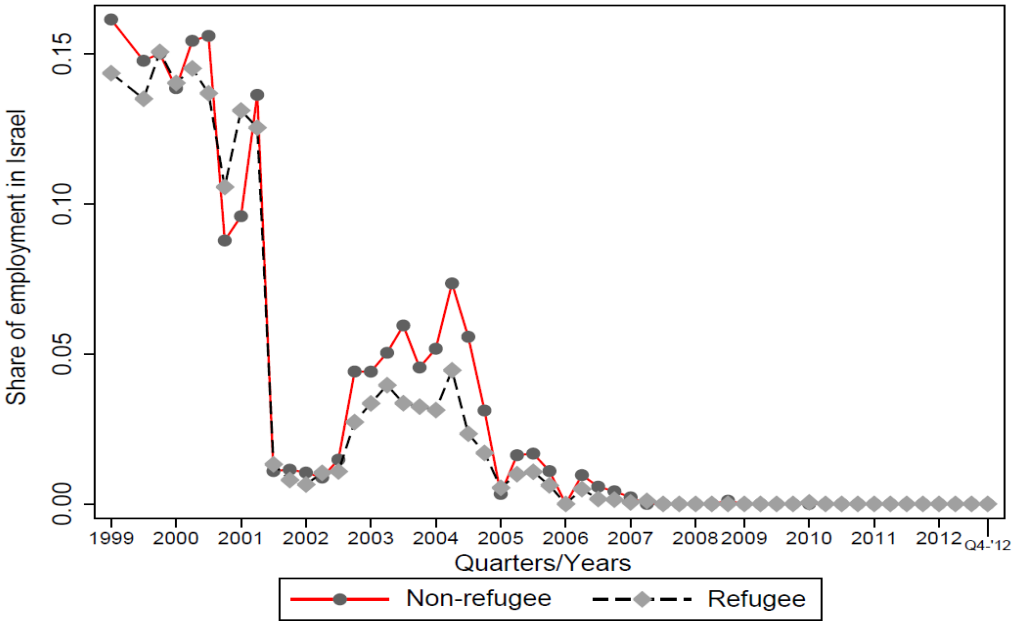
Figure 5.A.5.b: Wage decomposition for selected variables in Gaza

"The wage gap represents the differences between refugees' and non-refugees' salaries"



Source: Own calculations based on PCBS data.

Figure 5.A.6.a: Share of Palestinian non-refugee and refugee workers in the West Bank employed in Israel, 1999–2012



Source: Own calculations based on PCBS data.

Figure 5.A.6.b: Share of Palestinian non-refugee and refugee workers in Gaza employed in Israel, 1999–2012

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