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FREIE UNIVERSITÄT BERLIN

HUMBOLDT-UNIVERSITÄT ZU BERLIN

Essays on Socio-Economic Consequences of Violent Conflict in the Middle East

D I S S E R T A T I O N

zur Erlangung des akademischen Grades

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Abstract

This thesis consists of three essays that contribute to the empirical literature on the economics of violent conflict. More specifically, this work analyzes socio-economic consequences of conflict involvement which is often overseen next to the direct monetary cost of war. The first essay studies the effect of the Operation Iraqi Freedom and the following civil war on schooling outcomes of Iraqi children in mandatory schooling age. Several conflict measures which vary over geographic regions are proposed to capture different traits of conflict involvement. A special focus is laid on overcoming the potential endogeneity arising from non-random involvement into conflicts. I find decreased school enrollment of six-year-old boys and girls. Depending on the intensity of the conflict enrollment of girls is reduced by six to twelve percent. The detrimental effect measured for boys ranges between one and nine percent. The second essay examines wage differentials of high-skilled workers in relation to relaxing and tightening conflict intensity in the Israeli-Palestinian case. Contrary to previous research which uses data from the 1980s, I find increasing returns to schooling for Palestinian workers. After the outbreak of the Second Intifada in 2000 the relative wage of skilled workers experiences a substantial increase. This work identifies regional employment shifts coming along with a change in the sector composition to be responsible for a higher skill-intensive labor employment which translates into higher relative wages for skilled workers. The local service sector is found to play an insuring role in the Palestinian labor market. The third essay explores the evolution of the gender wage gap in the Palestinian Territories. While the male-female wage differential increases till 1999, this trend is reversed with the outbreak of the Second Intifada. The catch-up of the female wages can be explained by both, changes in relative labor prices as well as changes in the composition of employed labor. Price effects in favor of women can be found in returns to schooling, occupation and industry affiliation. The bigger share of the narrowing wage gap, however, can be explained by relative employment shifts across workplaces and sectors. The shift from employment in Israel to employment in the local labor market explains 57.8 percent of the closing wage gap between men and women. The related change in the industry structure explains another 26.5 percent of the wage convergence. Analyzing demand changes with the tightening of the political conflict I find a sharp increase in female labor demand. Examining the role of workplace-sector shifts in explaining labor demand changes I find relative gains of the service and agricultural sectors located in the Palestinian Territories, both of which rely on high shares of female labor input.

Keywords:
Labor economics, conflict, war, returns to schooling, skilled labor, relative labor supply, relative labor demand, gender wage gap, gender inequality

Zusammenfassung

Diese Dissertation besteht aus drei Aufsätzen, die zur empirischen Literatur der Ökonomie des gewaltsamen Konfliktes beitragen. Es werden dabei sozioökonomische Konsequenzen der Verwicklung in Konflikte untersucht, welche oft hinter die Betrachtung der unmittelbar monetären Kosten von Kriegen zurücktreten. Der erste Artikel untersucht den Einfluss der "Operation Iraqi Freedom" und des folgenden Bürgerkrieges auf die Beschulung von irakischen Kindern im schulpflichtigen Alter. Mehrere regional variierende Konflikt-Maße werden vorgeschlagen, um verschiedene Züge von Konfliktverwicklung abzubilden. Einen Schwerpunkt der Studie bildet die Überwindung eines Endogenitätsproblems, welches sich durch nicht-zufällige Verwicklung in Gewalt ergibt. Die Ergebnisse der Studie zeigen, dass in Abhängigkeit von der Intensität des Konfliktes die Schuleinschreibung von Mädchen durch eine Verwicklung in Konflikte zwischen sechs bis zwölf Prozent reduziert wird. Der bei Jungen gemessene Effekt beläuft sich auf eine Reduzierung um ein bis neun Prozent. Im zweiten Artikel werden Lohnzuschläge von hochqualifizierten palästinensischen Arbeitskräften in Zusammenhang mit alternierender Intensität im Nahostkonflikt gestellt. Im Gegensatz zu früherer Forschung, deren Ergebnisse auf Daten aus den 80er Jahren beruhen, finde ich steigende Bildungsrenditen für palästinensische Arbeitnehmer. Nach dem Ausbruch der Zweiten Intifada im Jahr 2000 steigen die relativen Löhne der gut ausgebildeten Arbeiter erheblich an. Als Ursache dafür werden die regionale Verschiebung und die damit einhergehende sektorale Umschichtung der Arbeitsallokation identifiziert. Diese verläuft zugunsten des Dienstleistungssektors in den Besetzten Gebieten, welcher anteilig mehr hochqualifizierte Arbeitskräfte beschäftigt als andere Sektoren. Die positiven Beschäftigungseffekte für Hochqualifizierte erklären somit den Anstieg ihrer relativen Löhne. Im dritten Artikel wird die Entwicklung des Geschlechterlohndifferentials in den Palästinensischen Gebieten untersucht. Während der Lohnunterschied zwischen Mann und Frau bis 1999 ansteigt, lässt sich mit dem Ausbruch der Zweiten Intifada die Umkehrung dieses Trends verzeichnen. Sowohl eine Änderung der relativen Arbeitspreise zugunsten von Frauen als auch eine veränderte Zusammenstellung der Arbeit ermöglichen den Anstieg der relativen Löhne von Frauen. Preiseffekte zugunsten von Arbeitnehmerinnen sind sowohl bildungs- als auch berufsgruppen- und sektorspezifisch. Der Großteil der sich schließenden Lohnlücke zwischen Mann und Frau lässt sich jedoch aus einem Kompositionseffekt, d.h. aus einer Verschiebung des Arbeitseinsatzes über Berufsgruppen und Industrien, erklären. Die Verlagerung des palästinensischen Arbeitseinsatzes aus Israel in den lokalen Arbeitsmarkt erklärt dabei 57,8 Prozent der schrumpfenden Lohnlücke. Die damit im Zusammenhang stehende veränderte Industriestruktur macht weitere 26,5 Prozent der Lohnkonvergenz aus. Mit der Verschärfung des politischen Konflikts wird ein Anstieg in der relativen Arbeitsnachfrage nach weiblichen Arbeitskräften gemessen. Um diesen zu erklären, wird die Verlagerung des Arbeitseinsatzes über die Sektoren und die Einsatzregion, d.h.

Israel oder die Palästinensische Gebieten, untersucht. Die Arbeitsallokation verschiebt sich zugunsten der Agrar- und Dienstleistungssektoren, welche sich beide durch einen hohen Anteil an weiblichen Beschäftigten auszeichnen. Die Beschäftigungseffekte zugunsten von Frauen wiederum spiegeln sich in einer Aufwärtsbewegung ihrer relativen Löhne wider.

Schlagwörter:
Arbeitsmarktökonomie, Konflikt, Krieg, Bildungsrenditen, Hochqualifizierte, relatives Arbeitsangebot, relative Arbeitsnachfrage, Lohnunterschiede zwischen Mann und Frau, Geschlechterungleichheit

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List of Abbreviations

	2SLS	Two-Stage Least-Squares
	ACLED	Armed Conflict Location and Event Database
	DHS	Demographic and Health Surveys
	ECV 2003	Encuesta de Calidad de Vida 2003
	ESOC	Empirical Studies of Conflict
	HLSS	Household Living Standards Survey
	IDF	Israel Defense Forces
	IHSES 2007	Iraq Household Socio-Economic Survey 2007
*	**KDP**	Kurdistan Democratic Party
	LSMS	Living Standards Measurement Study
	OEF	Operation Enduring Freedom
	OIF	Operation Iraqi Freedom
	OLS	Ordinary Least-Squares
	PCBS	Palestinian Central Bureau of Statistics
	PLFS	Palestinian Labor Force Survey
	PRIO	Peace Research Institute Oslo
	PUC	Patriotic Union of Kurdistan

If he doesn't understand the economy, he doesn't understand security.

Joseph Stiglitz

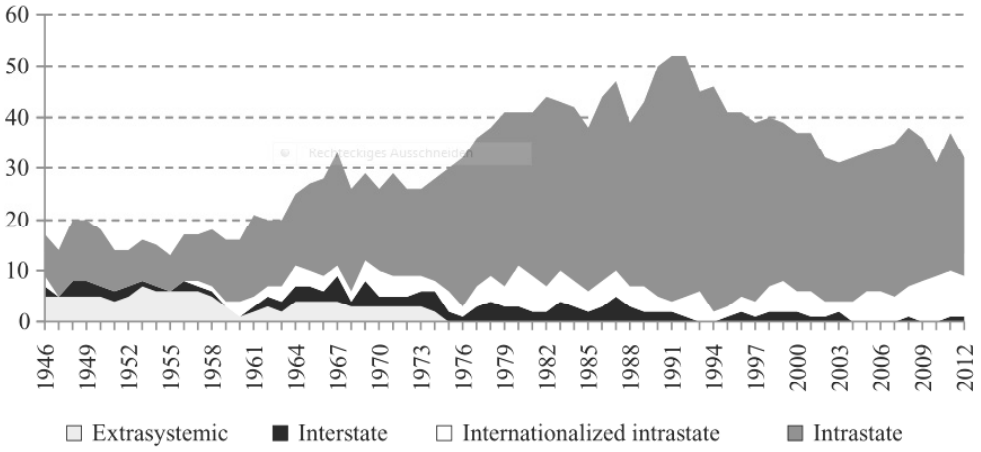
1 Introduction

1.1 Economics of Violent Conflict

Taking a wide historical perspective the world has never seen less people dying in violent conflict than nowadays. In 2012, the Uppsala Conflict Data Program (UCDP) recorded 32 violent conflicts. These are five registered conflicts less than in the previous year (Themnér and Wallensteen, 2013). And yet, political conflicts carried out in different parts of the world are present in our lives on a daily base. In contrast with historical wars, contemporary conflicts often globalize. They do so, because countries or smaller actors have strategic interests in political and economic conduct in other regions. Players, which are influential enough to interfuse, will therefore try to affect political events such that their economic and political objectives are retained. 'Asymmetric wars' describe conflicts which are carried out by unequal conflicting parties, usually a national state and a smaller group of resistance fighters. The modern armed conflict is characterized by a high degree of asymmetry (Münkler, 2002) which leads to the phenomenon which we observe more and more often: Conflicts do not end, sometimes even after the war is officially declared over as in the case of Iraq. Figure 1.1 illustrates the recent trend of armed conflicts which are increasingly intrastate and internationalized intrastate.

Any asymmetric conflict, i.e. resistance against a powerful oponent, can emerge in societies in which part of the population is feeling economically deprived or socially marginalized on the base of cultural or religious identity (Collier and Hoeffler, 2004). Political leaders of the resisting group use these circumstances to motivate group members to engage in militant forces. Leaders of national states command over armed forces. In the case of democracies the order over entry in conflict needs to be institutionally approved and therefore the public support. Both sides, the national state and the resisting group, rely on ideological conventions backed up in cultural allegiance to motivate the conflict engagement. However, their tools of war conduct are very different. Each of the conflicting parties realizes therefore a different cost when entering the conflict. The decision to fight is only reasonable if the expected outcome is higher than the cost of conflict involvement. Over the last six decades national governments of the Western world have enganged in armed conflict mostly outside of their own territorries. Political decision-makers of the Western democracies usually do not give economic reasons to justify these

Figure 1.1: Number of Armed Conflicts by Type, 1946−2012



Source: Themnér and Wallensteen (2013)

military operations, but rather refer to security concerns to find public support for the costly interventions. The question which therefore arises is whether the gain in security justifies the cost of war: The human costs are easily measured in terms of soldiers who lost their lives in the battle. Assessing the economic costs is a more complex task than it may initially appear. The direct monetary costs for Germany's participation in military missions abroad from 1992 till 2012 were €16.85 Billion. This does not include the monthly pay for soldiers abroad as they are calculated in the regular costs (Dewitz, 2013). Belasco (2011) calculated the cost of the U.S. military operations in Iraq, Afghanistan and other regions after the 9/11 at $944 Billion, 72 percent of which were dedicated to the realization of the Operation Enduring Freedom in Afghanistan. Stiglitz (2008), however, estimated the true cost of the Afghanistan war alone as high as $3 trillion. He draws attention to hidden economic costs resulting from a decline in economic growth which comes along with increased resource prices. He argues that the increased oil price after the launch of the military operations in Afghanistan not only hampered economic growth in the U.S. but also worked as a direct cash transfer from the U.S. to Saudi Arabia. Murdoch and Sandler (2001) study the relation of economic performance and civil war and find that economic growth is significantly hampered by civil wars not only in the host country but also in neighboring countries. In a globalized world, the economic consequences of a war are therefore difficult to foresee. They largely depend on the duration of the conflict which in turn is unpredictable in case of asymmetric war. Another distinguishing feature of asymmetric war is that the military mission of the national state will be perceived as failed as long as there is no conclusive battle that finishes the state of violence. It is therefore a new interesting question for how long political leaders are able to keep the conflict running without losing public support. Karol and Miguel (2007) investigate

the electoral cost of the Iraq war on the 2004 U.S. Presidential Election. Using changes in vote shares from 2000 to 2004 across states, they find that state-level Iraq casualties significantly depressed George Bush's vote share. There may, however, be a general effect which works through the fear of an external threat and which the President possibly used in his campaign to justify the war against the terror. If - in contrast to war casualties - this psychological mechanism does not differ over states and raises the consent to war, the military engagement in Iraq as part of the fight against the 'Axis of Evil' may still have helped him to increase his vote share. If it is the fear for our security that makes us enter in war we should get a good understanding of what is threatening our security and how this will change if we decide for military interventions. The following section will therefore explain why it is necessary to understand the socio-economic consequences of violent conflict.

1.2 Understanding the Socio-Economic Consequences of Violent Conflict

If Western democracies state that the ultimate interest lies in enforcing political stability in conflict regions and therewith guarantee their own national security, it is crucial to get an understanding of how these interventions shape those societies who experience violent force. A critical assessment of changes which conflict-involved regions go through should not only reveal the impact of conflict involvement but also deliver a key for decision-making on further conflict management. Adverse effects of armed conflict - such as economic depriviation, reduced educational attainment, deteriorated health outcomes, political and social imbalance - may serve as accelerators to further violence and thus counteract any endeavor to enhance political stability and security. The literature on determinants of violence is inconclusive in many aspects. Examining the role of education and poverty, Krueger and Malečková (2003) and Berrebi (2007) find no evidence that economic deprivation and a low level of education increase the likelihood to participate in militant actions. On the contrary, they find that Palestinian suicide bombers as well as militant Jewish underground fighters have a somewhat elevated economic and educational background. These findings contrast the results from cross-country studies by Fearon and Laitin (2003) and Collier and Hoeffler (2004) who find that income per capita, growth rate of GDP per capita and male secondary school enrollment rate decrease the incidence of civil war. This macro-evidence is further strengthened by micro-level studies on the Middle Eastern case provided by Saleh (2004), Saleh (2009), Sayre (2009) and Miaari et al. (2013). Their results directly constrast the findings of Krueger and Malečková (2003) and Berrebi (2007) in finding that Palestinian aggression towards Israel is explained by economic shortcomings. This brings us to the question of how much we can buy peace. In

their cross-country study, Taydas and Peksen (2012) assess the provision of social welfare services on the probability of onsets of civil wars. They find that welfare spending successfully reduces violent conflicts. They argue that the "provision of social services reduces grievances by offsetting the effects of poverty and inequality in society". Berman et al. (2011) address to the same question at the micro-level. They investigate whether the provision of public goods in the aftermath of the Operation Iraqi Freedom decreases violence in Iraq. They indeed find a negative effect of improved service provision on insurgent attacks.

Next to economic and educational factors, some research finds the experience of violence as such an important explanatory of further violence. Barber (2008) analyzes the effects of exposure to political violence on long-term psychological, social, and civic functioning in Bosnia and Palestine. He concludes that the response to experienced violence depends on the frequencies and degree of involvement in political violence, as well as the perceived impact of the political violence on daily life. He comments that Palestinians are more willing to actively involve in the conflict than Bosnians. This might be rooted in humiliation and intrusion which Palestinians experienced during conflict more frequently than Bosnians. Jaeger et al. (2012) offer another study of the effect of experienced violence in the Middle East. They use public opinion poll micro data of the Palestinian population and data on fatalities from the Second Intifada to investigate the effect of Israeli military actions on Palestinians' support for militant factions. They find a short-run radicalization effect that vanishes after 90 days. They, however, find stronger and more persistent effects in case of collateral damage on civilians. They also state differences in political preferences over birth cohorts which they attribute to the political atmosphere during the time of adolescence.

If the political interest in the aftermath of a military intervention lies in stabilizing the regions, reduce the duration of violence and thus effectively control the cost of the operation, it is crucial to understand the impact of the intervention on civilians' lives. Policies should then be developed to mitigate adverse effects which war-exposed populations potentially experience during conflict. This work contributes to the understanding of the socio-economic impact of conflict involvement with three essays. The first one quantifies the impact of armed conflict on schooling outcomes in Iraq. Education is found to be a substantial factor in promoting economic development (see Becker et al., 1990; Barro, 2001; Fleisher et al., 2010). The second essay dedicates to the skill premium in Palestinian Territories during the Second Intifada. It is motivated by the idea that investment in human capital should be rewarded sufficiently in order to provide incentives for individuals to accumulate knowledge and thus increase their productivity. The third essay

analyzes gender wage differences in the Palestinian Territories in the course of the Second Intifada. Female labor force participation is a potential source for economic development and is expected to increase with their relative wage.

1.3 Outline of the Thesis

This dissertation aims at giving empirical evidence on the socio-economic consequences of violent conflict. These socio-economic consequences can be diverse. I focus on schooling as well as on skill- and gender-specific labor market changes under conflict exposure. Education and incentives to participate in the labor force and increase labor productivity crucially determine the conditions for social and economic development of the country. Understanding the consequences of armed conflict for these growth determinants is important in developing policies directed at improving economic development and political stability.

Chapter 2 summarizes the relevant literature on the economics of conflict involvement with a specific focus on the socio-economic outcomes which are subject of this thesis. I will outline the main findings in the respective strands of research and discuss the applied methodologies. The critical assessment of former contributions will serve as a base for the empirical analyses undertaken in this thesis.

Chapter 3 studies the effect of the Operation Iraqi Freedom and the following civil war on schooling outcomes of Iraqi children in mandatory schooling age. The data base of this study is constructed from an Iraqi household survey conducted in 2007 which could be geo-matched to district-level information on war casualties and counterinsurgent attacks. Several conflict measures which vary over geographic regions are proposed to capture different traits of conflict involvement. Two macro measures use geographic variation of conflict intensities. Additional measures constructed from the household data identify different channels through which conflict may affect schooling decisions. I apply a cohort difference-in-differences technique which uses cross-sectional and cross-cohort variation in conflict involvement and schooling outcomes under unchanged schooling law to identify the causal effect of the violent conflict on schooling attainment in Iraq. Contrary to most former research, special focus is laid on overcoming the potential endogeneity arising from non-random involvement in conflicts. More precisely, I use the pre-war district-level ethnic composition as an exogenous source of variation which is a strong predictor for conflict involvement. I find decreased school enrollment of six-year-old boys and girls explained by exposure to violence. Depending on the intensity of the conflict, enrollment of girls is reduced by six to twelve percent. The detrimental effect measured for boys ranges between one and nine percent.

High security risk and experienced harm are identified as channels through which violent conflict negatively influences early school enrollment. Relying on the 2SLS estimates which control for non-random conflict involvement I estimate a decrease in enrollment for girls by 14.2 percent and 10.4 percent decrease for boys if harm has been experienced in the neighborhood. If the household itself suffered from any kind of conflict-related harm the detrimental effect rises to 28.8 percent for boys and 27.6 percent for girls. Also security risk reduces the probability of enrollment at the age of six for girls over all specifications. Living in risky areas (*security risk 2*) reduces school enrollment of females by 15 percent, living in very risky areas (*security risk 1*) even by 20 percent. Boys' school enrollment responds with a decrease of approximately five or nine percent, respectively.

In all estimations the 2SLS estimates are substantially smaller than the OLS estimates. This suggests the presence of a positive correlation of some unobservable component and the conflict variables. The OLS estimates therefore largely underestimate the detrimental effect of violence on schooling outcomes.

Chapter 4 investigates earning differentials between high- and low-skilled workers in the Palestinian Territories from 1996 to 2006. Using quarterly information from the Palestinian Labor Force survey, I can relate changes in labor market outcomes to the tightening of the political conflict with the outbreak of the Second Intifada. Contrary to findings from Angrist (1995) who finds decreasing returns to schooling in Gaza and West Bank for the period of 1981 to 1991, which he explains with the expansion of the educational system, I find increasing returns to schooling for all years. Especially after the outbreak of the Second Intifada in 2000 the relative wage of skilled workers experiences a substantial increase. I use a simple supply and demand framework that attributes changes in relative wages of skilled workers to changes in their relative demand and their relative supply. A strong relative demand growth dominates the relative supply growth in the period before the Second Intifada. With the outbreak of the conflict in 2000 the Palestinian labor market narrows down as a result of stricter border policies. The supply of high-skilled relative to low-skilled workers declines in the Palestinian labor market as a result of the squeezing in of low-skilled workers into the local labor market. The relative demand keeps growing, but at a lower pace than in the first period. The reduced relative supply is what drives up relative wages of skilled workers. A variance decomposition later on reveals through which mechanisms skilled workers profit from the changing labor market conditions. I find that the increase in income generated by skilled labor after the year 2000 is a result of two channels. First, a shift of employment from Israel to regions that are skill-intensive (Gaza and West Bank). Second, an increase in the relative wage of skilled workers in all three regions. The latter, in turn, results from a change in the allocation of

aggregate labor across sectors. A sectoral decomposition shows that employment shifts to the local service sector produce a substantial skill bias. Even though we observe a general wage decrease after the escalation of the Al-Aqsa movement in September 2000, tighter border closures hamper particularly low-skilled workers' income opportunities and therewith increase the skill premium.

Chapter 5 explores the evolution of the gender wage gap in the Palestinian Territories from 1996 to 2006. I find an increase of the unadjusted male-female wage gap till 1999. Interestingly, this trend is reversed with the outbreak of the Second Intifada. The catch-up of the female wages can be explained by both, changes in relative labor prices as well as changes in the composition of employed labor. Price effects in favor of women can be found in returns to schooling, occupation and industry affiliation. The bigger share of the narrowing wage gap, however, can be explained by relative employment shifts across workplaces and sectors. With the outbreak of the Second Palestinian Uprising the Israeli authorities intensify border policies that hamper labor mobility of Palestinian workers. The shift from employment in Israel to employment in the local labor market explains 57.8 percent of the closing wage gap between men and women. The related change in the industry structure explains another 26.5 percent of the wage convergence. Changes in the relative price for female labor reduce the wage differential by 23 percent - after controlling for compositional changes across sectors and compositional changes of the workplace. The change in returns to schooling in favor of women contributes 6.9 percent to the narrowing wage differential. The change in relative prices on specific professional groups explains another 10.6 percent of the relative wage gain of women. I furthermore explore how these strong dynamics relate to changes in labor demand which come along with the tightening of the political conflict. The overall demand for male labor is reduced over the Second Intifada. On the contrary, the labor demand for women strongly increases. It is interesting to note that more than half of the overall demand changes occur due to a between-workplace demand change. Thus, a substantial part of both the decrease of the demand for male labor and the increase of the demand for female labor, can be explained by the limited work mobility across the Israeli-Palestinian border. This is so, because in each sector the share of Palestinian women working in Israel is substantially lower than the share of Palestinian men commuting. Examining the role of sector-workplace shifts in explaining labor demand changes I find relative gains of the service and agricultural sectors located in the Palestinian Territories, both of which rely on high shares of female labor input. Sectors which sustain the Palestinian labor market in times of political instability happen to be sectors with a high intensity in female labor. Within the Palestinian society women seem to take over secure jobs inside the Palestinian Territories which guarantee a constant but

low pay relative to jobs held in Israel. Men, on the other hand, increase their pay by commuting to workplaces across the border but risk zero pay in bad times. In these periods the labor market activity of women gains importance in securing households' income.

2 Literature

2.1 Schooling under Violent Conflict

The body of literature that analyzes the impact of armed conflict on schooling outcomes is constantly growing and for the time being covers a variety of conflict-involved societies. The methodologies applied in those studies vary with the available data.

Shemyakina (2011) uses a difference-in-differences approach to analyze the regional and temporal exposure to the 1992 to 1998 armed conflict in Tajikistan. Her data base is the 1999 Tajik Living Standards Survey combined with data on the events during the conflict. She finds a reduced probability of mandatory schooling completion in Tajikistan for girls, but not for boys.

Dabalen and Paul (2012) apply difference-in-differences and propensity score estimation to estimate the causal effect of the civil war in Côte d'Ivoire on schooling. They use the Household Living Standards Survey (HLSS) of the year 2008 combined with data on local incidences of conflict taken from the Armed Conflict Location and Event Database (ACLED). The authors find between 0.2 and 0.9 fewer years of schooling of conflict-involved individuals in Côte d'Ivoire.

Swee (2011) provides another case study using a difference-in-differences approach. He estimates the impact of the 1992 to 1995 Bosnian War on schooling attainment. The author uses the 2001 to 2004 Bosnian Living Standards Measurement Study (LSMS) and information on municipality-level war casualties. He finds no strong impact of conflict involvement on primary schooling but a strong reduction in secondary schooling. Unlike the previously introduced studies, Swee (2011) acknowledges the problem of a potential selection out of violence by adopting a control function approach suggested by Heckman and Robb (1985). He uses the pre-war municipality-level ethnic polarization indices as instruments for war intensity.

Rodríguez and Sánchez (2009) use a duration model and a biprobit approach to assess the effect of violent conflict on school drop-out and child labor in Colombia. They use the Encuesta de Calidad de Vida 2003 (ECV 2003) on individual-level child information and municipal-level data on the total number of offensive actions to proxy armed conflict. To account for a potential endogeneity of violence in a

schooling equation they use lagged homicide capture rates in municipalities as instrument. This is a disputable instrument if autocorrelation is high.[1] Considering children aged between six and seventeen they find that violent conflict in Colombia increases school drop-out rates for the whole sample.

Alva et al. (2002) investigate consequences of ethnic segmentation in the 1990s in Kosovo using an Oaxaca-type decomposition. Their research is motivated by the existence of an informal educational system for Albanian Kosovars that appeared next to the official one between 1991 and the late 1990s. The authors use micro data originating from the 2000 Kosovo LSMS to assess the impact of the parallel system on school enrollment and completed years of schooling. They find a decreased secondary schooling for male Albanian Kosovars. This result parallels findings from Swee (2011) and Chen et al. (2008). Similar to Swee (2011) in his above-presented case study on Bosnia-Herzegovina, Chen et al. (2008) observe a drop in secondary (but not primary) schooling outcomes using cross-country data. Their study comprises 41 countries which they follow over the period of 1960 to 2003. They combine data on macro-economic indicators using different sources with information on conflicts from the Armed Conflict Dataset of the Peace Research Institute Oslo (PRIO).

Contrarily, the macro study provided by Miguel and Roland (2011) finds no robust negative effect of the U.S. bombing in Vietnam on economic variables including the literacy rates. They use district-level economic indicators and U.S. military data on bombing intensity to assess whether the war damage led to persistent local poverty traps. In their instrumental variable approach they exploit the distance to the 17th parallel demilitarized zone as an exogenous source of variation.

Akresh and de Walque (2008) indicate that this finding might be an artifact of the aggregated data. They conduct a micro study with data originating from the 1992 and 2000 Demographic and Health Surveys (DHS) for Rwanda. They also apply an instrumental variable technique - using distance to the Ugandan border as an exogenous source of variation. The authors show that while enrollment rates after the Rwandan genocide of 1994 are substantially higher, on the individual level there is a significant gap between children who were involved in the genocide and those who were not.

The empirical evidence on the effect of armed conflict on schooling outcomes is thus not clear-cut. The effect of enforced violence on schooling decisions is likely to vary from case to case. This lies in the diverse nature of each conflict. Especially the length of conflict exposure, but also the degree of intensity and type

[1] See e.g. Berman et al. (2011) who find that violence in the past is the strongest predictor for current violence.

of conflict involvement (passive vs. active) are likely to determine whether violent conflict exerts a detrimental effect on socio-economic outcomes (Barber, 2008). The research presented in Chapter 3 of this thesis contributes to this strand of literature with a case study on the Operation Iraqi Freedom (OIF) started in 2003. To date, no empirical assessment of the impact of the OIF and the following civil war on educational outcomes has been undertaken. Western democracies have engaged in this conflict with outstanding human and monetary resources. As argued earlier, understanding the socio-economic impact of the military interventions undertaken by the Western societies is crucial not only for understanding the result of the decision to engage in conflict with respect to the current cost, but also to get a perspective of social changes and therewith future costs. From a methodological point of view, the analysis carried out in Chapter 3 addresses the endogeneity problem which arises from non-random conflict involvement and is largely ignored in many earlier contributions. Results from conventional estimates will be contrasted to those which mitigate this type of endogeneity.

2.2 Skill Premium under Violent Conflict in the Palestinian Territories

The Palestinian labor market and its dependence on the Israeli policies have been studied intensively since the beginning of the 1990s. Among the most prominent papers are the contributions by J. Angrist who studied the returns to schooling for Palestinian men (Angrist, 1995) and short-run demand for Palestinian labor (Angrist, 1996). In his first article, which is starting and reference point for a number of further examinations on the Palestinian labor market, Angrist studies the returns to schooling using Labor Force Surveys conducted in the West Bank and the Gaza Strip over the period of 1981 to 1991. His parameter estimates are derived from simple wage regressions to capture changes in coefficients over years. He complements these estimates with first-difference estimates which may control for unobserved heterogeneity. He shows that between 1981 and 1987 wage differences between schooling groups fell by one half.[2] This sharp decrease in returns to schooling is explained by a substantial increase of high-skilled workers in the Palestinian labor force coming along with a strong educational expansion in the Occupied Territories which started in the 1970s (Simon, 1988).

In his second paper, Angrist analyzes the wage premium of Palestinian men working in Israel for the same observation period. He shows that the wage premium for working in Israel declined from roughly 17 percent in 1981 to zero in

[2]The first Palestinian Intifada broke out in 1987. An increase in returns to schooling is observed for the years 1990 and 1991 only.

1984 and then rose to 36 percent in 1991. He furthermore analyzes the relationship of wages and days of work using simple OLS estimation. He can show that wages paid to Palestinian workers in Israel are negatively related to their days worked in Israel. To study the effect of demand and supply shocks on the wage dynamics he adopts a labor market model with two skill-groups by Altonji and Card (1991). He uses quarterly time series on curfews combined with civil disturbances data collected by the Israel Defense Forces (IDF) as instruments for labor supply shocks. He estimates the short-run Israeli demand for Palestinian labor controlling for supply shocks induced by curfews and closures. He finds that "exogenous decreases in Palestinian labor supply are associated with significant increases in the wages Israeli employers pay their Palestinian workers". He thus concludes that a reduced access to the Israeli labor market does not harm earnings of Palestinian workers too much since the short-run Israeli demand for Palestinian labor is "inelastic enough". He, however, also notes that this result does not necessarily have to hold if the border policies change.

Bulmer (2003), contrarily, finds that Palestinian labor market and welfare outcomes are extremely vulnerable to the reliance on Israeli demand for Palestinian labor in the long-run. She develops a theoretical model that links the Palestinian labor market to the unskilled labor market in Israel. Her model incorporates the availability of higher paid jobs in Israel for unskilled workers, costs and uncertainty related to commuting and unemployment in the local labor market. She calibrates her model using the Palestinian Labor Force Survey (PLFS) of 1999. She predicts that relaxed border policies between Israel and the Occupied Territories would decrease domestic employment and unemployment and that some wage gap between domestic and Israeli wages would persist (reflecting commuting costs). However, the draw of Palestinian workers to the Israeli labor market would result in an upward pressure on wages paid in the local labor market, dampen domestic labor demand and therefore hamper economic development in the Palestinian Territories.

Aranki (2004) and Miaari and Sauer (2011) study the impact of the Israeli border policy during the Second Intifada.[3] Aranki (2004) measures the impact of the tightening conflict by border closures in percentage of days of closed borders per quarter. He applies a two-step estimation technique proposed by Donald and Lang (2007) to test for significance of the group-level variable of interest (closures). He finds that increased border closures significantly reduce employment of Palestinians (both locally and in Israel) as well as wages paid to Palestinians (in the local and the Israeli labor markets). The detrimental effect is found to be stronger in Gaza than in the West Bank. The author attributes this fact to differences in

[3] Aranki (2004) and Miaari and Sauer (2011) examine about the same period, 1999-2003 and 1999-2004, respectively, both using the PLFS.

the implementation of the closure policies in both regions. The Gaza Strip has experienced stricter access control than the West Bank, the latter being controlled with internal checkpoints and less external closures than the former. Miaari and Sauer (2011) quantify the conflict by the frequency of border closures and the number of foreign work permits issued by the Israeli government. Their fixed effect estimates document a strong negative effect of the Second Palestinian Uprising on Palestinian employment in Israel as well as on mean monthly earnings in all three workplaces (Israel, West Bank and Gaza) and therewith confirm the findings by Aranki (2004). Miaari and Sauer (2011) find a stronger effect for foreign work permits issued than for border closures and argue that the latter represents a rather transitory supply shock to the Israeli labor market while the former constitutes a long-run impact through the substitution of Palestinian workers by foreign workers.

Benmelech et al. (2010) use a different measure for the Israeli-Palestinian conflict. They investigate the impact of Palestinian suicide attacks in Israel during the Second Intifada on unemployment and wages of Palestinian workers. They combine data on suicide attacks between September 2000 and December 2006 with data from the PLFS. Their empirical method relies on variation in suicide attacks at the district-quarter level. They quantify that "a successful attack causes an increase of 5.3 percent in unemployment, increases the likelihood that the district's average wages fall in the quarter following an attack by more than 20.0 percent, and reduces the number of Palestinians working in Israel by 6.7 percent relative to its mean. Importantly, these effects are persistent and last for at least six months after the attack."

The last four studies presented above do not specifically look at skill differences of Palestinian workers across the different workplaces. I summarized their results as they examine labor market outcomes during the Second Intifada, which is the period of interest in the studies conducted in Chapter 4 and Chapter 5 of this thesis. Mansour (2010) studies the effect of labor supply shocks as induced by the Second Palestinian Uprising on labor market outcomes of low- and high-skilled workers for the period of 2000 to 2004. He exploits within-city variation in the number of workers from each city in the West Bank who report Israel as their usual place of work. This number varies over time for reasons that are uncorrelated with economic conditions at the city-level and which the author attributes to the Israeli border policy. His fixed effect estimates suggest that unemployment of low-skilled workers increases with an increase of low-skilled and high-skilled labor supply. Also wages of low-skilled workers are negatively affected by increases in supply in low-skilled and high-skilled workers. On the other hand, wages of high-skilled worker seem to respond to increases in their own labor supply only. He concludes that high-skilled workers compete for the high- and low-skilled jobs

pushing low-skilled workers into unemployment.

Etkes (2012) studies the aftermath of the Second Palestinian Uprising, 2005-2009. He combines data from the PLFS with Israeli administrative data on permits for employment in Israel. The author shows a decrease in unemployment among Palestinians with the relaxation of the political tension which is supported by an employment increase in both the local and Israeli labor markets. He investigates the distinguished impact of the permit policy on low- and high-skilled workers. He shows that the number of work permits issued to Palestinian men is strongly correlated with employment of low-skilled workers, but shows an insignificant correlation with high-skilled employment. This, in turn, affects the schooling premium. He quantifies that an increase in the number of permitted employees in Israel by 100 reduces the return to schooling of Palestinian men by 13 percent.

The contributions presented so far show a negative impact of the intensification of the Israeli-Palestinian conflict on labor market outcomes of Palestinian workers. They also attest that Palestinian low-skilled workers profit from employment opportunities in Israel rather than high-skilled workers. Since wages paid in Israel are generally higher than wages paid in the local labor market, the skill premium decreases in times of conflict relaxation when employment chances across the border are high.

The empirical analysis conducted in Chapter 4 builds on these earlier findings. It expands the observation period over the years 1996 to 2006 and strives to add to the literature in several ways: First, I examine the dynamics in returns to schooling before and during the intensification of the Israeli-Palestinian conflict. Interestingly and contrary to findings from the 1980s, I find increasing returns to schooling already before the Second Intifada. The increase in returns to schooling is hence not only explained by border policies. Second, I use a simple demand and supply framework to identify sources of changes in the relative wage of skilled Palestinian workers. Third, applying a variance decomposition method I can identify employment patterns at the sector level which are responsible for the relative wage gain of skilled workers.

2.3 Gender Wage Gap Dynamics in the Palestinian Territories

Inequality in wages between men and women is a high-ranked policy issue in nearly every country in the world. It has, thus, been studied extensively for many countries. Controlling for educational and other socio-economic gender differences

- which strongly differ across countries - earlier literature found a substantial male-female earnings gap which could not be explained and was hence attributed to labor market discrimination (see e.g. O'Neill, 1985; Blau and Ferber, 1987; O'Neill and Polachek, 1993).[4] More recent literature finds that these unexplained wage differentials are mainly driven by omitted variables and can be explained by differences in workplace and job characteristics (O'Neill, 2003), unobserved heterogeneity and endogeneity (Kim and Polachek, 1994).

As a matter of fact, the gender wage gap has seen various changes throughout recent decades that differ across countries. While developed countries experienced no change (see e.g. Mussida and Picchio, 2013 on Italy) or a decrease in the gender pay gap (see e.g. Blau and Kahn, 1997, and Bacolod and Blum, 2010, for studies on the U.S.; Black and Spitz-Oener, 2010, for an analysis of West Germany) the trend in developing countries is less explicit. Cross-country comparison reveals that whether the gender gap has closed or widened depends largely on the structural changes on the production side which, in turn, determine relative demand for female labor. Rendall (2013) finds that wage disparities between men and women are successfully reduced in countries which shift from "brawn"-intensive to "brain"-intensive production. Research aiming at identifying driving factors behind the catch-up of women's wages in developed economies finds that technological change favored female employment and wages (see e.g. Blau and Kahn, 1997; Bacolod and Blum, 2010; Yamaguchi, 2013; Black and Spitz-Oener, 2010). The bottom line of this research can be summarized as follows: changes in the occupational mix or in job tasks happened in favor of non-routine and analytical skills in which men - other than in motor skills - have no comparative advantage.

To the best of my knowledge only two studies examine the gender pay differences in the Palestinian Territories. Daoud (2005) estimates the differences in returns to schooling between men and women using the 1999 and 2001 PLFS. He estimates alternative versions of the Mincerian wage equation using OLS and a Heckman selection model. The author finds that women earn 14 to 15 percent less in 1999. Between the years 1999 and 2001 - one year before and one year after the outbreak of the Second Palestinian Uprising - the estimated wage differential declines which the author explains with a rise in male unemployment during the Second Intifada. Keeping in mind the literature presented in the previous section, this result is not unexpected. It is widely known that mainly male Palestinian workers take the effort of commuting and profit from higher earnings across the border in times of relaxed access policies. However, the decline in wage differences

[4] Stanley and Jarrell (1998) published a meta-study on the discrimination gender gap. They evaluate 55 studies and find a mean estimated gender gap of 31.8 percent. The range of those estimates across studies is, however, quite considerable, ranging from 2.7 to 91 percent.

is rather small. The author also finds that the schooling coefficients for women decrease much stronger than the schooling coefficients for men over the two-year period. A major weakness of the study is that it does not specifically address compositional effects in the active labor force after the turmoil in September 2000. The author himself notes: "One of the important changes between 1999 and 2001 is the change in industrial composition of Palestinian employment resulting from lost access to certain industries." He argues that by applying the Heckman estimator without industry and occupation dummies he would solve that issue: "The removal of the industry and occupation dummies is expected to reveal the true effect of the Intifada on returns to schooling." Losing control over wage difference between occupations and industries, however, does by no means improve the wage estimation, nor does it allow to control for differences in compositional effects.

Daoud and Shanti (2012) analyze differences in private-public sector employment and wage differentials in the Palestinian Territories from a gender perspective. They follow an approach proposed by Blinder (1973) and Oaxaca (1973). This counterfactual decomposition technique enables them to attribute differences in the wage between two groups to differences in endowment and differences in returns. They use the PLFS for the years 1999, 2001, 2007, and 2010. With descriptive statistics they show several interesting facts. First, the share of public sector employment increases after the Second Intifada. Even though this result is not surprising, it should be kept in mind for the later analysis. Second, unemployment rates of men increase while those of women decrease from 1999 to 2001. Third, low-skilled men experience the most drastic rise in unemployment. Fourth, the public-private sector wage gap for men is negative in 1999 and 2001 and positive thereafter. For women it is always strongly positive. Fifth, women in the public sector earn more than men while in the private sector they earn less. Sixth, the average years of schooling of men employed in the private sector are higher than of men employed in the public sector. The opposite is true for women.

In their empirical approach, the authors decompose the private-public wage gap and the gender wage gap separately. The link between gender wage differential and the role of sector employment remains therefore largely uncaptured. In their sector decomposition they find higher predicted wages in the public than in the private sector for men and women. This contradicts the initially presented evidence on the unadjusted wage gap between sectors. They also report that men would be overpaid and females underpaid in the public sector. The reliablility of this result, however, crucially depends on the control for endowment-related differences. The authors themselves state: "But overall, the endowment effect is dominated by the residual effect (unexplained or discrimination) in explaining the wage differential." In their analysis of the gender wage gap they argue that the "wage is predicted to be

higher for females in the public sector only, and that the endowment effect explains a good portion of the difference". In other words, it is likely that differences in schooling explain a good part of the difference in wages between male and female public sector employees. With their chosen empirical approach the authors cannot explain the dynamics of the gender wage gap even though they look at several years. The Oaxaca-Blinder between-group decomposition is static in the sense that it decomposes wage differentials at a certain point in time, but it is not adequate to analyze changes in these wage differentials.[5] Additionally, it suffers from a well-documented weakness in that it often attributes differences in endowment, which are not controlled for, to differences in returns. This results from omitted variables biases in the underlying wage regressions. The fact, that most of the difference in their analysis of the wage gap remains unexplained as stated above, elevates this concern.

The empirical analysis presented in Chapter 5 of this thesis takes these earlier works as a starting point and aims at making several contributions. First, it provides empirical evidence about the evolution of the gender wage gap in the Palestinian Territories between 1996 and 2006. Second, it quantifies how much of the change in the wage differential between men and women can be attributed to changes in the composition of employed labor relative to changes in rewards to workers' attributes. Third, it uncovers to which extent the gender-equalizing effect is driven by sector-workplace shifts that can be related to the Second Intifada and the Israeli border policies. And fourth, it identifies the sectors which secure the Palestinian workforce and also those which favor relative demand for female labor. With the identification of those sectors this work offers a key to develop policy measures which stabilize the Palestinian economy which has been shown to be extremely vulnerable to political distress in the past. It also pinpoints factors which favor womens' employment and should therefore be considered by any policy maker who wishes to enhance gender equality.

[5]The Oaxaca-Blinder decomposition can inform about differences in time if the groups are defined by the same group but at different time points. Then, however, differences between subgroups (e.g. male vs. female) can no longer be evaluated.

3 Impact of Conflict Involvement on Schooling in Iraq

3.1 Introduction

The Operation Iraqi Freedom brought the government of Saddam Hussein to a quick end and sparked a long-lasting civil war. Even though Iraq has seen three wars in only two decades, there has been little academic attention to the effect that those conflicts have on the Iraqi people.[1] In particular, empirical studies that assess the effect of the recent armed conflict in Iraq on schooling outcomes are rare and micro evidence is largely missing. At the same time, scholars have increasing concerns about the impact of the violence in Iraq on schooling decisions of housholds. Issa and Jamil (2010), Ranjan and Jain (2009) and de Santisteban (2005) report full participation in primary schooling before the Gulf War I and huge drops in schooling rates going along with increased child labor thereafter. They show aggregated educational outcomes that allow no causal inference.[2] This work therefore aims at closing this gap.

One might argue that the destructive effect of wars gives rise to bigger concerns than educational outcomes, such as mortality and health outcomes. However, when it comes to developing strategies to rebuild an economy, investment in human capital constitutes a facilitating factor (see Becker et al., 1990; Barro, 2001; Fleisher et al., 2010). The political interest in the aftermath of wars lies in fostering political stability. Berman et al. (2011) examine the provision of local public goods on counterinsurgency in Iraq. They find a violence-reducing effect of aid flows that establish public services. Following their results, the question is whether the education sector is one that has been damaged. If this is so, investments that build up the educational infrastructure will pay off in two ways: through a direct effect on education and through the growth-generating effect on human capital. Conflict involvement may affect child schooling in various ways. Parents possibly prescind from sending their children to school for security reasons. Destruction of infrastructure may lead to a rise in schooling costs. In addition, households in

[1] Guerrero-Serdán (2009) analyzes the effect of the recent war on child health outcomes. Berman et al. (2011) dedicate their work to the aftermath of the civil war. They address the question of whether financial aid is a successful tool to reduce insurgent violence.

[2] Schooling statistics are provided on a regular basis by the UNESCO and the Iraq Ministry of Education.

war economies are likely to face an aggrevated economic situation which increases the opportunity cost for child schooling. Two major concerns constitute the focus of this study: First, giving micro evidence on the impact of the Operation Iraqi Freedom and the following civil war on child educational outcomes. Second, the identification of channels through which armed conflict impacts schooling outcomes. Both are important when developing policy strategies to foster recovery from a war-ravaged economy with limited available resources. To the best of my knowledge this work is the first contribution which empirically assesses the effect of the recent violence in Iraq on schooling outcomes.

The body of literature that analyzes the impact of armed conflict on schooling outcomes in other countries is constantly growing and for the time being covers a variety of conflict-involved societies. The methodologies applied in those studies vary with the available data. Shemyakina (2011), Swee (2011) and Dabalen and Paul (2012) use difference-in-differences to estimate the effect of violent conflict on schooling outcomes. Dabalen and Paul (2012) find fewer years of schooling of conflict-involved individuals in Côte d'Ivoire. Shemyakina (2011) finds a reduced probability of mandatory schooling completion in Tajikistan for girls as a consequence of violent conflict. Rodríguez and Sánchez (2009) use an instrumental variable approach to assess the effect of violent conflict on school drop-out rates in Colombia.[3] Considering children aged between six and seventeen they find that violent conflict in Colombia increases school drop-out rates for the whole sample. Alva et al. (2002) investigate consequences of ethnic segmentation in the 1990s in Kosovo using an Oaxaca-type decomposition. They find a decreased secondary schooling for male Albanian Kosovars. This result parallels findings from Swee (2011) and Chen et al. (2008). Swee (2011) follows a difference-in-differences approach using micro data on Bosnia and Herzegovina. He finds no strong impact of conflict involvement on primary schooling but a strong reduction in secondary schooling. Similarily, Chen et al. (2008) observe a drop in secondary (but not primary) schooling outcomes using cross-country data. Contrarily, Miguel and Roland (2011) find no robust negative effect of the U.S. bombing in Vietnam on economic variables including the literacy rates. Akresh and de Walque (2008) indicate that this finding might be an artifact of the aggregated data. They show that while enrollment rates after the Rwandan genocide of 1994 are substantially higher, on the individual level there is a significant gap between children who were involved in the genocide and those who were not.[4]

[3] To account for a potential endogeneity of violence in a schooling equation they use lagged homicide capture rates in municipalities as IV. This is a disputable instrument if autocorrelation is high. See e.g. Berman et al. (2011) who find that violence in the past is the strongest predictor for current violence.

[4] Akresh and de Walque (2008) use an instrumental variable approach using distance to the Ugandan border as exogenous source of variation.

This study examines the impact of the Operation Iraqi Freedom and the following war on enrollment and schooling completion of children in mandatory schooling age. I use a cross-sectional micro survey to observe schooling outcomes of children across different cohorts. Additionally I use two external data sources that provide information on conflict intensities which are geo-matched to the household data at the district level. I apply a cohort difference-in-differences approach which exploits the variation in conflict-involvement on the one hand and observed differences in schooling across regions and cohorts on the other hand. A potential selection into violence in this field of research has been largely neglected in previous research. I address this limitation using pre-war ethnicity data as an exogenous predictor for conflict involvement. I find a strong reduction in school enrollment of conflict-involved six-year-old boys and girls. This finding is robust to the incorporation of the instrumental variable approach. I show that the effect of exposure to war on schooling outcomes is substantially underestimated relying on the exogeneity of the conflict measures. Protective behavior of the parents towards very young children appears to be a major reason for the reduced school enrollment at the beginning of mandatory schooling age.

The remainder of this paper is structured as follows: The empirical estimation strategy is outlined in Section 3.2. The data underlying the empirical work are presented in Section 3.3. Estimation results are shown in Section 3.4. Section 3.5 concludes.

3.2 Identification and Empirical Strategy

When assessing the effect of armed conflict the researcher ideally compares the outcomes of interest before and after the outbreak of violence. This comparison gives a good estimate of the impact of the conflict if the variables of interest do not change over time due to other conditions than the conflict itself. This work is concerned with the effect of the 2003 invasion and the following armed conflict in Iraq on the allocation of child schooling. Using cross-sectional data collected in 2006 and 2007, I compare mandatory schooling outcomes across birth cohorts. The identifying assumption for exploiting the variation in accumulated schooling is that outcomes of birth cohorts whose schooling was affected by war would follow the same trend as outcomes of earlier birth cohorts who could complete their primary schooling in peacetime.

3.2.1 Identification Strategy on Exogenous Variation

The identification strategy uses the legal characteristics of the educational system in Iraq. The Compulsory Education Law passed in 1976 regulates six years of free

mandatory schooling which take place between the age of six and twelve.[5] Two types of schooling outcomes are analyzed in this work: enrollment and completed mandatory schooling. Sample A is restricted to children who should have been enrolled by 2006, i.e. children aged six or older. Variation from that norm as regulated by law therefore reveals delayed schooling. Sample B in contrast contains teenagers who should have completed their compulsory schooling by 2006, i.e. they are at least thirteen years old. Thus, a common characteristic underlying both samples is that the schooling variables of interest should be constant over cohorts. Variation in enrollment and schooling completion between pre-war and war cohorts thus allows us to draw conclusions about shocks that prevented children from attending classes and obtaining their primary degree. At the same time, attention has to be paid to the fact that Iraq has seen various wars over the last three decades. As the purpose of this study is to analyze the impact of the 2003 invasion and the following war, birth cohorts whose mandatory schooling could have been affected by former wars do not serve as a control group and thus will be excluded from the sample. Figure 3.1 provides an overview of violent conflicts in Iraq over the last three decades which need to be considered in the sample construction.

Figure 3.1: Iraqi Conflicts, 1980 - 2006

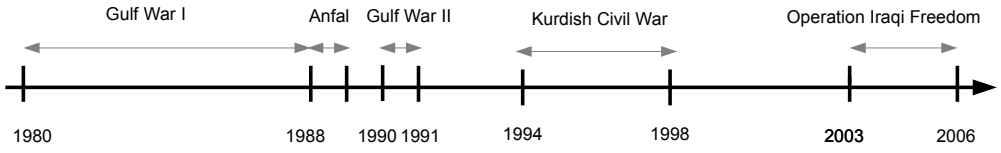


Table 3.1 presents the composition of the samples used to identify cross-cohort effects on schooling outcomes in this analysis. The samples are defined such that various conditions are met. The samples are restricted to observations of boys and girls, whose cohort characteristics of schooling are observed before or after the 2003 invasion, and are not polluted by the other conflicts that the country has gone through. Sample A concentrates on school enrollment. The pre-war cohort contains children born between 1993 and 1996.[6] This ensures that 1) the child entered mandatory schooling age only after Gulf War II, 2) the child was at least seven years old before the start of Operation Iraqi Freedom. The war cohort in

[5]Several schooling laws were passed in the 1970s by the Ba'athist regime that enhanced gender equality and promulgated free education at all levels. Schooling was made compulsory at the primary level only. See e.g. de Santisteban (2005) and Issa and Jamil (2010).

[6]Since children born in 1996 and 1997 could belong to either group, those birth cohorts are excluded from the analysis to avoid contamination.

contrast contains all observations of children aged six in 2004 and 2005.[7] Excluding the Kurdistan region from the sample I can extend the pre-war birth cohorts till 1986. I do so to keep the sample clean from effects exerted by the Kurdish Civil War.

Table 3.1: Identification in Different Samples

	Sample A Enrollment at Primary Schooling Age		Sample B Completed Mandatory Schooling beyond Primary Schooling Age	
	pre-war	war	pre-war	war
Cohort	1993 -1995	1998 - 1999	1986 - 1989	1992-1993
Area	All Iraqi Regions		Iraqi Regions w/o Kurdistan	
Cohort	1986 -1995	1998 - 1999		
Area	Iraqi Regions w/o Kurdistan			

Sample B defines all children born between 1986 and 1989 to belong to the pre-war cohort. This ensures that 1) those children are at least thirteen years old by the start of the 2003 Operation (i.e. should have completed mandatory schooling), 2) they did all their mandatory schooling (aged six to twelve) during peacetime[8] and 3) children of this group were covered by the same compulsory education law as children whose schooling fell into the war period. Similarly, all children born between 1992 and 1993 belong to the war cohort. Those children have experienced at least one year of mandatory schooling during the period of interest and are at least 13 years old when the interview takes place. Note that the Kurdistan region is excluded if the completion of mandatory schooling is examined. As shown in Figure 3.3 in the Appendix, the schooling outcomes of earlier birth cohorts are influenced by the Kurdish Civil War.[9] The Kurdistan region is therefore missing a proper pre-war cohort and cannot be included in the difference-in-differences analysis.

Legal educational regulations thus give rise to the possibility of assessing the effect of the Operation Iraqi Freedom and the ongoing civil unrest in the spirit of a

[7] Children aged six in 2006 are excluded since they could either be interviewed before enrollment or - if born later that year - belong to the enrollment of 2007.

[8] Figure 3.1 shows the history of wars over the last three decades that need to be considered when defining the cohorts of children that attended primary school in peacetime only. Schooling of children born before 1986 could have been affected by the previous wars.

[9] De facto independence of the Kurdistan region after Gulf War II led to fights between the Patriotic Union of Kurdistan (PUK) and the Kurdistan Democratic Party (KDP) from 1994 to 1998.

natural experiment. The estimation equation is specified as follows:[10]

$$S_{ijk} = \alpha + \beta(Conf_j * W_k) + Z'_{ijk}\zeta + \delta_k + \mu_j + \epsilon_{ijk} \tag{3.1}$$

where S_{ijk} is the schooling outcome variable (enrollment or completed mandatory schooling), μ_j are regional fixed effects at the strata level[11], δ_k are cohort fixed effects, $Conf_j$ is the 'conflict measure' described in detail in Section 3.3, and W_k is a dummy indicating whether the schooling of a child born into cohort k was exposed to conflict activity. The parameter of interest which estimates the effect of conflict involvement on schooling outcomes is thus β. The baseline model estimates the interaction effect of war and war cohort using regional and cohort fixed effects. The set of control variables that complement the baseline model comprises: mother's age and its square, a dummy for being Kurdish, years of schooling of the mother and the household head, dummy variables indicating whether the child has younger siblings and an older brother and pre-war district level income.

3.2.2 Endogenous Conflict Involvement

While Equation 3.1 intends to mitigate an omitted-variable bias with a strong set of controls and by including regional fixed effects it disregards a potential endogeneity of the variable of interest. It is likely that a selection into violence works along individual characteristics. Those include the unobserved ability to migrate and ethnic membership. I therefore use an instrumental variable approach that uses pre-war district-level ethnicity data as an exogenous source of variation.[12] The identifying assumption underlying this estimation strategy is that the change in schooling outcomes over cohorts are equal across ethnic groups in the absence of war. More precisely, I predict the interaction of the war cohort and district-level conflict intensities with interactions of war cohort and dummies for Kurdish dominated, Sunni dominated and mixed regions.[13] The first-stage regression is

[10] Similar models were used in earlier work. Shemyakina (2011) applied a baseline model without controls to assess the effect of Tajik armed conflict on child schooling. Swee (2011) checks robustness across five specifications with a fully augmented model including all controls specified in Equation 3.1. These models were heavily influenced by earlier application of cross-sectional difference-in-differences models by Esther Duflo in different research settings (see Duflo, 2001, 2003).

[11] There is a total of 54 strata. Each of the 18 governorates is divided into 3 strata (urban, metropolitan and rural) plus two additional metropolitan areas in Baghdad.

[12] Ethnic population data come from the Empirical Studies of Conflict (ESOC) ethnicity data set. Following Berman et al. (2011) I use indicators for dominant ethnicities if the share of that ethnic group is bigger than 2/3.

[13] Regions dominated by Shia are the reference category. Berman et al. (2011) find Sunni and mixed areas to be most conflict-intense.

thus described by the following equation:

$$\begin{aligned} Conf_j * W_k &= \alpha + \beta_1(K_j * W_k) + \beta_2(S_j * W_k) + \beta_3(M_j * W_k) \\ &\quad + Z'_{ijk}\zeta + \delta_k + \mu_j + v_{ijk} \end{aligned} \tag{3.2}$$

where K_j, S_j and M_j indicate Kurdish, Sunni-dominated or mixed regions, respectively. The other variables have been specified in Equation 3.1 which in this estimation strategy represents the second stage using the prediction of the dependent variable of Equation 3.2. On the one hand, ethnic composition is a powerful predictor for violence (see Berman et al., 2011; Swee, 2011). On the other hand, the interaction of pre-war ethnic composition and war cohort should be uncorrelated with unobserved individual characteristics in the schooling equation. One might suspect that ethnic membership may affect child schooling outcome even in the absence of war. I therefore test for ethnic fixed effects in the schooling equation. The estimates of the ethnicity dummies, however, turn out to be insignificant. This suggests that there seems to be no other effect of ethnic membership on schooling than the one through conflict involvement. This result was expected as the 1976 schooling reform set up an egalitarian system for children in mandatory schooling age.

3.3 Data, Definitions and Descriptives

I use several data sources to combine information on geographical variation of conflict involvement on the one hand and schooling outcomes of Iraqi children and their socio-economic background on the other hand. The dependent variables measuring child schooling outcomes and the individual controls such as age, family background and geographical position are derived from the Iraq Household Socio-Economic Survey 2006-2007 (IHSES 2007).[14] The IHSES 2007 furthermore contains questions about the households' living situation in terms of conflict involvement.

I supplement the household information with macro data on conflict intensities from two different sources. Fatality rates at the district level are calculated based on leaked military documents which were published on WikiLeaks in October 2010.[15] These data contain aggregated casualties as reported by Iraqi and U.S. military forces between 2004 and 2009. Attacks against coalition forces at the district level originate from Berman et al. (2011).[16] Insurgent attacks are reported on a quarterly

[14]The IHSES 2007 is freely available through the World Bank's Microdata Catalogue. The survey was established with the goal to develop policies for poverty reduction and contains broad information on economic activities of households, consumption behavior, health outcomes and living standards.

[15]The Guardian datablog provides tables with casualty data elaborated from the Iraq War Logs.

[16]Berman et al. (2011) work with the Iraq War Data Set compiled within the ESOC (esoc.princeton.edu).

basis. I use population-weighted accumulated attacks between 2004 and the first half of 2007.

3.3.1 Measuring Child Schooling

Schooling outcome of Iraqi children is measured in terms of enrollment at the age of six as well as in terms of completion of compulsory schooling beyond mandatory schooling age. Both variables are binary measures. The enrollment variable takes on the value one if the observed child was enrolled at the age of six.[17] This indicator allows us to deduct information from younger cohorts whose schooling is still taking place during the period of data collection and hence can easily be connected to the constructed conflict measures. However, enrollment is not a conclusive measure of successful educational attainment, but may just indicate delayed schooling. Completed mandatory schooling can only be evaluated on earlier birth cohorts and ultimately give information about schooling success. A drawback of working with early birth cohorts linked to the conflict measures is a potential increase in measurement error. Two variables for completed mandatory schooling are generated: CMS1 is a dummy variable that takes the value 1 if the child has completed six years of mandatory schooling. CMS2 measures whether a child earned a primary degree. Both variables are created only for children who passed the mandatory schooling age.

Table 3.2: Schooling Outcomes across Cohort Groups by Gender

	BOYS			GIRLS		
	pre-war	war	difference	pre-war	war	difference
enrol (whole)	0.9094	0.9346	0.0251	0.9177	0.9235	0.0058
enrol (no Kurd)	0.9145	0.9308	0.0163	0.9253	0.9178	-0.0074
CMS1	0.7521	0.7830	0.0308	0.6307	0.6549	0.0242
CMS2	0.6979	0.5540	-0.1439	0.6001	0.5439	-0.0563

The means of all outcome variables are shown for pre-war and war cohorts in Table 3.2. Several facts are worth mentioning. First, all numbers are significantly different from 1. This means that the Compulsory Schooling Law is not strictly enforced. This is true even prior to the beginning of the Operation Iraqi Freedom. Second, while enrollment rates are similar for boys and girls, completion rates of primary schooling differ substantially across gender. While 75 percent of boys

[17] Enrollment at the age of six was analyzed on two subsamples, one of which includes and the other excludes the Kurdistan region in the north of Iraq. Details are explained in Section 3.2.

belonging to the pre-war cohort reached six years of education, only 63 percent of girls complete the same amount of schooling years. Third, the share of children who complete six years of schooling increases for children belonging to the war cohort. Fourth, the share of children actually obtaining their primary degree is substantially smaller than the share of children accumulating the compulsory six years of schooling. This fact is observed for both sexes and across all cohorts. And fifth, the share of male and female children who reach post-mandatory schooling age without a primary degree is significantly higher for birth cohorts whose mandatory schooling falls into the conflict period. Whereas boys belonging to the war cohorts are 14.4 percent less likely to obtain a primary degree than their older counterparts, the share of girls who conclude their primary education sucessfully only declines by 5.6 percent.

3.3.2 Measuring Conflict Involvement

Any study assessing the impact of war on socio-economic variables depends largely on the measure of conflict it uses. Various concepts to measure exposure to war or involvement in conflict are possible, such as generated casualties, destruction of housing or exposure to violence such as kidnapping, life threat and murder.[18] Of course, the accuracy of the measure crucially impacts the precision of any following estimation. Errors in variables are likely to bias estimates in this type of study. In the awareness of a potential measurement problem, this study uses eight different measures of conflict. Two macro measures provide information on the variation of the conflict intensity across regions. Six micro measures are constructed drawing on information provided in the IHSES 2007. These measures check channels through which households' schooling decisions might be affected and tests the sensitivity to changes in definition. Table 3.3 summarizes the conflict measures applied in this work.

Two macro measures capture the variation of conflict intensity across Iraqi districts. The first measure contains a population-weighted aggregate of casualties (see Figure 3.2 in the Appendix). These data stem from the Iraq War Logs and aggregate the deaths reported by US and Iraqi military forces between 2003 and 2009.[19] The second measure uses the number of recorded attacks. These data originate from Berman et al. (2011). In this work I use population-weighted aggregates of attacks launched between 2004 and the first half of 2007. Both macro variables are not

[18] Brück et al. (2010) discuss different concepts of measuring violent conflict and strategies of identifying the impact of violence on socio-economic outcomes.

[19] The laborated data express time-aggregated entries. This means that I proxy the intensity of war in 2006/2007 by regional data counting deaths from 2003 and 2009. This works well only if places of conflict do not change over time. Matching the Iraq War Logs statistics to the ISHES 2007 on the governorates level is complete, on the district level only 12 out of 100 districts could not be matched.

Table 3.3: Summary Statistics of Conflict Measures

Variable	Obs	Mean	Std. Dev.	Min	Max
Macro measures:					
deaths	79163	1.46	2.05	0	26.08
attacks	106077	10.98	24.21	0	169.21
Micro measures:					
harm_psu	127298	0.15	0.35	0	1
harm	127298	0.07	0.26	0	1
secr1_psu	127298	0.28	0.45	0	1
sec_risk1	127298	0.21	0.41	0	1
secr2_psu	127298	0.46	0.50	0	1
sec_risk2	127298	0.36	0.48	0	1

normally distributed. In order to capture the sensitivity of schooling response along different conflict intensities I generate dummy variables that cut off the conflict intensities at the 25th and 75th percentiles. This means I construct four dummy variables: 1) the rate of district casualties is higher than the 25 lowest percent $deaths > p(25)$, 2) the rate of the district casualties falls into the upper 25 percent $deaths > p(75)$, and 3) and 4) using rate of attacks rather than fatalities with $attacks > p(25)$ and $attacks > p(75)$, respectively.

The micro measures are informative about channels through which conflict involvement impacts schooling decisions. The first measure uses information on whether at least one household member experienced some harm in the form of kidnapping or violence due to the abnormal situation.[20] The dummy variable *harm* switches to 1 if the household answers positively. An alternative approach uses household statements about their security risk on a four-unit scale.[21] The variable *security risk 1* is a dummy that takes on the value 1 if the household reported to be largely affected by security risks. *security risk 2* uses the same information but sets the dummy variable to 1 if the household reports to be largely

[20] The relevant question is in Section 18 (risk). "Has any household member been adversely affected by [...] the last twelve months?" checks among other things for "Violence due to usual circumstances in Iraq" and "Kidnapping, threating to death, pertaining due to usual circumstances in Iraq". Individuals simply answer with "Yes" or "No".

[21] The respective question is found in Section 3 (housing, E): "Is your household affected by security risk?" Answers are given as 1 "Largely affected", 2 "Little affected", 3 "Very little affected" and 4 "Not at all affected".

or little affected. The two measures together therefore inform about sensitivity to security risks. Finally, three additional micro measures are constructed by aggregation of the aforementioned variables *harm, security risk 1 and security risk 2* at the primary sampling unit level.[22] The idea behind the aggregation is that neighboring households, even though not directly affected are located in dangerous areas.

How macro and micro measures correlate at the district level is shown in Table 3.9 in the Appendix. Note that the correlation between fatalities and insurgent attacks is low and insignificant, probably due to the different length in the aggregation period. However, both macro measures are significantly correlated with the household responses on conflict intensity. Between both macro measures, the district-level fatalities show much stronger correlations with the experience of harm or security risk than counted district-level insurgent attacks.

3.4 Estimation Results

This Section presents the estimation results following the empirical strategy outlined in Section 3.2. I estimated the impact of conflict involvement on schooling outcomes of Iraqi children of mandatory schooling age after the 2003 invasion and the following civil war. I first present the impact of conflict involvement on enrollment at the age of six followed by estimates on completed mandatory schooling. I also address the problem of a possible endogenous treatment. Later in this Section I examine some possible channels through which households' schooling decisions are influenced. Bertrand et al. (2004) pointed out that statistical inference using difference-in-differences models is vulnerable to serial correlation that possibly produces a downward bias in the standard errors. I therefore apply standard errors clustered at the strata level to all estimates presented in the following Tables.[23] The following Tables present only the coefficient of interest. This is the treatment effect calculated as the interaction of the conflict measure (reported in the beginning of the rows) and the dummy indicating whether a child's mandatory schooling fell into a period affected by the conflict. In the following Tables columns (1) and (4) display estimates of the raw difference-in-differences model. Columns (2) and (5) include controls.[24] The estimates from the instrumental variables approach are presented in columns (3) and (6).

[22] The variable *harm_psu*, for example, is a dummy taking up the value one if at least one individual in the primary sampling unit has experienced harm. This idea is adopted from Shemyakina (2011).

[23] Block bootstrapped standard errors (not presented here) yield similar results.

[24] Population-weighted income in 2002 is used as district level control. Individual controls used are education of the household head, mother's education, mother's age and its square, having an older brother and having a younger sibling. (The gender-specific birth order seems to play a role in households' schooling decisions as elder brothers add more explanatory power to the estimation than elder siblings.)

3.4.1 The Impact of Conflict Involvement on School Enrollment

Each cell in Table 3.4 presents estimates from OLS and 2SLS regressions of the coefficient of interest, the interaction of belonging to the affected cohort and living in a high conflict region. I estimate the effect of conflict on school enrollment using two subsamples: A shorter one that includes Kurdistan and a longer one that excludes the Kurdistan region. I estimate the latter version as a robustness check of the first one. Both samples are restricted such that observed child outcomes are not influenced by other wars than the one of interest in this work.[25] Raw difference-in-differences reported in column (1) for boys and in column (4) for girls show no detrimental effect. Controlling for individual and district-level characteristics in columns (2) and (5), the estimates decrease indicating a negative effect of conflict intensity on school enrollment which is stronger for girls. 2SLS estimates in column (3) show a clear negative effect of conflict involvement on early-age school enrollment for boys. This effect is more pronounced in the sample that excludes Kurdistan. For girls, a similar detrimental effect of conflict activity on enrollment is found in column (6). The first-stage estimates of pre-war district-level ethnic variables on conflict intensities are presented in Table 3.10 in the Appendix. The ethnic composition of districts is shown to be a powerful predictor for all conflict intensities. Kurdish-dominated districts are less likely to experience intense conflict. Sunni-dominated districts and mixed districts record increased probabilities of conflict. This parallels findings of Berman et al. (2011). Figure 3.4 in the Appendix checks whether the parallel trend assumption is fulfilled. I plotted the predictions of school enrollment at the age of six controlling for individual and district-level characteristics, cohort and regional fixed effects. The pre-war plots of the high-conflict and low-conflict groups indeed seem to follow a similar pattern.

Table 3.5 uses district-level population-weighted fatalities instead of attacks as a measure of conflict intensity. Similar to the estimation outcome presented in Table 3.4, the OLS results for boys show no detrimental effect of high-conflict activity on early school enrollment. The OLS results for girls are more pronounced. Girls' enrollment seems to be more sensitive in the lower quartile of the conflict-intensity distribution whereas boys' schooling reacts stronger to the upper quartile of the conflict distribution. Using pre-war ethnic composition at the district level as an instrument for conflict involvement, the estimates are very similar to the ones presented in Table 3.4. Again, the 2SLS estimates reported in columns (3) and (6) are essentially lower than the OLS estimates and confirm a strong reduction in enrollment rates. Household responses to conflict are now higher if the household is located in one of the 25 percent most conflict-intense areas for boys and girls.

[25] For details see Section 3.2.

Table 3.4: The Impact of Attacks on the Enrollment at the Age of Six

War cohort interacted with	BOYS (1) OLS	BOYS (2) OLS	BOYS (3) 2SLS	GIRLS (4) OLS	GIRLS (5) OLS	GIRLS (6) 2SLS
			All Regions			
attacks >(p25)	0.0119	0.00748	-0.0190	-0.00570	-0.0232	-0.0865**
	(0.0157)	(0.0171)	(0.0327)	(0.0157)	(0.0177)	(0.0346)
	[0.049]	[0.058]	[0.058]	[0.047]	[0.068]	[0.064]
attacks > (p75)	-0.0118	-0.0166	-0.0447	0.0111	-0.0194	-0.0904**
	(0.0134)	(0.0147)	(0.0287)	(0.0147)	(0.0165)	(0.0438)
	[0.049]	[0.058]	[0.058]	[0.047]	[0.068]	[0.065]
			Regions excluding Kurdistan			
attacks > (p25)	0.00589	0.000159	-0.144*	-0.0196	-0.0293	-0.0734
	(0.0215)	(0.0212)	(0.0791)	(0.0228)	(0.0218)	(0.0827)
	[0.084]	[0.094]	[0.084]	[0.075]	[0.094]	[0.093]
attacks > (p75)	-0.0280	-0.0290	-0.0571*	-0.00543	-0.0164	-0.0377
	(0.0170)	(0.0182)	(0.0310)	(0.0167)	(0.0173)	(0.0306)
	[0.084]	[0.095]	[0.094]	[0.075]	[0.094]	[0.094]

Note: Standard errors clustered at strata level in parentheses. Adjusted R-squared in square brackets. Regional and cohort fixed effects included. Controls included in columns (2), (3), (5) and (6).
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3.5: The Impact of Fatalities on the Enrollment at the Age of Six

War cohort interacted with	BOYS (1) OLS	BOYS (2) OLS	BOYS (3) 2SLS	GIRLS (4) OLS	GIRLS (5) OLS	GIRLS (6) 2SLS
			All Regions			
deaths > (p25)	0.00682	0.00686	-0.0105	-0.0312	-0.0493**	-0.0699**
	(0.0153)	(0.0191)	(0.0322)	(0.0190)	(0.0222)	(0.0301)
	[0.049]	[0.058]	[0.058]	[0.048]	[0.070]	[0.069]
deaths > (p75)	-0.000852	-0.000806	-0.0537	-0.0112	-0.0177	-0.123***
	(0.0137)	(0.0153)	(0.0418)	(0.0180)	(0.0211)	(0.0383)
	[0.049]	[0.058]	[0.055]	[0.047]	[0.068]	[0.057]
			Regions excluding Kurdistan			
deaths > (p25)	-0.00312	-0.00298	-0.0624	-0.0275	-0.0383	-0.0705***
	(0.0308)	(0.0318)	(0.119)	(0.0493)	(0.0512)	(0.0270)
	[0.084]	[0.094]	[0.094]	[0.075]	[0.094]	[0.094]
deaths > (p75)	-0.0262	-0.0279	-0.0907	-0.00898	-0.00924	-0.0936**
	(0.0178)	(0.0183)	(0.0586)	(0.0185)	(0.0206)	(0.0410)
	[0.084]	[0.095]	[0.092]	[0.075]	[0.094]	[0.089]

Note: Standard errors clustered at strata level in parentheses. Adjusted R-squared in square brackets. Regional and cohort fixed effects included. Controls included in columns (2), (3), (5) and (6).

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

To findings on the effect of conflict involvement using both district-level attacks and fatalities as a proxy for conflict intensity can be summarized as follows: Girls' enrollment rates respond stronger to high-conflict activity than boys'. The OLS estimates seem to underestimate the impact of war on schooling outcomes. They indicate no effect for boys and an about two percent reduction in early school enrollment for girls. The 2SLS estimates which account for a potential endogeneity in the conflict measures give rise to a six to twelve percent decrease in school enrollment for conflict-involved girls if conflict intensity is proxied by fatalities, and a four to nine percent decline if insurgent attacks are used as conflict measure. The detrimental effect on boys is measured less precisely. Controlling for endogeneity the estimates indicate a reduction in boys' school enrollment that ranges between one and nine percent if fatalities measure the conflict activity. The range of the negative impact of war on enrollment is even higher when attacks are used to measure conflict intensity. These estimates indicate a high sensitivity to both, to conflict intensity (which is determined by different cut-off points in the distribution of the war measures) and to the applied war proxy. Regardless of the sensitivity of the point estimates, a detrimental effect of conflict involvement on school enrollment of boys has been shown along all definitional modifications for both sexes.

3.4.2 The Impact of Conflict Involvement on Completion of Mandatory Schooling

The results in Table 3.6 present estimated effects of conflict involvement measured by district-level attacks on the completion of mandatory schooling. Successful completion of mandatory schooling is measured in two ways. The upper panel reports estimates on six completed schooling years. The lower panel reports results on the attainment of a primary degree. Negative effects are found only on the amount of years that boys spent at school. Surprisingly, the estimated effects on the attainment of a primary degree turn out to be positive for boys and girls. Relying on ethnic composition as a predictor for conflict, these positive effects become very strong, particularly for boys. These results are confirmed by Table 3.7 which presents estimates calculated on district-level fatalities as measure of conflict involvement. Mandatory schooling years of boys are reduced due to the Operation Iraqi Freedom and the following war. However, there is no evidence of decreased probabilities to achieve a primary degree on the basis of regional variation in conflict intensities. Primary schooling of cohorts that were beyond primary schooling age in 2003, thus are shown to be affected only in schooling years. This raises concerns about the quality of schooling. It remains an open question, however, if younger cohorts, that could be analyzed in data provided for later years than 2006, are still shown to be unaffected in their attainment of a primary degree as the war goes on. Furthermore, a general decrease in the probabilities to achieve a primary degree

is shown in Figure 3.6 in the Appendix. As mentioned earlier, this decrease in completed compulsory schooling is independent of conflict intensities. This hints to economic reasons for a reduced completion of mandatory schooling. Ranjan and Jain (2009), de Santisteban (2005) and Issa and Jamil (2010) point out that mandatory schooling was successfully enforced before Gulf War I. Thereafter the Iraqi economy suffered from the following wars and enhanced sanctions and never recovered to the pre-Gulf War I level. If indeed economic conditions determine the completion rather than violence-related concerns, this effect goes unmeasured by the conflict proxies applied in this work. The identifying assumption would then fail. Figures 3.5 and 3.6 in the Appendix check the identifying assumption of the cohort difference-in-differences approach with completed mandatory schooling as outcome variable. This time, most plots indicate a violation of the parallel trend assumption. A common trend can be assumed for girls coding the upper quartile of the conflict intensity distributions to one.[26]

[26]See panels (b) and (f) in both Figures.

Table 3.6: Impact of Attacks on the Completion of Mandatory Schooling

War cohort interacted with	BOYS (1) OLS	BOYS (2) OLS	BOYS (3) 2SLS	GIRLS (4) OLS	GIRLS (5) OLS	GIRLS (6) 2SLS
	Completion of Mandatory Schooling (Six Years)					
attacks > (p25)	-0.0393	-0.0428	-0.0585	0.00854	0.0238	-0.189*
	(0.0322)	(0.0311)	(0.160)	(0.0369)	(0.0370)	(0.112)
	[0.078]	[0.166]	[0.166]	[0.171]	[0.286]	[0.274]
attacks > (p75)	-0.0356	-0.0487*	-0.0160	-0.0145	0.0143	0.0204
	(0.0233)	(0.0266)	(0.0756)	(0.0243)	(0.0249)	(0.0800)
	[0.078]	[0.166]	[0.166]	[0.171]	[0.286]	[0.286]
	Completion of Mandatory Schooling (Primary Degree)					
attacks > (p25)	-0.0170	-0.0192	0.459**	0.000893	0.0100	0.0502
	(0.0247)	(0.0264)	(0.222)	(0.0294)	(0.0299)	(0.162)
	[0.110]	[0.222]	[0.170]	[0.172]	[0.308]	[0.308]
attacks > (p75)	0.0299	0.0248	0.222*	-0.00312	0.0334	0.0819
	(0.0215)	(0.0278)	(0.113)	(0.0247)	(0.0305)	(0.101)
	[0.111]	[0.222]	[0.213]	[0.172]	[0.308]	[0.308]

Note: Standard errors clustered at strata level in parentheses. Adjusted R-squared in square brackets. Regional and cohort fixed effects included. Controls included in columns (2), (3), (5) and (6).
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3.7: The Impact of Fatalities on the Completion of Mandatory Schooling

War cohort interacted with	BOYS (1) OLS	BOYS (2) OLS	BOYS (3) 2SLS	GIRLS (4) OLS	GIRLS (5) OLS	GIRLS (6) 2SLS
	Completion of Mandatory Schooling (Six Years)					
deaths > (p25)	-0.0105	-0.0230	-0.0198	0.0456	0.0186	0.164
	(0.0384)	(0.0332)	(0.0684)	(0.0503)	(0.0463)	(0.130)
	[0.077]	[0.166]	[0.166]	[0.171]	[0.286]	[0.283]
deaths > (p75)	-0.0403*	-0.0434*	-0.0688	-0.00806	0.00984	-0.0822
	(0.0222)	(0.0232)	(0.104)	(0.0265)	(0.0244)	(0.0658)
	[0.077]	[0.166]	[0.166]	[0.171]	[0.286]	[0.283]
	Completion of Mandatory Schooling (Primary Degree)					
deaths > (p25)	0.0226	0.00769	0.0340	-0.0182	-0.0435	0.0588
	(0.0552)	(0.0555)	(0.169)	(0.0395)	(0.0316)	(0.0904)
	[0.107]	[0.222]	[0.220]	[0.172]	[0.308]	[0.307]
deaths > (p75)	0.0166	-0.00317	0.222	-0.0108	0.00289	-0.0177
	(0.0254)	(0.0274)	(0.155)	(0.0282)	(0.0296)	(0.0889)
	[0.110]	[0.222]	[0.207]	[0.171]	[0.308]	[0.308]

Note: Standard errors clustered at strata level in parentheses. Adjusted R-squared in square brackets. Regional and cohort fixed effects included. Controls included in columns (2), (3), (5) and (6).

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

3.4.3 Identification of Channels

Schooling outcomes in war regions might be influenced by several factors. Infrastructure and schooling facilities might be destroyed. Parents could hold back their children from going to school for security reasons. Domestic household tasks as well as market labor might shift over to children when households face a tightened economic budget. In this section I analyze possible channels that affect household decisions on school enrollment at the age of six. Since I am restricted by the availability of survey information I can check for violence related items only. Tables 3.8 and 3.11 present estimates of the interaction of children belonging to the affected cohort and household indicators that inform about whether the household has experienced harm during the last 12 months due to the abnormal situation or whether the household is located in an area with an augmented security risk. Table 3.8 uses the shorter sample including all Iraqi regions. Table 3.11 in the Appendix serves as a robustness check to these results. It excludes the Kurdistan region but extends the sample over earlier birth cohorts. In both Tables, specifications control for regional and cohort fixed effects as well as for individual and district-level characteristics. All estimates attest a negative effect of experienced harm in the household or the neighborhood on schooling outcomes. Relying on the 2SLS estimates which control for non-random conflict involvement I estimate a decrease in enrollment for girls by 14.2 percent and 10.4 percent decrease for boys if harm has been experienced in the neighborhood. If the household itself suffered from any kind of conflict-related harm the detrimental effect rises to 28.8 percent for boys and 27.6 percent for girls. Also security risk reduces the probability of enrollment at the age of six for girls over all specifications. Note that columns (1) and (2) display non-negative effects for boys. However, this effect turns negative when applying the instrumental variables approach. In all estimations the 2SLS estimates are substantially smaller than the OLS estimates. This suggests the presence of a positive correlation of some unobservable component and the conflict variables. The OLS estimates therefore largely underestimate the detrimental effect of an aggrevated security situation on school enrollment. The reported effects for security risk at the household level and the neighborhood are more similar than the effects of harm suffered by both entities. This makes sense, since security risk perceptions are likely to be highly correlated amoung neighboring households. How families assess security risk is more influential to girls' schooling than to boys'. Living in risky areas (*security risk 2*) reduces school enrollment of females by 15 percent, living in very risky areas (*security risk 1*) even by 20 percent. Boys' school enrollment responds with a decrease of approximately five or nine percent, respectively. Note that the estimates reported in Table 3.11 show similar results. However, the effects are even stronger if the Kurdistan region is excluded from the sample yielding more comparable households.

Table 3.8: Channels of Conflict on School Enrollment at the Age of Six

War cohort interacted with	BOYS (1) OLS	BOYS (2) OLS	BOYS (3) 2SLS	GIRLS (4) OLS	GIRLS (5) OLS	GIRLS (6) 2SLS
harm (PSU)	-0.0264	-0.0206	-0.104	-0.0601***	-0.0692***	-0.142*
	(0.0172)	(0.0204)	(0.0831)	(0.0211)	(0.0248)	(0.0796)
	[0.049]	[0.059]	[0.054]	[0.050]	[0.071]	[0.068]
harm	-0.0182	-0.0266	-0.288	-0.0759**	-0.0765*	-0.276
	(0.0162)	(0.0195)	(0.237)	(0.0369)	(0.0398)	(0.174)
	[0.049]	[0.058]	[0.042]	[0.049]	[0.069]	[0.060]
sec risk 1 (PSU)	0.0165	0.0207	-0.0818	-0.0304*	-0.0269	-0.200**
	(0.0128)	(0.0149)	(0.0671)	(0.0178)	(0.0227)	(0.0794)
	[0.049]	[0.059]	[0.050]	[0.048]	[0.068]	[0.043]
sec risk 1	0.00974	0.00669	-0.107	-0.0227	-0.0200	-0.207**
	(0.0124)	(0.0138)	(0.0818)	(0.0153)	(0.0183)	(0.0810)
	[0.049]	[0.058]	[0.050]	[0.048]	[0.068]	[0.045]
sec risk 2 (PSU)	0.0239	0.0341**	-0.0446	-0.0201	-0.0138	-0.146**
	(0.0143)	(0.0157)	(0.0520)	(0.0157)	(0.0186)	(0.0618)
	[0.049]	[0.060]	[0.052]	[0.048]	[0.068]	[0.046]
sec risk 2	0.0113	0.0192	-0.0624	-0.0213	-0.0202	-0.154***
	(0.0136)	(0.0155)	(0.0567)	(0.0143)	(0.0169)	(0.0590)
	[0.049]	[0.059]	[0.052]	[0.048]	[0.068]	[0.049]

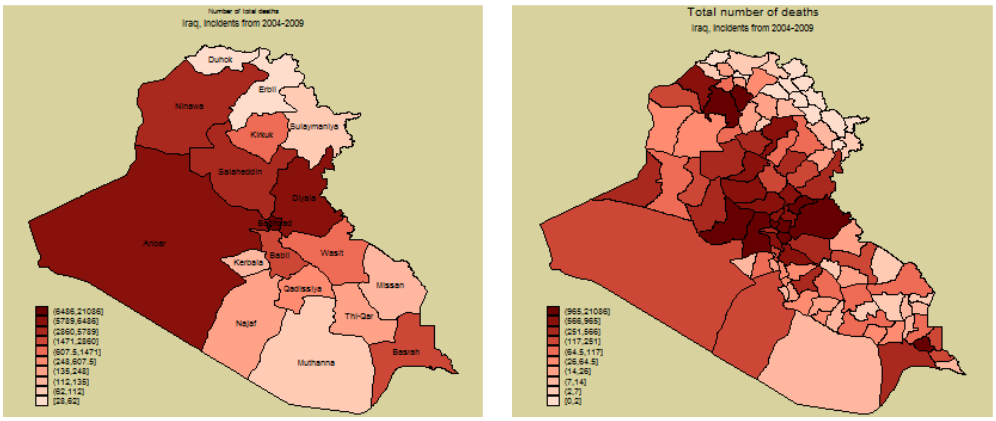
Note: Standard errors clustered at strata level in parentheses. Adjusted R-squared in square brackets. Regional and cohort fixed effects included. Controls included in columns (2), (3), (5) and (6). Sample includes all Iraqi Regions. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

3.5 Conclusions

This paper provides an analysis of the impact of the Operation Iraqi Freedom and the following civil war on schooling outcomes of Iraqi children of mandatory schooling age. I find strong evidence for reduced school enrollment of six-year-olds for boys and girls. This finding is robust to the incorporation of an instrumental variables approach that takes into account a potential correlation of unobserved characteristics and the conflict variables applied in this work. Depending on the intensity of the conflict enrollment of girls is reduced by six to twelve percent. The detrimental effect measured for boys ranges between one and nine percent. I find a substantial upward bias of the OLS estimates assessing the effect of war on schooling. Relying on the exogeneity of conflict involvement as seen in earlier work, therefore substantially underestimates the effect of war on schooling outcomes. Protective behavior of parents towards very young children seems to be a major factor in reducing enrollment at the beginning of mandatory schooling age. Households who have suffered harm during the conflict or who live in high-security risk areas are less likely to send their children to school. On the other hand, I find no evidence of reduced mandatory schooling completion that can be explained by district-level variation in conflict intensities. Instead I find decreased probabilities to accomplish the mandatory primary degree for war cohorts independent of conflict intensities. This could be a result of the deterioration of the Iraqi economy in which the maintenance of the educational infrastructure meets budgetary limits not only in highly violent regions. This could imply an increase in the cost of schooling - an effect which goes largely unmeasured by conflict proxies capturing only variation in violence. As due to data limitations this point could not be investigated in this work further research should include other dimensions of conflict that take into account the destruction of infrastructure and variation in regional budget constraints. If it is true that the deterioration of the Iraqi economy as a whole explains why we observe a decline in mandatory schooling completion without being able to specifically relate this to high conflict intensity, another open question remaining for further research is whether it is the households' aggrevated economic situations which change schooling decisions or simply the destruction of educational infrastructure, both potentially raising the cost of schooling in addition to violence.

3.6 Appendix

Figure 3.2: Variation in Conflict Intensity



(a) Relative Deaths at Governorates Level (b) Relative Deaths at District Level

Figure 3.3: Completion of Six Years of Schooling over Birth Cohorts

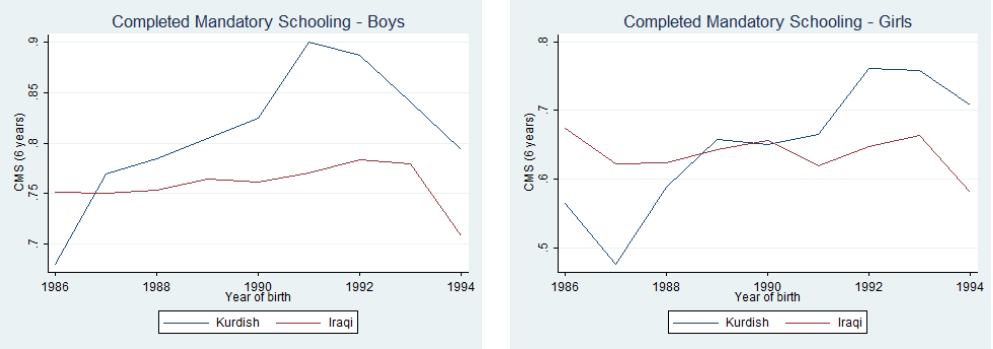


Table 3.9: Cross-Correlations of Conflict Measures

Variables	attacks	deaths	harm_psu	harm	secr1_psu	sec_risk1	secr2_psu	sec_risk2
attacks	1.00							
deaths	0.18	1.00						
	(0.14)							
harm_psu	0.22	0.51	1.00					
	(0.04)	(0.00)						
harm	0.24	0.48	0.86	1.00				
	(0.03)	(0.00)	(0.00)					
secr1_psu	0.40	0.62	0.63	0.59	1.00			
	(0.00)	(0.00)	(0.00)	(0.00)				
sec_risk1	0.37	0.65	0.65	0.61	0.98	1.00		
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)			
secr2_psu	0.35	0.52	0.52	0.48	0.86	0.81	1.00	
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)		
sec_risk2	0.33	0.57	0.56	0.51	0.92	0.89	0.96	1.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	

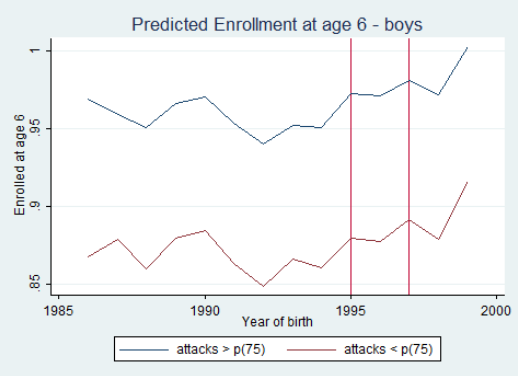
Note: Conflict measures are mean-collapsed at district level. Significance level reported in parentheses.

Table 3.10: First-Stage Regressions on Conflict Intensities

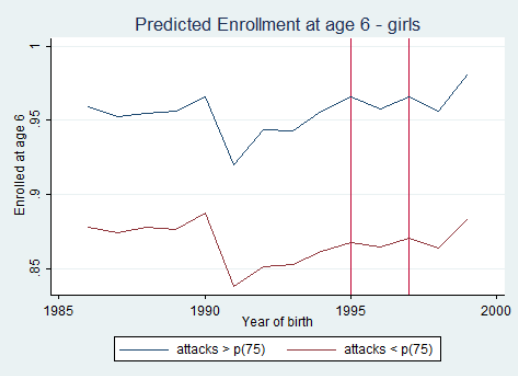
birth cohort	(1) attack (p25)	(2) attack (p75)	(3) deaths (p25)	(4) deaths (p75)
BOYS				
TW_sunni	0.203***	0.445***	0.0659***	0.220*
	(0.0468)	(0.129)	(0.0236)	(0.112)
TW_mix	0.247***	0.416	0.0745***	0.595***
	(0.0564)	(0.280)	(0.0278)	(0.0709)
TW_kurd	-0.600***	-0.200***	-0.707***	-0.299***
	(0.0741)	(0.0537)	(0.0744)	(0.0887)
age_mother	0.00838	0.000343	0.00481	-0.00641
	(0.00552)	(0.00295)	(0.00465)	(0.00405)
age_mother2	-8.70e-05	-1.06e-05	-5.60e-05	6.79e-05
	(6.41e-05)	(3.47e-05)	(5.69e-05)	(4.57e-05)
educ_mother	0.00799*	-0.00470	0.00579**	-0.00507
	(0.00437)	(0.00311)	(0.00249)	(0.00537)
educ_hhead	0.000307	0.000502	-0.00308	0.000205
	(0.00281)	(0.00194)	(0.00244)	(0.00219)
youngersibling	0.00671	-0.0116	0.00167	-0.000122
	(0.00781)	(0.00863)	(0.00703)	(0.0106)
olderbrother	-0.00661	0.00177	-0.00118	-0.00273
	(0.00642)	(0.00487)	(0.00564)	(0.00674)
inc_2002_rel	-8.41e-05	0.000148*	-0.000119	0.000357
	(0.000103)	(8.68e-05)	(9.22e-05)	(0.000230)
GIRLS				
TW_sunni	0.222***	0.434***	0.0769***	0.200
	(0.0506)	(0.140)	(0.0275)	(0.125)
TW_mix	0.272***	0.311	0.0822***	0.554***
	(0.0564)	(0.313)	(0.0305)	(0.0769)
TW_kurd	-0.528***	-0.186***	-0.708***	-0.315***
	(0.0921)	(0.0518)	(0.0871)	(0.0905)
age_mother	0.00690*	-0.00284	-0.000863	0.00138
	(0.00407)	(0.00350)	(0.00265)	(0.00495)
age_mother2	-8.59e-05*	3.08e-05	8.44e-06	-1.73e-05
	(4.78e-05)	(4.02e-05)	(3.11e-05)	(5.50e-05)
educ_mother	0.00153	-0.00164	0.000945	-0.00455
	(0.00358)	(0.00183)	(0.00240)	(0.00544)
educ_hhead	0.00246	0.00237	0.000421	0.00218
	(0.00225)	(0.00168)	(0.00159)	(0.00309)
youngersibling	-0.0137	-0.0111	-0.00952	0.00493
	(0.00943)	(0.00839)	(0.00818)	(0.0111)
olderbrother	-0.00306	-0.00366	4.51e-05	-0.0104
	(0.00750)	(0.00485)	(0.00359)	(0.00870)
inc_2002_rel	-0.000130	-5.41e-06	-0.000201	0.000176
	(0.000135)	(0.000112)	(0.000142)	(0.000204)
regional & cohort fe	✓	✓	✓	✓

Note: Standard errors clustered at strata level in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
The sample is restricted to produce regression results of Tables 3.4 and 3.5.

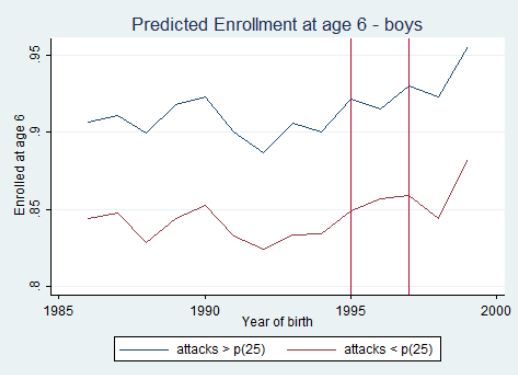
Figure 3.4: Enrollment at the Age of Six over Birth Cohorts by Conflict Intensities



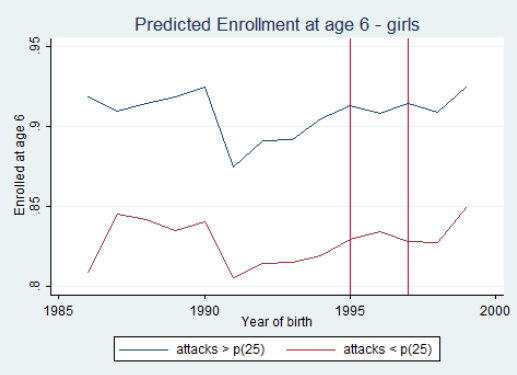
(a) Attacks > (p75)



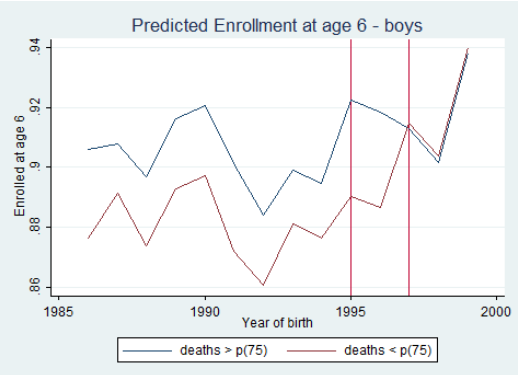
(b) Attacks > (p75)



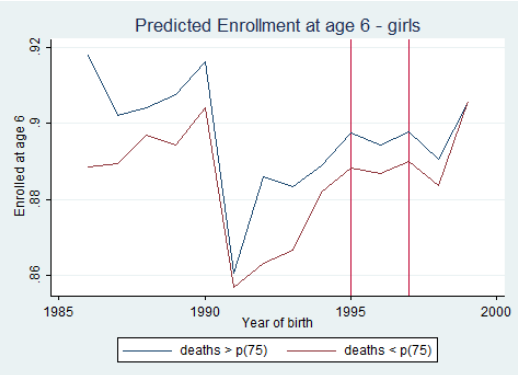
(c) Attacks > (p25)



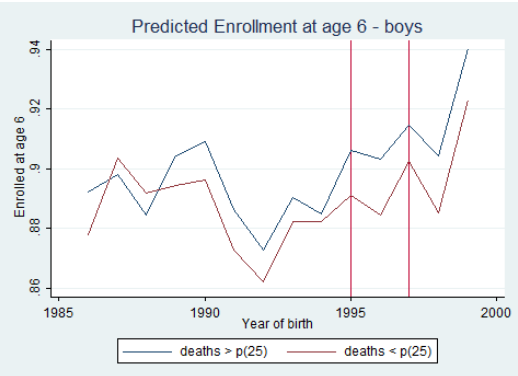
(d) Attacks > (p25)



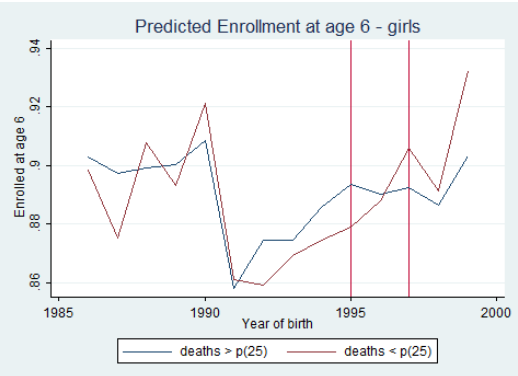
(e) Deaths > (p75)



(f) Deaths > (p75)

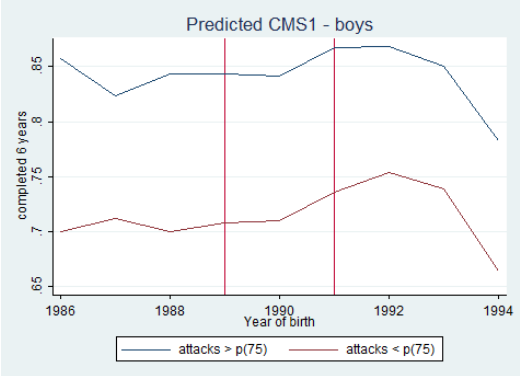


(g) Deaths > (p25)

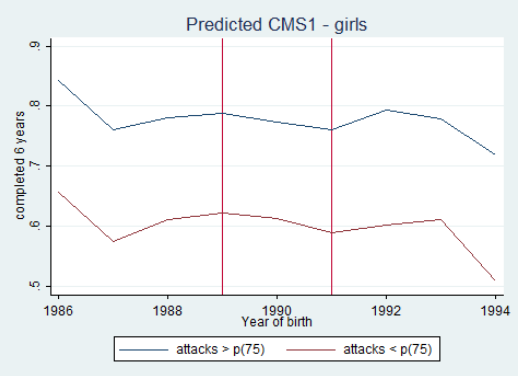


(h) Deaths > (p25)

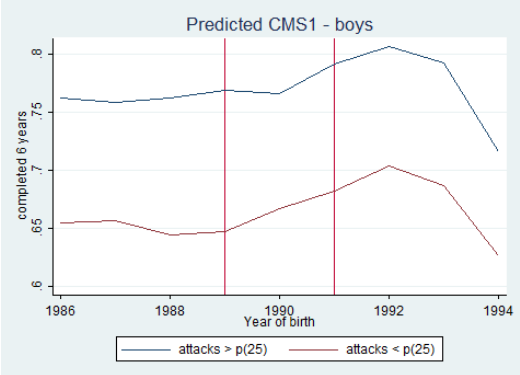
Figure 3.5: Completed Six Years over Birth Cohorts by Conflict Intensities



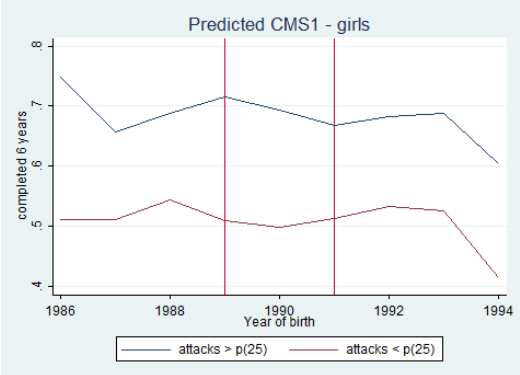
(a) Attacks > (p75)



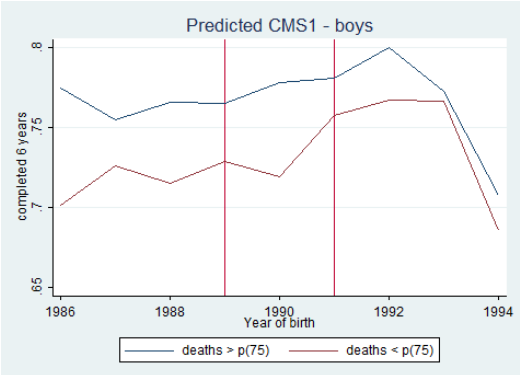
(b) Attacks > (p75)



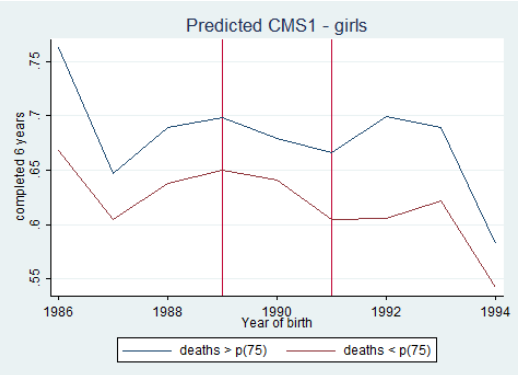
(c) Attacks > (p25)



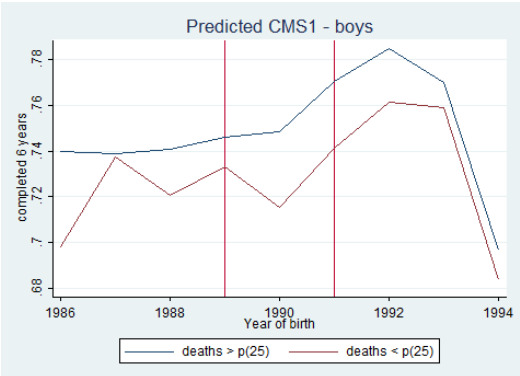
(d) Attacks > (p25)



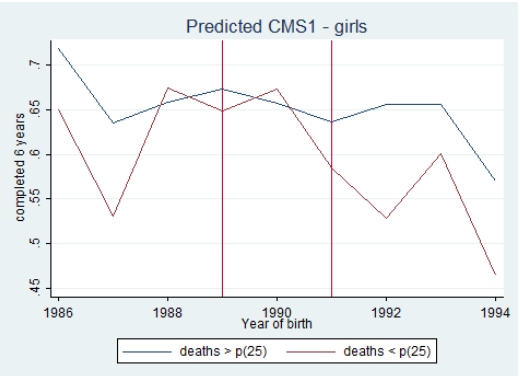
(e) Deaths > (p75)



(f) Deaths > (p75)

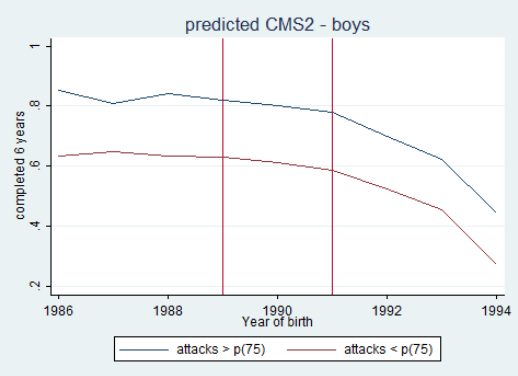


(g) Deaths > (p25)

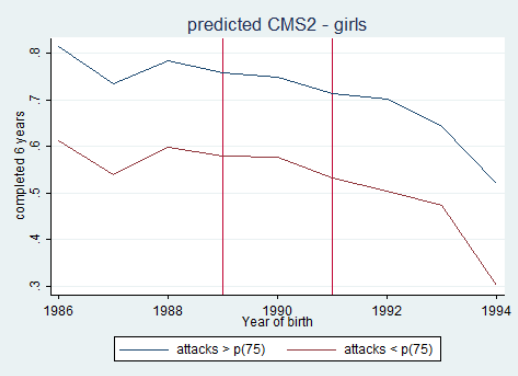


(h) Deaths > (p25)

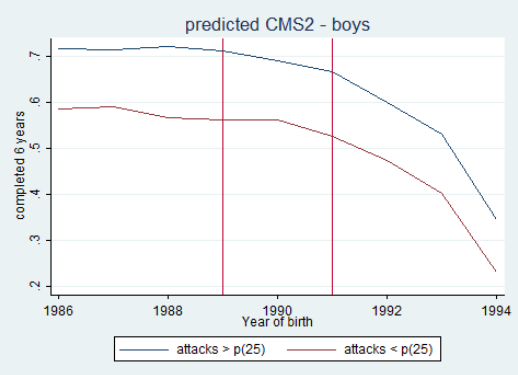
Figure 3.6: Completed Primary Degree over Birth Cohorts by Conflict Intensities



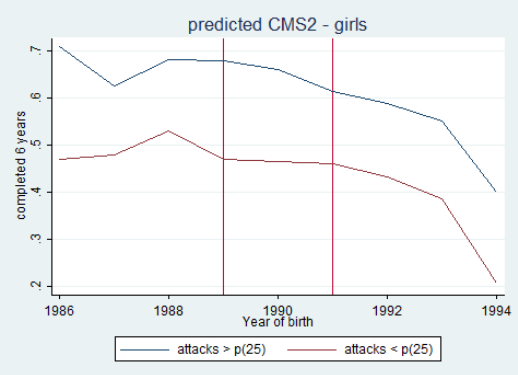
(a) Attacks > (p75)



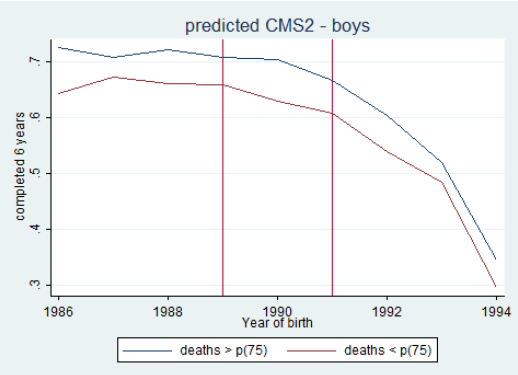
(b) Attacks > (p75)



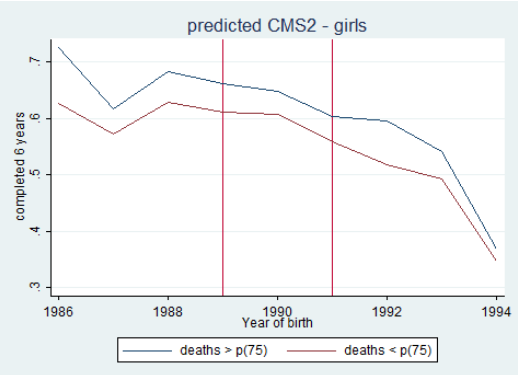
(c) Attacks > (p25)



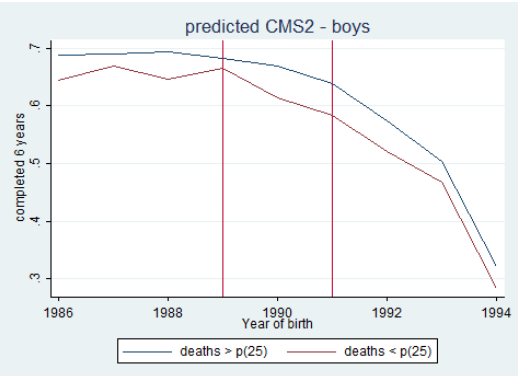
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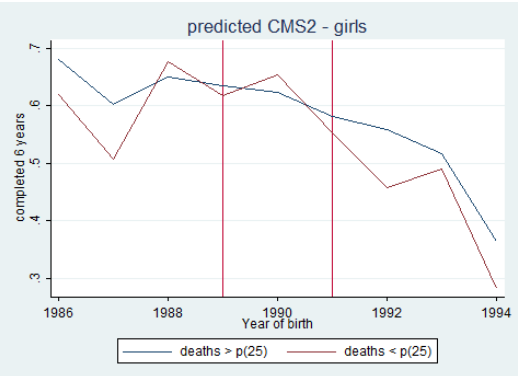
(e) Deaths > (p75)



(f) Deaths > (p75)



(g) Deaths > (p25)



(h) Deaths > (p25)

Table 3.11: Channels of Conflict on School Enrollment at the Age of Six

War cohort interacted with	BOYS (1) OLS	BOYS (2) OLS	BOYS (3) 2SLS	GIRLS (4) OLS	GIRLS (5) OLS	GIRLS (6) 2SLS
harm (PSU)	-0.0342*	-0.0318	-0.126	-0.0713***	-0.0788***	-0.0843
	(0.0187)	(0.0227)	(0.0928)	(0.0229)	(0.0260)	(0.0693)
	[0.084]	[0.095]	[0.091]	[0.077]	[0.096]	[0.096]
harm	-0.0247	-0.0353	-0.296	-0.0799**	-0.0816*	-0.168
	(0.0172)	(0.0211)	(0.240)	(0.0375)	(0.0405)	(0.133)
	[0.084]	[0.095]	[0.084]	[0.076]	[0.095]	[0.094]
sec risk 1 (PSU)	0.0142	0.0137	-0.117	-0.0333*	-0.0320	-0.135**
	(0.0155)	(0.0188)	(0.0791)	(0.0197)	(0.0249)	(0.0636)
	[0.084]	[0.095]	[0.085]	[0.076]	[0.094]	[0.088]
sec risk 1	0.00756	-0.000294	-0.131	-0.0232	-0.0233	-0.142**
	(0.0138)	(0.0164)	(0.0899)	(0.0161)	(0.0191)	(0.0610)
	[0.084]	[0.094]	[0.087]	[0.075]	[0.094]	[0.087]
sec risk 2 (PSU)	0.0314*	0.0379*	-0.110*	-0.0225	-0.0172	-0.0871
	(0.0169)	(0.0205)	(0.0655)	(0.0167)	(0.0203)	(0.0643)
	[0.085]	[0.096]	[0.079]	[0.075]	[0.094]	[0.090]
sec risk 2	0.0178	0.0230	-0.124	-0.0184	-0.0191	-0.101
	(0.0131)	(0.0172)	(0.0791)	(0.0154)	(0.0185)	(0.0615)
	[0.084]	[0.095]	[0.081]	[0.075]	[0.094]	[0.089]

Note: Standard errors clustered at strata level in parentheses. Adjusted R-squared in square brackets. Regional and cohort fixed effects included. Controls included in columns (2), (3), (5) and (6). Sample excludes the Kurdistan regions. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4 Skill Premium and the Second Palestinian Uprising

4.1 Introduction

The Palestinian labor market is characterized by an interdependent relationship with the Israeli labor market. The level of integration of both markets alters with the intensification and the relaxation of the political conflict. Periods of higher integration result in a narrowing wage gap between Israel and the Palestinian Territories, increasing production outcome in Israel and reducing poverty in the West Bank and Gaza Strip. The intensification of the political conflict, on the other hand, translates quickly into detrimental effects in the Palestinian labor market. Miaari and Sauer (2011) and Aranki (2004) find that increased border closures during the Second Intifada reduce employment rates and earnings of Palestinian workers.[1] Etkes (2012) studies the aftermath of the Second Palestinian Uprising, 2005-2009. He finds that an increase in work permits issued to Palestinian workers increases employment favoring Palestinian low-skilled labor. Angrist (1995) studies the returns to schooling in the West Bank and the Gaza Strip for the period of 1981 to 1991 and finds the rising supply of high-skilled workers to be responsible for the falling schooling premium. Extending the analysis to a more recent period, however - which is done in the present study - leads to very different results. Returns to schooling immediately after the Second Intifada show to be increasing. With the tightening of the political conflict in the Middle East in the year 2000 the skill premium sharply increases despite the continuing rise in tertiary education in the Palestinian Territories. The supply side explanation therefore fails to account for the rising wage differentials after the escalation of the Al-Aqsa movement. Angrist (1996) examines the short-run Israeli demand for Palestinian labor. He finds that a reduced access to the Israeli labor market does not harm earnings of Palestinian workers too much since the short-run Israeli demand for Palestinian labor is "inelastic enough". He, however, also notes that this result does not necessarily have to hold if the border policies change. Bulmer (2003), contrarily, finds that Palestinian labor market and welfare outcomes are extremely vulnerable to the reliance on Israeli demand for Palestinian labor.

[1] Aranki (2004) and Miaari and Sauer (2011) examine about the same period, 1999-2003 and 1999-2004, respectively.

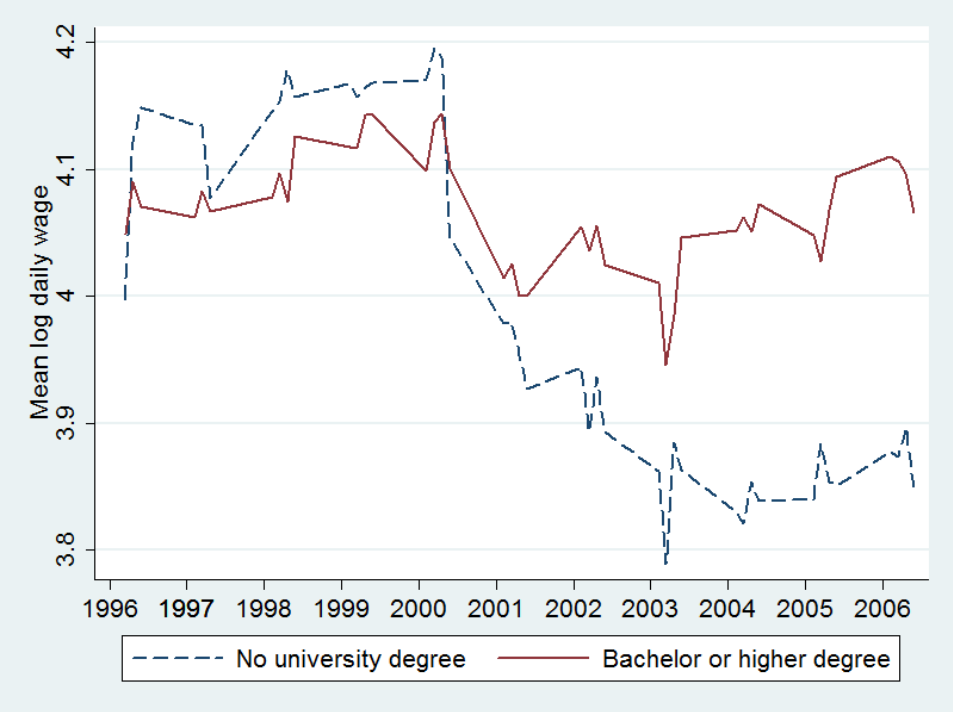
This work aims at analyzing the impact of the change in the Israeli border policy after the Second Intifada on the skill premium. It extends the existing literature in several ways. First, it extends the period of analysis such that years before and after the outbreak of the Second Intifada are covered equally. Second, I apply a simple supply and demand model to estimate relative demand and supply changes for skilled labor for the period before and after the intensification of the political conflict. And third, using a variance decomposition I show how the relative allocation of skilled labor goes along with regional shifts. Those, in turn, correspond to labor relocation across sectors which are characterized by different skill intensities. I find that the relative increase in income generated by skilled labor after the year 2000 is a result of two channels. First, a shift of employment to the West Bank and Gaza which use more skill-intensive Palestinian labor than Israel. Second, an increase in the relative wage of skilled workers in all three regions. The latter effect is explained by a skill-biased labor shift which occurs through a change in the sectoral composition. More precisely, the gain in the relative wage of skilled workers can be explained by a change in employment across sectors in favor of the local service sector which yields the highest skill intensity. The skill-intensive service sector, contrary to the other sectors, is less mobile and therefore does not suffer a wage decrease induced by a return to the local market.

The remainder of this paper is organized as follows. Section 4.2 presents the data used in this work. Section 4.3 estimates the return to schooling for each year in the time period 1996 to 2006. Section 4.4 presents a theoretical framework that analyzes changes in relative wages between two skill groups as a response to supply and demand shifts. Section 4.5 examines to what extent shifts in relative employment and relative wage bill share of skilled workers can be explained by changes in the work location of Palestinian workers. Section 4.6 gauges the role of sectoral shifts in explaining changing wage differentials between skill groups. Section 4.7 concludes this work.

4.2 Data and Descriptives

The sample is restricted to working males aged between 26 and 65. Over the entire period from 1996 to 2006 this yields 253,680 individual observations stemming from 140,114 households. The data originate from the Palestinian Labor Force Survey (PLFS) which have been collected by the Palestinian Central Bureau of Statistics (PCBS) since 1995. The survey design follows recommendations of the International Labor Organization. Individuals are drawn on a quarterly base in repeated rounds from a two-stage stratified cluster random sample. The accrued

Figure 4.1: Wage Dynamics over Years by Skill Group



Note: The wage trend for both skill groups is represented as the mean log real daily wage calculated using PCBS sampling weights.

rotated panel covers 1/6 of the total sample in each round in all sample areas. As income variable I use the real daily wage reported by Palestinian men working in the West Bank, the Gaza Strip or Israel (including Jerusalem).

Figure 4.1 pictures the dynamics of the real daily wage before and after the Second Intifada for two skill groups. Apparently skilled workers do not have an average wage premium in the nineties. Just as the conflict between Palestinians and Israel culminates in September 2000 an average wage gap arises between workers with and without tertiary education. Note, however, that the income variable declines for both groups. The average skill premium comes therefore as a result of the fact that low-skilled workers suffer a higher wage loss than skilled workers.

Table 4.1 summarizes important features of the sampled male population that may explain these income dynamics. The estimates given here are obtained using the PCBS sampling weights. I find that years of schooling have increased on average by one year over an observation period of 11 years only. This increase in educational attainment translates into a higher share of skilled workers over the years.[2] One third of the sampled population lives in Gaza. The fourth and

[2] "Skilled" is a label attached to those persons who held a degree from tertiary education. This simplified labeling does not express the author's belief but simply follows the definition of

Table 4.1: Summary Statistics

Year	Years of schooling	Skilled labor (in %)	Living in Gaza (in %)	Working in Israel (in %)	Real wage (in NIS, daily)
1996	9.27	0.21	0.31	0.22	65.51
1997	9.27	0.21	0.34	0.24	66.57
1998	9.63	0.22	0.34	0.26	68.92
1999	9.86	0.23	0.32	0.27	70.58
2000	9.90	0.23	0.33	0.27	70.38
2001	9.96	0.23	0.33	0.22	58.83
2002	10.02	0.23	0.33	0.13	60.93
2003	10.08	0.23	0.33	0.13	55.98
2004	10.18	0.23	0.33	0.13	57.26
2005	10.16	0.23	0.33	0.13	57.87
2006	10.27	0.23	0.33	0.12	59.64

Note: Means are calculated for the period of 1996 to 2006 using PCBS sampling weights.

fifth columns show the effect of the Second Palestinian Uprising on the regional labor markets. In the 1990s the share of workers who profit from the regional integration of the labor market is still steadily increasing and ranges around one quarter. With the beginning of the Al-Aqsa movement I find a 50 percent decline in labor mobility. With the tightening of the Israeli-Palestinian conflict, the Israeli government intensified border closures. These political measures clearly affect the average real wages of Palestinian workers. The earnings variable I use measures the inflation-adjusted daily wage in New Israeli Shekel (NIS). While earnings have been steadily increasing before the Second Intifada they experience a substantial drop of approximately 15 percent with the aggravation of the conflict. Note also that the average mean daily wage does not recuperate its earlier level until the end of the observation period.

Table 4.2 presents the spread of labor incomes over groups of workers that differ in both skill level and place of living. The picture found in Figure 4.1 does not change when disaggregating the working population by their place of living. Low-skilled workers experience a stronger decrease in labor income than higher-skilled workers independent of the place of living. Still, for geographical and political reasons the level of integration into the Israeli product and labor market differs between the West Bank and the Gaza Strip. This leads to different wage levels in both regions. Over the entire period wages are significantly

"skilled" used in existing literature.

higher in the West Bank than in the Gaza Strip. In the West Bank, interestingly, the average wage of low-skilled workers is higher than the one of skilled workers in the first half of the observation period. With the Al-Aqsa movement this relationship is reversed. As shown in Figure 4.1, the wage loss of those without tertiary education is substantially higher than of those who held at least a Bachelor degree. In fact, the negative average mark-up for skilled labor before the Second Intifada is a result of the labor market integration between Israel and the West Bank. The Gazan numbers, in contrast, reveal a smaller negative wage gap between high- and low-skilled labor before 2000 which is even positive in the first two years. However, also in Gaza the wage gap is positive after the Second Palestinian Uprising. Note also that it is much more pronounced than the one in the West Bank.

Table 4.2: Mean Wage in NIS by Skill Group and Place of Living

	West Bank			Gaza		
Year	No university	Bachelor or higher	Total	No university	Bachelor or higher	Total
1996	69.01	63.61	67.31	59.13	62.93	60.51
1997	70.98	63.53	68.74	61.24	63.19	61.84
1998	73.08	65.98	71.23	66.02	64.17	65.45
1999	73.96	68.31	72.53	65.85	64.53	65.44
2000	75.16	69.03	73.51	63.15	62.20	62.83
2001	63.11	60.17	62.21	41.19	55.16	47.64
2002	63.82	65.84	64.53	42.32	56.37	48.50
2003	60.05	61.12	60.44	41.30	53.98	46.12
2004	58.40	64.43	60.57	39.61	59.10	48.25
2005	59.05	64.12	60.57	39.60	59.27	47.96
2006	58.70	66.02	60.98	42.56	62.39	51.37

Note: Means are calculated for the period of 1996 to 2006 using PCBS sampling weights.

Table 4.3 links the income spread to the place of work. Palestinian men who manage to cross the border earn on average 70 percent more than those working locally.[3] One can see that the relative wage gain from commuting is higher for workers without tertiary education. Notice also that the drop in the daily wage after September 2000 takes place in both schooling groups and in both regions. However, Palestinian men working in Israel suffer a higher wage loss than their

[3]The average real daily wage over all years is 90.80 NIS in Israel and 53.56 NIS in the Palestinian Territories. The calculation is based on sample restriction detailed in Section 4.2.

Table 4.3: Mean Wage in NIS by Skill Group and Place of Work

	Palestine			Israel		
Year	No university	Bachelor or higher	Total	No university	Bachelor or higher	Total
1996	52.18	61.34	56.05	89.65	92.23	89.85
1997	51.32	60.58	55.06	91.93	93.11	92.03
1998	51.65	60.93	55.24	92.78	97.38	93.19
1999	52.33	62.68	56.27	92.95	97.14	93.31
2000	53.26	62.72	57.06	94.29	100.34	94.79
2001	49.25	57.28	52.65	78.62	80.96	78.76
2002	47.02	60.27	52.84	87.75	100.68	88.87
2003	44.07	57.32	49.61	86.63	93.25	87.03
2004	43.84	61.03	51.32	86.23	100.12	87.38
2005	43.90	60.74	50.48	85.64	91.69	86.18
2006	45.76	63.18	52.75	85.30	93.14	86.11

Note: Means are calculated for the period of 1996 to 2006 using PCBS sampling weights.

locally employed counterparts. Compared to the wage level of 2000, the respective 2001 wages of men working in the Occupied Territories are 92.47 percent for low-skilled and 91.32 percent for high-skilled workers. Palestinian men who work in Israel experience a wage drop to 83.38 percent of the 2000 wage level for low-skilled and even to 80.68 percent for high-skilled workers.[4]

4.3 Returns to Tertiary Education over Time

The aggregate picture of a negative return to tertiary education before the Second Intifada as depicted in Figure 4.1 changes when controlling for individual socio-economic characteristics. Table 4.2 indicates that Gazans in contrast to West Bankers profit from their university career already in some years before the Second Palestinian Uprising. Table 4.3 gives evidence that skilled workers always earn higher wages if the place of work is taken into account. The aim of this section is to examine the dynamics of the returns to tertiary education over all years. I therefore estimate the skill premium controlling for important socio-economic wage

[4]Note that this wage drop is based on aggregate descriptives of employed Palestinian workers. It may be influenced by compositional changes. I will come back to this point later in this thesis. A comparison to Israeli wages from aggregated statistics is not sensible due to the particular sample restriction outlined in Section 4.2 and differences in the workforce composition.

determinants as given by the following equation:

$$\begin{aligned} log(w_{it}) = \alpha_t + \beta_t S_{it} + \sum_c \gamma_{ct} A_{ic} + \sum_q \delta_{qt} Q_{iq} + \lambda_t G_{it} \\ + \phi_t U_{it} + \theta_t C_{it} + \psi_t M_{it} + \sum_d \kappa_{dt} PW_{id} + \varepsilon_{it} \end{aligned} \tag{4.1}$$

where variation in the logarithmic wage is explained by tertiary education (S_{it}), four equally ranged age groups for males from $26-65$ (A_{ic}), quarterly effects (Q_{iq}), a dummy for living in the Gaza Strip (G_{it}), in an urban area (U_{it}), in a refugee camp (C_{it}), being married (M_{it}) and two dummies indicating whether the place of work is located in the West Bank or Israel (PW_{id}). The reference population works in Gaza. ε_{it} is assumed to be exogenous but can be autocorrelated at the household level.[5] The coefficients of interest are β_t which estimates the skill premium for each year and κ_{dt} which states the effects of different workplaces over time.

Table 4.4 presents the estimated coefficients of the full sample in columns (1) to (3). Splitting up the overall sample into three possible workplaces as done in columns (4) to (6), the dynamics of the skill premium can be shown for each region separately. Table 4.4 gives evidence on several interesting facts. The main finding, which can be seen in the full sample as well as in the regionally divided subsamples, is an increase in the returns to tertiary education over years. Estimates in column (2) reveal that workers in the West Bank generally earn higher wages than workers in Gaza. Interestingly, this is not true for the first four years after the Second Intifada. The income in 2001 is marked by a considerable negative effect of working in the West Bank compared to working in Gaza. Also Palestinian men who work in Israel experience a drop in wages in 2001 (see column (3)). However, the positive mark-up remains and the wage premium in Israel recuperates quickly to the level before the uprising. With the exception of the year 2001, Palestinian men who offer their labor in Israel earn between 58 and 92 percent more than their counterparts in Gaza. At the same time, estimates in column (6) indicate that the skill premium in Israel is the lowest across the three regions. However, the skill premium is on average higher in the second half of the observation period. The highest relative return for tertiary education can be expected by men working in Gaza, where the increased political tension after September 2000 had little effect on

[5] A broad body of literature shows that the exogeneity condition does not hold in this wage equation (see e.g. Card (2001) for an overview). Various instruments are suggested in former research to mitigate the endogeneity bias, none of which is applicable in this work. Angrist (1995) uses first-difference estimation to control for unobserved individual effects. However, first-difference estimation in the presence of little within variation - as is the case in the schooling variable of interest - yields imprecise estimates. Note that a violation of the exogeneity assumption does not invalidate the explanatory power of the comparison of schooling estimates over years, which is the purpose of this section. Rather, the necessary working assumption is that the endogeneity bias does not change over time. Returns to schooling are likely to be influenced by unobserved characteristics which influence the accumulation of schooling. The schooling choice, however, is already taken before the outbreak of the Second Intifada.

Table 4.4: Dynamics in Returns to Tertiary Education

	Full Sample			West Bank	Gaza	Israel
	(1)	(2)	(3)	(4)	(5)	(6)
	skilled	West Bank	Israel	skilled	skilled	skilled
1996	0.135***	0.081***	0.582***	0.084***	0.282***	0.013
1997	0.134***	0.202***	0.703***	0.059***	0.313***	0.021
1998	0.151***	0.224***	0.747***	0.069***	0.340***	0.059***
1999	0.169***	0.271***	0.752***	0.108***	0.316***	0.044**
2000	0.163***	0.248***	0.738***	0.089***	0.312***	0.058**
2001	0.168***	-0.225***	0.212***	0.094***	0.279***	0.032
2002	0.238***	0.015	0.591***	0.174***	0.320***	0.112**
2003	0.248***	-0.004	0.637***	0.194***	0.321***	0.053
2004	0.319***	0.067	0.696***	0.254***	0.403***	0.148***
2005	0.316***	0.309***	0.917***	0.260***	0.409***	0.073*
2006	0.316***	0.200**	0.778***	0.276***	0.389***	0.089**

Note: Controls used are stated in Equation 4.1. Standard errors are clustered at the household level. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

relative wages of skilled workers. Skill premiums presented in column (5) show a slight drop in 2001 but increase steadily again thereafter. The change in the skill premium after the Al-Aqsa movement for men working in the West Bank depicted in column (4), on the other hand, is remarkable.

I find an interesting development of the skill premiums across the three potential places of work. The question arises why returns to schooling increase to such an extent after the Second Palestinian Uprising. Since the years of schooling are increasing over the entire observation period, it is interesting to look at changes in relative demand for skilled labor. In the following section I therefore use a simple supply and demand framework to identify the determinants of the relative wage dynamics presented above.

4.4 Demand and Supply for Skilled Labor

I apply a simple theoretical model which was developed within the literature of skill-biased technological change and has become a standard model in this strand

of research.[6] The economy produces with two types of labor input, skilled (L_s) and unskilled (L_u) labor, with corresponding different productivities:

$$Y_t = \left[(\alpha_t L_{s,t})^{\frac{\sigma-1}{\sigma}} + (\beta_t L_{u,t})^{\frac{\sigma-1}{\sigma}} \right]^{\frac{\sigma}{\sigma-1}} \tag{4.2}$$

where α_t and β_t are labor-augmenting parameters that are influenced by the border policy (this includes productivity effects of different capital intensities) and σ is the substitution elasticity between both types of labor.

Assuming that both types of labor are not perfectly substitutable and considering furthermore that the labor market is perfectly competitive, one can derive the relative log wage of skilled labor:[7]

$$\ln\left(\frac{w_{s,t}}{w_{u,t}}\right) = \frac{\sigma-1}{\sigma}\ln\left(\frac{\alpha_t}{\beta_t}\right) - \frac{1}{\sigma}\ln\left(\frac{L_{s,t}}{L_{u,t}}\right) \tag{4.3}$$

where $D_t = (\sigma-1)\ln\left(\frac{\alpha_t}{\beta_t}\right)$ measures log relative demand in favor of skilled labor. Thus relative demand shifts can be calculated solving the log ratio of competitive wages for D_t:

$$D_t = \ln\left(\frac{w_{s,t}L_{s,t}}{w_{s,t}L_{s,t}}\right) + (\sigma-1)\ln\left(\frac{w_{s,t}}{w_{u,t}}\right). \tag{4.4}$$

The log relative demand D_t is hence a function of the log relative wage bill and log relative supply of skilled labor.
The first term of Equation 4.3 specifies that border policies that result in favoring skilled labor increase the relative wage of skilled workers if $\sigma > 1$.[8] The second term of Equation 4.3 shows that the relationship between log relative supply and log relative wage of skilled labor is negative. This means that in the absence of a skill-favoring change the relative wage of skilled labor decreases necessarily if relative supply increases.[9]

I calculate the relative wages of skilled compared to low-skilled workers and their respective relative wage bills as a function of wages and labor supply according to the above model. Table 4.5 presents all relative measures for the male Palestinian labor force which are needed to calculate the equilibrium quantities. I find that Palestinian men who obtained a degree from higher education on average did

[6] See e.g. Autor et al. (1998) and Card and Lemieux (2001). Bound and Johnson (1992) and Borjas (2003) also include capital.

[7] The competitive wages for skilled and unskilled labor are given by:
$w_{s,t} = \frac{\partial Y_t}{\partial L_{s,t}} = \alpha_t^{\frac{\sigma-1}{\sigma}} \left[\alpha_t^{\frac{\sigma-1}{\sigma}} + \beta_t^{\frac{\sigma-1}{\sigma}} \frac{L_{s,t}}{L_{u,t}}^{\frac{\sigma-1}{\sigma}} \right]^{\frac{1}{\sigma-1}}$ and
$w_{u,t} = \frac{\partial Y_t}{\partial L_{u,t}} = \beta_t^{\frac{\sigma-1}{\sigma}} \left[\beta_t^{\frac{\sigma-1}{\sigma}} + \alpha_t^{\frac{\sigma-1}{\sigma}} \frac{L_{u,t}}{L_{s,t}}^{\frac{\sigma-1}{\sigma}} \right]^{\frac{1}{\sigma-1}}$ respectively.

[8] See that $\frac{\partial \ln(w_{s,t}/w_{u,t})}{\partial \ln(\alpha_t/\beta_t)} = \frac{\sigma-1}{\sigma}$.

[9] See that $\frac{\partial \ln(w_{s,t}/w_{u,t})}{\partial \ln(L_{s,t}/L_{u,t})} = \frac{-1}{\sigma}$.

Table 4.5: Relative Wages, Wage Bill and Supply

Year	Relative Wages	Relative Wage Bill	Relative Supply
1996	0.9561	0.3224	0.3372
1997	0.9327	0.3021	0.3239
1998	0.9205	0.2735	0.2971
1999	0.9380	0.3061	0.3263
2000	0.9327	0.3129	0.3355
2001	1.0202	0.3894	0.3817
2002	1.0971	0.4409	0.4019
2003	1.1099	0.3945	0.3554
2004	1.2047	0.4536	0.3765
2005	1.1704	0.4033	0.3446
2006	1.1962	0.4387	0.3667
Total	1.0435	0.3670	0.3497

not earn more than those without university degree before the Second Palestinian Uprising, but yield a substantial relative wage increase of about 20 percent within only 5 years afterwards. The last column shows that the skilled labor share is considerably larger in the second half of the observation period. This signifies that the supply side explanation - by which Angrist (1995) explains the decrease in relative wages of skilled workers in the previous decade with increasing skilled labor supply - is not transferable to the period under examination in this work. The strong relative wage gain of skilled workers together with their rising labor supply explains the very large increase of 50 percent in the wage bill over the whole observation period.

I use the simple supply and demand framework introduced above to derive changes in relative demand for skilled labor according to Equation 5.2. Table 4.6 presents *average annual log changes* in relative wages, relative wage bill share, relative supply and relative demand of skilled labor. To calculate the latter, I assume different degrees of substitutability between both types of labor.[10] Table 4.6 reports the mean annual log changes for the five-year periods before and after the Second

[10] I expect $\sigma \in [1, 2]$. Katz and Murphy (1992) estimate the rate of substitution of both types of labor for the U.S. labor market 1963 - 1987 and yield a estimate of $\sigma = 1.41$ This is very similar to results of Card and Lemieux (2001) who estimate a range of substitution elasticities between 1.1 and 1.6 differentiating by gender. To the best of my knowledge no such estimates are available for the Palestinian labor market in the literature yet.

Table 4.6: Average Annual Log Changes

	Relative Wage	Relative Wage Bill	Relative Supply	Relative Demand $\sigma = 1$	Relative Demand $\sigma = 1.5$	Relative Demand $\sigma = 2$
Before	1.2977	3.7766	2.4789	3.7766	4.4254	5.0742
After	3.1826	2.3815	-0.8012	2.3815	3.9728	5.5641
Total	2.2402	3.0790	0.8389	3.0790	4.1991	5.3192

Intifada.[11] I find increasing relative wages for skilled labor in both periods. Note, however, that the average annual growth of relative wages is accelerated in the second period.[12] A strong relative demand growth dominates the relative supply growth in the first period. After the Second Intifada the supply of skilled relative to low-skilled workers declines in the Palestinian labor market. The Palestinian labor market narrows down after 2000 as a result of stricter border policies. This results in a squeezing in of low-skilled workers into the local labor market by which the relative supply of skilled workers decreases. The relative demand keeps growing, but at a lower pace than in the first period. The reduced relative supply is what drives up relative wages of skilled workers. In the following section I will use a regional decomposition to illustrate relative employment changes across regions. Furthermore, I will examine through which mechanisms skilled workers profit from the tightening of the labor market.

4.5 A Regional Decomposition

A simple but efficient explorative tool to analyze the change in the allocation of labor across groups will be applied in the following. The aim is to understand the gain in the relative wage of skilled workers related to the relocation of labor across different demographic groups. Therefore, employment shifts will be decomposed into two components. The change of the share of skilled labor in aggregate employment can be described by a shift across regions (where regions differ in skilled labor intensities) and a change of the occupational structures within k regions as follows:

[11] Note that I measure the first change from the first year to the next just in 1997 and likewise the effect of the Uprising just in 2001. Table 4.12 in the Appendix displays in Panel A the annual log relative wages, log relative supply and derived log relative demand. Panel B presents how these translate into annual log changes which are finally used to calculate the averages in Table 4.6.

[12] This is in line with findings in column (1) of Table 4.4.

$$\begin{aligned}\frac{N_t^s}{N_t} - \frac{N_{t-\tau}^s}{N_{t-\tau}} = &\sum_k \left(\frac{N_{kt}}{N_t} - \frac{N_{k,t-\tau}}{N_{t-\tau}}\right) * 1/2 \left(\frac{N_{kt}^s}{N_{kt}} + \frac{N_{k,t-\tau}^s}{N_{k,t-\tau}}\right) \\ &+ \sum_k \left(\frac{N_{kt}^s}{N_{kt}} - \frac{N_{k,t-\tau}^s}{N_{k,t-\tau}}\right) * 1/2 \left(\frac{N_{kt}}{N_t} + \frac{N_{k,t-\tau}}{N_{t-\tau}}\right)\end{aligned} \tag{4.5}$$

where N is the total employment, N^s is the total employment of the skilled labor and N_k^s and N_k the respective employments in region k. Two points in time determine the end and the beginning of a period, t and $t-\tau$. The first term of the right hand side measures the employment shift between k regions by summing up over all regions the change in employment in region k relative to overall employment weighted by the average skilled labor employed in region k. The second term describes a within-region shift as the sum of the rates of change of the skilled labor ratio used in region k weighted with the share of employment in region k in overall employment. Later on in this section I will furthermore analyze changes in the relative wage bill share of skilled workers. Analyzing those together with the change in employment share permits conclusions on whether employment shifts or wage changes or both determine a change in the earned income (as a product of work and wage) of skilled workers. Section 4.6 will extend on this analysis in the sense that it incorporates changes in the sectoral composition.

Table 4.7 shows the decomposition of changes in the skilled labor employment share into relative employment shifts between regions and changes of the relative employment within regions. These shifts are illustrated for the period before the Second Palestinian Uprising in the upper part of the Table and for the period after the crisis in the lower part of the Table. In the first column we notice a relative employment shift across regions from the West Bank to Israel and Gaza before the Second Intifada. The second column shows that employment in the West Bank is 3.5 times more skill-intensive than Palestinian labor used in Israel. This results in a strong decrease in the share of skilled labor in aggregate employment. The positive employment shift to Gaza, the most skill-intensive region, is too small to make up for the loss in skilled labor use. The employment shift between regions sums up to a negative effect. At the same time, the employment share of skilled workers employed per region increases in both Palestinian Territories. Since the share of workers who are employed in these regions outweighs by far the relative employment in Israel, this positive employment shift in favor of skilled labor dominates the skilled labor loss in Israel. This leads to an average increase in skilled labor use within regions. Summing up the between and within shift, the total effect is positive, meaning that overall there is a skill-favoring employment shift in the first observation period.

Table 4.7: Regional Decomposition of Employment

	employment change in region k to total employment	share of skilled workers employed in region k	employment change of skilled workers in region k	share of workers employed in region k
1996-2000				
West Bank	-0.0476	0.2817	0.0094	0.5458
Gaza	0.0140	0.3134	0.0365	0.2408
Israel	0.0336	0.0871	-0.0050	0.2134
TOTAL	BETWEEN		WITHIN	
0.6754	-0.6097		1.2851	
2001-2006				
West Bank	0.0346	0.2708	-0.0305	0.5941
Gaza	0.0058	0.3561	-0.0058	0.2876
Israel	-0.0404	0.0813	0.0315	0.1183
TOTAL	BETWEEN		WITHIN	
-0.7933	0.8154		-1.6087	

With the outbreak of the Second Intifada the relative regional employment shifts back from Israel to the Palestinian Territories, mainly to the West Bank (see first column). Since Israel is the least skill-intensive region (see second column), this shift creates an increase in skilled labor share. At the same time, however, the share of skilled workers employed in the West Bank and the Gaza Strip declines (see third column). Since those two regions are the ones using the highest shares of aggregate employment, the increase in skilled labor share in Israel cannot compensate for the shift to low-skilled labor within the Palestinian Territories. The within-region change of relative skilled labor is strongly negative and larger than the positive shift between regions. The overall effect is therefore negative which implies that the relative share of skilled workers employed after the Second Palestinian Uprising declines.

Table 4.8: Regional Decomposition of Wage Bill

	change in wage bill share in region k to total wage bill	skilled wage bill share to wage bill in region k	change in wage bill share of skilled workers in region k	wage bill share of workers in region k
1996-2000				
West Bank	-0.0302	0.2950	0.0114	0.4771
Gaza	0.0016	0.3810	0.0380	0.1765
Israel	0.0419	0.0901	-0.0012	0.2927
TOTAL	BETWEEN		WITHIN	
0.7259	-0.4516		1.1776	
2001-2006				
West Bank	0.0058	0.3022	0.0024	0.5672
Gaza	0.0213	0.4232	0.0135	0.2474
Israel	-0.0441	0.0861	0.0376	0.1685
TOTAL	BETWEEN		WITHIN	
1.7998	0.6969		1.1029	

Table 4.8 illustrates the results of the decomposition analysis with regard to the wage bill share of skilled workers. The upper part of the Table parallels the results of the employment shifts before the Second Intifada in Table 4.7. A regional shift of income generated in the West Bank to Israel (see first column) coupled with a higher relative wage bill share of skilled workers in the Palestinian Territories (see second column) leads to a decrease in the skilled workers wage bill share due to a cross-regional shift.[13] The third column shows that the relative wage bill

[13]Note that we can recognize the wage dynamics across regions comparing the first columns of Table 4.7 and Table 4.8. For example the wage bill share loss in the West Bank is smaller than the decrease in employment share. This indicates that the wage in the West Bank in the first period was increasing. Similarly, we can identify an increasing wage in Israel and a decreasing wage in

share of skilled workers increases in the Palestinian Territories. From Table 4.7 we remember that this increase is supported by a higher employment share of skilled workers in this region. However, comparing the change in the wage bill share to the change in employment also reveals that the skill premium has risen in all three regions. This is reassuring the findings displayed in columns (4) to (6) of Table 4.4. This positive change in the skilled workers' wage bill share within regions dominates the negative between-region shift. The overall change of the relative wage bill is therefore positive. Comparing the size of the overall wage bill shift in favor of skilled labor with the one of the employment shift, we observe that the relative wage increased in the first period. This is consistent with the model calculation of Table 4.6.

After the Second Intifada, the wage bill share of skilled workers in Israel declines while the ones in the Palestinian Territories, especially in the Gaza Strip, increase. This, again, parallels findings on changes of the regional employment share displayed in Table 4.7.[14] The between-region shift of the relative wage bill is therefore positive. Contrary to the patterns found in the employment share analysis, the changes in the wage bill share of skilled workers within the regions are all positive. This is a consequence of the high increase of the relative wage for skilled labor, in particular in Gaza and the West Bank (see also Table 4.4).[15] It follows that the within-region shift of the relative wage bill share is strong and positive. Summing up the two positive shifts, the overall change in the relative wage bill therefore favors skilled labor also in the second period.[16]

To summarize the findings presented in Table 4.7 and Table 4.8: the relative increase in income generated by skilled labor after the year 2000 is a results of two channels. First, a shift of employment to regions that are skill-intensive (Gaza and West Bank). Second, an increase in the relative wage of skilled workers in all three regions. The latter in turn, can eventually result from a change in the allocation of aggregate labor across sectors. The next section therefore provides an examination of changes in the sectoral composition.

Gaza. See also Table 4.11 in the Appendix.

[14] Conclusions about the change in relative wages can again be drawn on the basis of a comparison of the magnitude of the shifts between Table 4.7 and Table 4.8. The relative wage increases in Gaza and decreases in the West Bank and Israel. See also Table 4.11.

[15] If the change in the employment share is negative, the change in the wage bill share can still be positive if the increase in the relative wage is high enough.

[16] Comparing the total shift of the wage bill share to the total shift of the employment share leads to the conclusion that the relative wage increased strongly in the period after the Second Intifada (see also Table 4.6).

4.6 A Sectoral Decomposition

I am modifying Equation 4.5 such that k regions are substituted by j sectors. Table 4.9 presents shifts in skilled labor intensity decomposed into shifts between and within sectors. The cell labeled *total* presents the annual growth rate of the skilled labor share, the cells labeled *between* and *within* display changes of the allocation of aggregate labor between sectors and changes in the skilled labor share within sectors, respectively. Changes in aggregate employment before the Second Intifada occured in favor of the agriculture, the construction and the service sectors. Out of these, the latter is particularly skill-intensive such that the between-sector shift in employment sums up to 6.44 percent annual growth in relative employment. The skilled-labor share within sectors in this period of time, on the other hand, decreases slightly as a result of the skill reduction in agriculture and service. However, the between-shift dominates the within-shift such that the average annual growth in the skilled labor share amounts to 0.66 percent. After the Second Intifada the agricultural sector experiences an employment growth while the aggregate employment in the construction sector is reduced. The between-shift in relative labor employment is small but positive. At the same time, the service, commerce and manufacturing sectors reduce their skill intensities which leads to a decrease in relative employment. Skill intensities increase in agriculture and transport, however, these two sectors are smaller and cannot compensate for the loss in relative factor demand in service, commerce and manufacturing. This creates a significant within-shift in favor of low-skilled labor which dominates the positive skill-favoring between-shift by far. The total share of relative employment decreases by 0.79 percent annually.

Table 4.10 parallels the findings for the first period of Table 4.9. More interesting dynamics are observed in the second period. The wage bill share produced in the agricultural sector decreases even though Table 4.9 shows an increase in employment. This suggests that workers moved from the agricultural sector in Israel to the local one where they earn lower wages. The wage bill share generated in the construction sector decreases heavily. This is partly explained by decreased employment. The rest of the decrease is explained by lower wages which suggest the same phenomenon as described for the agricultural sector. Note that the manufacturing and commercial sectros also face a decreasing wage bill share. However, those two sectors experienced higher losses in the previous period. The service sector - as a consequence of decreasing wage and employment shares in the other sectors - gains relative importance in the generation of income. Since the service sector is the most skill-intensive one, this creates a huge relative gain for skilled workers. This is so even though the skill intensity in the service sector decreases in this period, which - together with an additional skill reduction in the commercial sector

Table 4.9: Sectoral Decomposition of Employment

	employment change in sector j to total employment	share of skilled workers employed in sector j	employment change of skilled workers sector j	share of workers employed in sector j
1996-2000				
agriculture	0.0128	0.0755	-0.0241	0.1010
commerce	-0.0343	0.1855	0.0072	0.1823
construction	0.0223	0.0919	0.0063	0.2175
manufacturing	-0.0259	0.1177	0.0291	0.1338
service	0.0244	0.5524	-0.0188	0.2984
transport	0.0008	0.0943	0.0135	0.0670
TOTAL	BETWEEN		WITHIN	
0.6558	0.7124		-0.0567	
2001-2006				
agriculture	0.0198	0.0769	0.0289	0.1139
commerce	0.0008	0.1957	-0.0120	0.1866
construction	-0.0231	0.0834	0.0001	0.1485
manufacturing	-0.0040	0.1106	-0.0093	0.1167
service	0.0003	0.5371	-0.0258	0.3589
transport	0.0061	0.1168	0.0149	0.0755
TOTAL	BETWEEN		WITHIN	
-0.7937	0.0212		-0.8149	

Table 4.10: Sectoral Decomposition of Wage Bill

	change in wage bill share in sector j to total wage bill	skilled wage bill share to wage bill in sector j	change in wage bill share of skilled workers in sector j	wage bill share of workers in sector j
1996-2000				
agriculture	0.0118	0.0789	-0.0177	0.0871
commerce	-0.0308	0.1703	0.0046	0.1892
construction	0.0337	0.0950	0.0086	0.2824
manufacturing	-0.0179	0.1165	0.0308	0.1322
service	0.0105	0.6073	-0.0120	0.2476
transport	-0.0009	0.0995	0.0240	0.0596
TOTAL	BETWEEN		WITHIN	
0.7369	0.3077		0.4292	
2001-2006				
agriculture	-0.0085	0.0811	0.0283	0.0823
commerce	-0.0154	0.1959	-0.0260	0.1849
construction	-0.0505	0.0840	0.0109	0.1860
manufacturing	-0.0097	0.1237	0.0010	0.1221
service	0.0330	0.5979	-0.0118	0.3421
transport	0.0031	0.1350	0.0336	0.0656
TOTAL	BETWEEN		WITHIN	
0.8809	1.0994		-0.2186	

- creates a negative within-shift. However, the cross-sectoral shift which gives more importance to the service sector, whose skill intensity is 60 percent, is influential enough to create a substantial positive skill bias of 0.88 percent of annual growth in relative income.

The findings of the previous two Tables can be summarized as follows. After the Second Intifada aggregate employment shifts from the construction sector to agriculture which creates a loss in relative employment of skilled workers. However, the wage bill shares in all sectors but the service sector decrease as a consequence of the regional employment shift outlined in the previous section. The skill-intensive service sector, contrary to the other sectors, is less mobile and therefore does not suffer a wage decrease induced by a return to the local market. Thus, the increase in the relative wage of skilled workers is a consequence of a shift of relative employment to the service sector.[17]

4.7 Conclusions

As pointed out by Angrist (1995), the returns to schooling decreased in the 1980s as a response to an increased higher educational attainment. This work shows that the falling trend in relative wages of skilled workers does not continue in later years even though the educational expansion continues. Especially after the Second Intifada the skill premium rises remarkably. Political disturbances in the region starting in September 2000 lead to stricter border policies which reduce labor mobility. Mainly low-skilled Palestinian workers are pushed back to the local labor market where they experience a substantial wage decline. The supply of high- relative to low-skilled workers decreases in the Palestinian labor market as a result of the squeezing in of low-skilled workers into the local labor market. The relative demand keeps growing, but at a lower pace than in the first period. It is thus the decreased relative supply which drives up relative wages of skilled workers.

A variance decomposition reveals the mechanism behind the relative gain of skilled workers. The relative increase in income generated by skilled labor after the year 2000 is a result of two channels. First, a shift of employment to the West Bank and Gaza which use more skill-intensive Palestinian labor than Israel. Second, an increase in the relative wage of skilled workers in all three regions. The latter effect is explained by a skill-biased labor shift which occurs through a change in the sectoral composition. More precisely, the gain in the relative wage of skilled workers can be explained by a change in employment across sectors in favor of the local service sector which yields the highest skill intensity. The skill-intensive

[17] This does not imply that service workers do not experience a decline in their wage level after the year 2000. The increase in relative wages of skilled workers mainly is explained by the wage loss of the mobile workers (which are mainly low-skilled).

service sector, contrary to the other sectors, is less mobile and therefore does not suffer a wage decrease induced by a return to the local market. As a matter of fact, the relative wage increase of skilled workers is not a result of increasing wages for their labor, but arises due to the fact that their wage losses are smaller than those of low-skilled workers. In revealing the compositional mechanism working behind the change in relative wages, these results complement findings of Etkes (2012) who finds that an increase in work permits issued to Palestinian workers in times of conflict relaxation benefits the low-skilled Palestinian workers and adversely affects returns to schooling in the Palestinian Territories.

4.8 Appendix

Table 4.11: Mean Wage over Time by Place of Work

Year	West Bank	Gaza	Israel
1996	57.46	52.68	89.85
1997	57.54	50.04	92.03
1998	57.79	49.83	93.19
1999	60.22	49.76	93.31
2000	61.48	49.71	94.79
2001	55.99	47.61	78.76
2002	57.43	46.79	88.87
2003	54.25	43.94	87.03
2004	54.47	47.41	87.38
2005	52.74	47.35	86.18
2006	53.77	51.24	86.11

Table 4.12: Log Measures and Annual Changes in Log Measures

PANEL A: LOG MEASURES OVER YEARS

Year	log relative wage	log relative wage bill	log relative supply	log relative demand ($\sigma = 1$)	log relative demand ($\sigma = 1.5$)	log relative demand ($\sigma = 2$)
1996	-0.0449	-1.1319	-1.0870	-1.1319	-1.1544	-1.1768
1997	-0.0697	-1.1970	-1.1273	-1.1970	-1.2318	-1.2667
1998	-0.0828	-1.2965	-1.2136	-1.2965	-1.3379	-1.3793
1999	-0.0640	-1.1838	-1.1198	-1.1838	-1.2158	-1.2478
2000	-0.0696	-1.1617	-1.0921	-1.1617	-1.1966	-1.2314
2001	0.0200	-0.9431	-0.9631	-0.9431	-0.9331	-0.9231
2002	0.0927	-0.8189	-0.9116	-0.8189	-0.7725	-0.7262
2003	0.1043	-0.9302	-1.0345	-0.9302	-0.8780	-0.8259
2004	0.1862	-0.7906	-0.9768	-0.7906	-0.6975	-0.6044
2005	0.1573	-0.9081	-1.0655	-0.9081	-0.8295	-0.7508
2006	0.1791	-0.8240	-1.0032	-0.8240	-0.7345	-0.6449
Total	0.0371	-1.0169	-1.0540	-1.0169	-0.9983	-0.9797

PANEL B: ANNUAL CHANGES IN LOG MEASURES (x 100)

Year	change in log relative wage	change in log relative wage bill	change in log relative supply	change in log relative demand ($\sigma = 1$)	change in log relative demand ($\sigma = 1.5$)	change in log relative demand ($\sigma = 2$)
1996	.	.	.	.	.	.
1997	-2.4806	-6.5049	-4.0242	-6.5049	-7.7452	-8.9855
1998	-1.3157	-9.9521	-8.6364	-9.9521	-10.6099	-11.2677
1999	1.8812	11.2673	9.3861	11.2673	12.2079	13.1485
2000	-0.5594	2.2079	2.7673	2.2079	1.9282	1.6485
2001	8.9628	21.8646	12.9018	21.8646	26.3460	30.8274
2002	7.2703	12.4228	5.1525	12.4228	16.0580	19.6931
2003	1.1580	-11.1304	-12.2885	-11.1304	-10.5514	-9.9724
2004	8.1912	13.9551	5.7640	13.9551	18.0507	22.1463
2005	-2.8865	-11.7509	-8.8644	-11.7509	-13.1941	-14.6374
2006	2.1801	8.4107	6.2306	8.4107	9.5008	10.5908
Total	2.2402	3.0790	0.8389	3.0790	4.1991	5.3192

5 Gender Wage Gap and the Second Palestinian Uprising

5.1 Introduction

Inequality in wages between men and women is a high-ranked policy issue in nearly every country in the world. Policy makers are often referred to aggregate statistics that provide a clear and easy message: women earn less than men and women are underrepresented in high-skilled and well-paid jobs. A common policy measure derived from those statistics often tries to enforce a higher share of women into high job positions by legal directive. Controlling for educational and other socio-economic gender differences - which strongly differ across countries - earlier literature found a substantial male-female earnings gap which could not be explained and was hence attributed to labor market discrimination (see e.g. O'Neill, 1985; Blau and Ferber, 1987; O'Neill and Polachek, 1993).[1] More recent literature finds that these unexplained wage differentials are mainly driven by omitted variables and can be explained by differences in workplace and job characteristics (O'Neill, 2003), unobserved heterogeneity and endogeneity (Kim and Polachek, 1994). As a matter of fact, the gender wage gap has seen various changes throughout recent decades that differ across countries. While developed countries experienced no change (see e.g. Mussida and Picchio, 2013 on Italy) or a decrease in the gender pay gap (see e.g. Blau and Kahn, 1997, and Bacolod and Blum, 2010, for studies on the U.S.; Black and Spitz-Oener, 2010, for an analysis on West Germany) the trend in developing countries is less explicit. Cross-country comparison reveals that whether the gender gap has closed or widened depends largely on the structural changes on the production side which in turn determine relative demand for female labor. Rendall (2013) finds that wage disparities between men and women are successfully reduced in countries which shift from "brawn"-intensive to "brain"-intensive production. Research aiming at identifying driving factors behind the catch-up of women's wages in developed economies finds that technological change favored female employment and wages (see e.g. Blau and Kahn, 1997; Bacolod and Blum, 2010; Yamaguchi, 2013; Black and Spitz-Oener, 2010).

[1] Stanley and Jarrell (1998) published a meta-study on the discrimination gender gap. Evaluating 55 studies they calculate a mean gender gap of 31.8 percent. The range of the gender gap estimates produced by those selected studies is, however, considerable with a minimum estimate of 2.7 and a maximum estimate of 91 percent.

The bottom line of this research can be summarized as follows: Changes in the occupational mix or in job tasks happened in favor of non-routine and analytical skills in which men - other than in motor skills - have no comparative advantage.

To the best of my knowledge only two studies examine the gender pay gap in the Palestinian Territories. Daoud (2005) estimates the differences in returns to schooling between men and women. He finds that women earn 14 to 15 percent less in 1999. Between the years 1999 and 2001 - one year before and one year after the outbreak of the Second Palestinian Uprising - the estimated wage differential declines which the author explains with a rise in male unemployment during the Second Intifada. This result does not come unexpected. It is widely known that mainly male Palestinian workers take the effort of commuting and profit from higher earnings across the border in times of relaxed access policies. Daoud and Shanti (2012) analyze differences in private-public sector employment and wage differentials in the Palestinian Territories from a gender perspective. They find that women's wages are higher in the public sector only. Using the Oaxaca-Blinder decomposition, they can attribute this fact to differences in endowment, i.e. women having higher schooling than men in this sector. These earlier contributions were critized in detail in Section 2.3. There were three major points of critique: First, the link between gender wage gap and the role of sector employment remains largely unexplored. Second, with the applied estimation strategy the authors cannot explain changes in the wage gap over time. Third, differences in endowment seem to be largely uncontrolled, therefore falsely ascribing differences in wages to differences in returns.

The present paper takes this earlier work as a starting point and aims at making several contributions. First, it provides empirical evidence about the evolution of the gender wage gap in the Palestinian Territories between 1996 and 2006. Second, it quantifies how much of the change in the wage differential between men and women can be attributed to changes in the composition of employed labor relative to changes in rewards to workers' attributes. Third, it uncovers to which extent the gender-equalizing effect is driven by sector-workplace shifts that can be related to the Second Intifada and the Israeli border policies. And fourth, it identifies the sectors which secure the Palestinian workforce and also those which favor relative demand for female labor. With the identification of those sectors this work offers a key to develop policy measures which stabilize the Palestinian economy which has been shown to be extremely vulnerable to political distress in the past. It also pinpoints factors which favor womens' employment and should therefore be considered by any policy maker who wishes to enhance gender equality.

Contrary to results derived in studies on developed economies, I find that the

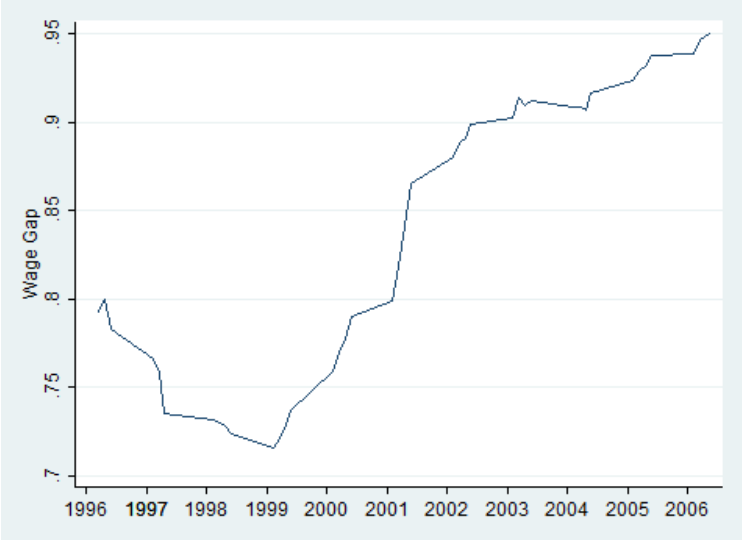
wage differential between male and female workers in Gaza and the West Bank increased till 1999. Interestingly, this trend is only reversed with the outbreak of the Second Palestinian Uprising in September 2000 and rapidly approaches zero at the end of the observation period. The change in the wage differential in favor of women in the second half of the observation period can be explained by both a change in relative prices of observed characteristics of male and female workers but also by a change in the workers' composition. The larger effect, however, can be attributed to compositional changes which come along with enforced Israeli border measures. Those reduce the share of Palestinian labor employed in Israel and at the same time change the industry mix of Palestinian labor. Both compositional effects work in favor of female employment. In periods of low conflict and relaxed border policies mainly male Palestinian workers take advantage of higher wages in Israel. Employment opportunities for Palestinian workers in Israel are predominantly offered in occupations which comprise physical strength - an occupational field in which male labor is favored over female. An analysis of the sector-workplace composition reveals that with the outbreak of the Second Intifada employment in the local labor market gains relative importance. Sectors that withstand the political distress are the service and agricultural sectors located in Gaza and West Bank whereas the construction sector located in Israel loses employment. These changes in the sectoral composition come in favor of female employment. The local agriculture and service sectors are the ones with the highest share of female employment. The labor demand for women increases by an estimated total of 19 percent while the demand for male labor decreases by 4.5 percent. The womens' gain in relative demand thus explains a substantial part of the observed narrowing wage differences between men and women.

The remainder of this paper is organized as follows. Section 5.2 shortly presents the data used in this work and provides some useful descriptives on labor-market relevant gender differences in the Palestinian Territories. Section 5.3 examines occupational differences between male and female workers before and during the Second Palestinian Uprising. Section 5.4 calculates the contributions of possible factors in reducing the gender gap. Section 5.5 details the role which specific sector-workplace shifts play in explaining the reduction of the gender wage gap. Section 5.6 concludes this work.

5.2 Gender Differences in Palestinian Territories

The data used in this analysis stem from the Labor Force Surveys provided by the Palestinian Central Bureau of Statistics. The survey design follows recommendations of the International Labor Organization and is intended to provide a

Figure 5.1: Gender Wage Gap, 1996−2006



Note: The gender wage gap is represented from the 2nd quarter of 1996 to the 4th quarter in 2006 in a 9-quarter moving average of the median real daily wage of women over that of men.

representative sample on the district level. Individuals are drawn on a quarterly base in repeated rounds from a two-stage stratified cluster random sample. The accrued rotated panel covers 1/6 of the total sample in each round in all sample areas. I restrict the sample to full-time working men and women aged between 26 and 65. Over the entire period from 1996 to 2006 this yields 164,290 labor market observations for men and 39,498 for women living in 112,381 households. The wage variable used is the real daily wage expressed in 1996 NIS (New Israeli Shekel).

Figure 5.1 shows the gender wage trend in the Palestinian Territories after 1996. The wage differential in this graph is represented by the 9-quarter moving average of the median real daily wage of women over that of men. The unadjusted wage gap between male and female workers increased till 1999 and decreased sharply after the outbreak of the Second Intifada. The catch-up of female wages to the male wage level after the year 2000 is especially strong till the year 2003. Within only 7 years the ratio of female over male wages increases from 72 percent in 1999 to 95 percent in 2006. Changes in the gender wage gap can occur due to changes in womens' characteristics relative to men's or due to changes in their relative returns.

Table 5.1 therefore presents changes in potential wage determinants for the period of interest for women and men. The first row depicts the log real daily wage by gender pooled for years before and during the Second Intifada. The observed real wages are always higher for men. However, the wage differential between sexes amounts to an average of 26 percent in the period before the Second Intifada and

Table 5.1: Gender Differences in Socio-Economic Characteristics

	1996-1999			2001-2005			
	male	female	Δ^1	male	female	Δ^2	$\lvert\Delta^2\rvert - \lvert\Delta^1\rvert$
log wage	4.1290	3.8693	0.2597	3.9429	3.8300	0.1129	-0.1468
university	0.2417	0.3724	-0.1307	0.2799	0.3940	-0.1141	-0.0166
years school	10.0365	9.2402	0.7963	10.6819	9.9800	0.7019	-0.0944
experience	21.9358	23.4973	-1.5615	22.4071	23.1702	-0.7631	-0.7984
urban	0.4411	0.3980	0.0431	0.4664	0.4088	0.0576	0.0145
rural	0.4030	0.4861	-0.0831	0.3428	0.4470	-0.1042	0.0211
camp	0.1560	0.1159	0.0401	0.1908	0.1442	0.0466	0.0065
Gaza	0.3057	0.1821	0.1236	0.3356	0.2264	0.1092	-0.0144
West Bank	0.6943	0.8179	-0.1236	0.6644	0.7736	-0.1092	-0.0144
work Israel	0.2245	0.0234	0.2011	0.1049	0.0124	0.0925	-0.1086

Note: Δ^1 is calculated as mean value of males minus mean value of females for observations pooled for the period before the Second Intifada. Δ^2 is calculated respectively for the period during the Second Intifada.

narrows down to 11.3 percent for observations pooled over years during the Second Intifada. The educational background of labor market participants is controlled for by two variables. One measures the years of schooling, of which men are accumulating 0.8 more in the first period or 0.7 more in the second period. Interestingly, measuring schooling success by a tertiary degree indicates that the schooling distribution of females is very different to that of males. There are as much as 13.1 percent more female wage earners holding a university degree as their male counterparts before the year 2000. Even though this difference is reduced slightly for the years after the Al-Aqsa movement it still points to a distinct selection into labor market activity for women compared to men. Women which have enjoyed higher education seem to face higher costs in staying out of the labor market. It is therefore important to control for the educational background of wage earners in both dimensions, years of schooling and university degree, as their schooling distribution differs considerably. Women in this sample seem to be more experienced than men.[2] What is important to notice is that differences in wages, education and experience between sexes are smaller in absolute terms after the outbreak of the Second Intifada. This is not the case for the regional provenance of the worker. While women are most likely to work in rural areas, men are most likely to work in urban areas. This difference increases after the year 2000. The gender differences in labor market activity between Gaza and West Bank is smaller in the second period. While

[2]However, due to a lack of information on actual job experience and job interruptions, I calculated potential experience as standardized by the literature (age minus schooling years minus 6). This might lead to an overestimation of the actual job experience of women compared to that of men.

30.6 percent of the male wage earners observed between 1996 and 1999 are Gazian, only 18.2 percent of the working women are from Gaza. For the second period the share of Gazians with observed wage increases for both sexes, but Gazian women gain relative importance. The biggest convergence in wage related labor market characteristics, however, can be found in the last row of Table 5.1. While before the Second Palestinian Uprising 22.5 percent of the Palestinian men work in Israel, only 2.3 percent of the Palestinian women commute to a workplace across the border. This huge difference decreases in the second half of the observation period due to a decline in labor market mobility of Palestinian men. After the year 2000 only 10.5 percent of the Palestinian male workers report to work in Israel. To sum up findings so far: If one can expect wages to vary along the socio-economic characteristics as stated in Table 5.1, then a reduction in differences along those observable characteristics may explain a decrease in the gender wage gap as depicted in Figure 5.1. The only labor-market relevant characteristic in which gender differences are not reduced is the type of locality the workers live in. The extent to which this increase in gender differences may contribute to a widening of wage differentials between men and women is determined by the difference in renumeration for work across these locality types. This analysis will follow in Section 5.4 of this work.

5.3 Occupational Differences

O'Neill (2003) emphasizes that the gender wage gap disappears when occupational differences between men and women are controlled for. Might the convergence in occupational choices between men and women therefore explain the narrowing male-female wage differential? Table 5.2 displays important differences in occupational choices between women and men before and after the outbreak of the Second Palestinian Uprising. Differences in occupational choices are represented across six different sectors and seven occupational groups. While most women work in the service sector or agriculture (78.9 percent before and 84.6 percent after the outbreak of the Second Intifada), the sector choice of male workers is more diversified. Palestinian men predominantly work in service industries, construction or commerce. However, there is a strong shift in relative employment between sectors. While the share of male workers employed in services gains relative importance, the construction sector loses relative employment. This is likely to be related to restricted labor mobility that comes along with enforced border controls. The connection of the political situation and sector-workplace shifts will be further examined in Section 5.5. For now it is important to notice that gender inequality in sectoral distributions increases from the first to the second period in all sectors with the exception of the construction and the service sectors. If wages paid to workers

Table 5.2: Sectoral and Occupational Changes

	1996-1999			2001-2005			
	male	female	Δ^1	male	female	Δ^2	$\lvert\Delta^2\rvert - \lvert\Delta^1\rvert$
Sectors							
agriculture	0.0883	0.3315	-0.2432	0.1122	0.3764	-0.2642	0.0210
manufacture	0.1406	0.1229	0.0177	0.1142	0.0739	0.0403	0.0226
construction	0.2254	0.0036	0.2218	0.1360	0.0017	0.1343	-0.0875
commerce	0.1842	0.0800	0.1042	0.1881	0.0755	0.1126	0.0084
transport	0.0638	0.0042	0.0596	0.0730	0.0035	0.0695	0.0099
service	0.2978	0.4578	-0.1600	0.3765	0.4691	-0.0926	-0.0674
Occupations							
managers	0.0563	0.0308	0.0255	0.0525	0.0269	0.0256	0.0001
technical	0.1943	0.3885	-0.1942	0.2382	0.4014	-0.1632	-0.0310
service	0.0585	0.0308	0.0277	0.1874	0.0870	0.1004	0.0727
skilled agric	0.0641	0.3183	-0.2542	0.0853	0.3676	-0.2823	0.0281
craft workers	0.2422	0.1100	0.1322	0.1817	0.0469	0.1348	0.0026
machine oper	0.0964	0.0050	0.0914	0.1074	0.0196	0.0878	-0.0036
elementary	0.2883	0.1166	0.1717	0.1475	0.0506	0.0969	-0.0748

Note: Δ^1 is calculated as mean value of males minus mean value of females for observations pooled for the period before the Second Intifada. Δ^2 is calculated respectively for the period during the Second Intifada.

differ across sectors then a decrease in the gender wage gap is only consistent with the herewith stated gender-specific sectoral shifts if the convergence in construction and service sectors sets off the divergence in employment in all the other sectors. The last column of Table 5.2 indicates the direction and the magnitude of the shift. A negative sign indicates a decrease in gender differences in labor allocation to the distinct sectors, a positive sign an increase. Note that the decrease in gender inequality across sectors is larger in agriculture and construction than the increase in inequalities in the other sectors. However, how much this contributes to the narrowing gender wage gap will be determined not only by the shifts depicted above, but also by the difference in returns to employment in the respective sectors.

A similar analysis can be carried out along professional groups. Women work predominantly in skilled agriculture and professional and technical occupations. Men's occupational choices are less concentrated. Before the Second Intifada the highest share of male workers is found in elementary occupations, followed by craft work and professional and technical occupations. Interesting shifts occur out of the elementary occupations after the year 2000 - a phenomenon likely to be linked to the restricted border mobility. Occupations in commerce and services as

well as technical and professional jobs gain relative importance. Which one of the occuring shifts is gender-equalizing in terms of relative employment can be read off in the last column. A minus sign indicates that occupational disparities between male and female workers are reduced. The decrease in male labor employed in elementary occupations exerts the strongest effect in reducing occupational disparities between sexes. The pull-out of male labor from elementary occupations comes along with a relative increase in male labor in commerce and service as well as in professional and technical occupations, the former increasing, the latter decreasing the dissimilarity of the occupational profiles of men and women.

5.4 Decomposing the Gender Wage Gap

The extent to which the convergence of wage determining characteristics between men and women (see Section 5.2) and male-female relative employment changes across sectors and occupations (see Section 5.3) translates into relative wage changes between men and women depends not only on how much more similar workers of both sexes become over time, but also on how much more equally they get paid (along equal characteristics). The return to individual characteristics and job characteristics has been neglected so far and shall now be included into the analysis.

The interest of this work lies in identifying factors which explain *changes* in the gender wage gap over time. I adopt an analytical framework developed by Juhn et al. (1993) which allows us to decompose the changes in wage differentials between male and female workers into endowment-related relative wage changes and relative changes in returns. This decomposition method, in a first step, assesses the determinants of wage differentials between men and women for each point in time. In a second step, the *difference* of these differentials between points in time informs us about changes in endowment and prices of observable and unobservable characteristics which, in turn, explain changes in the gender wage gap. This double decomposition can be written as follows:

$$\begin{aligned} G_{T_2} - G_{T_1} = (\Delta X_{T_2} - \Delta X_{T_1})\beta_{T_1} + \Delta X_{T_2}(\beta_{T_2} - \beta_{T_1}) \\ + (\Delta\theta_{T_2} - \Delta\theta_{T_1})\sigma_{T_1} + \Delta\theta_{T_2}(\sigma_{T_2} - \sigma_{T_1}) \end{aligned} \tag{5.1}$$

where G_t is the male-female log wage gap in time point t and $t = [T_1, T_2]$. T_1 and T_2 measure observations in the periods of 1996 to 1999 and 2001 to 2006, respectively. ΔX_t represents differences in observable characteristics between men and women in time t. β_t is a vector of parameter estimates in the male wage equation. θ_t is the standardized residual and σ_t is the standard deviation of the

Table 5.3: Decomposition of Changes in the Gender Wage Gap

	Model I	Model II
Δ wage gap	-0.1469	-0.1469
Observed characteristics:	-0.0054	-0.1007
experience	0.0032	0.0031
schooling	0.0020	0.0124
region	-0.0106	-0.0026
work in Israel	-	-0.0849
occupation	-	0.0103
sector	-	-0.0390
Observed prices:	-0.1140	-0.0644
experience	-0.0071	-0.0048
schooling	-0.0808	-0.0102
region	-0.0262	-0.0098
work in Israel	-	0.0098
occupation	-	-0.0156
sector	-	-0.0338
Unobserved characteristics:	-0.0133	0.0145
Unobserved prices:	-0.0143	0.0037

Note: Experience includes potential experience and its square. Schooling is measured by years of schooling and tertiary degree. Region includes controls for living in urban, rural areas or in the Gaza Strip. Parameter estimates are derived using the male wage equation. The benchmark period is T_1 (1996-1999).

residuals in the male wage equation.[3] The first term on the right hand side of the Equation 5.1 therefore describes the endowment effect in observed characteristics, the second term the price effect in observed characteristics, the third term the gap effect, i.e. endowment effect in unmeasured gender differences, and the fourth term the price effect of the unobservables.

Table 5.3 displays results of the double decomposition of the male-female log wage gap using Equation 5.1. Pooling the years 1996 to 1999 as period T_1 and the years 2001 to 2006 as period T_2 the observed gender log wage gap decreased by

[3]The parameter estimates are preferably derived from the male wage equation in the literature. The standard argument is that it better captures market prices than the female wage equation since female labor supply is often conditional on the spouses' labor market outcome. See e.g. O'Neill (2003).

0.1469 log points from the first to the second period. Model I estimates the impact of changes in the human capital endowment which is found to be influential in reducing the gender gap in earlier research.[4] This model includes variables on the educational background (measured by years of schooling and tertiary degree), potential experience and its square and regional variables indicating whether the individual lives in Gaza, an urban area or a camp.[5] For the case of the Palestinian Territories almost no change in the male-female wage gap can be explained by changes in the human capital endowment of women relative to men. Relying on this benchmark model, the narrowing gender gap would thus be ascribed to changes in returns to endowment. In particular, returns to schooling - but also cross-gender price adjustments for regional provenance - would be reported to be responsible for the female wage catch-up. More specifically, the change in returns to schooling in favor of women would account for 55 percent of the closing wage differential. Integrating occupational and sectoral differences into the estimation model as done in Model II is a necessary improvement when assessing the gender wage gap.[6] When structural differences in sector and occupation choice between women and men are acknowledged, most of the change in the male-female wage differential can be explained by a compositional effect. A highly potential predictor for the narrowing gender wage gap is the changing sectoral composition which accounts for as much as 26.5 percent of the closing wage differential between male and female workers. The strongest explanatory, however, is the change in the workplace. The shift from labor employed in Israel to labor employed in the local labor market reduces the gender wage gap by 57.8 percent. The estimated price effect on the other hand is found to be most substantial for sectoral identifiers. Changes in the relative price for female labor reduce the wage differential by 23 percent - after controlling for compositional changes across sectors and compositional changes of the workplace. The change in returns to schooling in favor of women in this model contributes only 6.9 percent to the narrowing wage differential. The change in relative prices on specific professional groups (as stated in Table 5.2) explains 10.6 percent of the relative wage gain of women.[7] Note also, that some change in unobserved characteristics seems to widen the wage gap between male and female workers. However, this effect is small and largely off-set by compositional and price effects of changes in the industry structure, occupational changes and shifts

[4] Blau and Kahn (1997) find for the U.S. that the observed change in human capital explains between 11.2 and 52.0 percent of the narrowing gender wage gap depending on the women's skill level.

[5] The reference categories are thus individuals living in the West Bank and rural areas, respectively.

[6] This suggestion was made by many authors using different measures of job diversity. See e.g. Blau and Kahn (1997); O'Neill (2003); Bacolod and Blum (2010); Black and Spitz-Oener (2010); Yamaguchi (2013). The underlying wage regressions to Model II can be found in Table 5.7 in the Appendix.

[7] This analysis could be refined if there were more precise data on specific job tasks. It is likely that the contribution of these price effects are even overestimated since changes in the returns to schooling but also to certain professions can be explained by diverse job tasks. For this strand of research see e.g. Bacolod and Blum (2010), Black and Spitz-Oener (2010).

in the workplace.

5.5 Border Policy, Labor Demand and Gender Wage Trend

With the outbreak of the Second Intifada in the year 2000 the Israeli authorities enhance stricter border policies. This results in less labor mobility across the Palestinian-Israeli border. The Palestinian labor market shrinks to the local one, narrowing employment opportunities and changing dramatically the sectoral composition. Results from Section 5.4 indicate that changes in the sectoral composition play an essential role in explaining the narrowing male-female wage differential. This section therefore aims at i) shedding light on how shifts in the sector-workplace structure influence gender-specific labor demand and ii) identifying which sectors gain or lose relative importance with the outbreak of the Second Palestinian Uprising. According to economic theory changes in relative demand are positively correlated with changes in relative wages. Adopting a simple equilibrium model suggested by Katz and Murphy (1992) I calculate the log change of overall demand for female ($k = female$) and male ($k = male$) labor as follows:

$$\Delta D_k = \sum_j S_{jk}(\Delta S_j / S_k) \tag{5.2}$$

where S_{jk} is gender k's share of labor employed in cell j in period T_1 and j indicates the sector-workplace cells. ΔS_j indicates the difference between the period after and before the outbreak of the Second Intifada of the share of total labor employed in cell j. Finally, S_k refers to the gender-specific share of total employment in period T_1.

Table 5.4: Log Labor Demand Changes

	MEN	WOMEN
overall	-0.0448	0.1908
between wp	-0.0238	0.1069
within wp	-0.0210	0.0839

Table 5.4 presents the estimates for the change in the overall labor demand using Equation 5.2 with j representing 12 sector-workplace cells. Between-workplace demand changes are calculated using Equation 5.2 where j indexes the two possible workplaces. They describe the extent to which border closures affect labor

mobility of Palestinian workers. Within workplace demand changes are simply the difference between overall and between demand changes. They thus express the change in labor demand due to changes in the sectoral structure net of the workplace effect. The overall demand for male labor is reduced over the Second Intifada. On the contrary, the labor demand for women strongly increases. It is interesting to note that more than half of the overall demand changes occur due to a between-workplace demand change. Thus, a substantial part of both, the decrease of the demand for male labor and the increase of the demand for female labor, can be explained by the limited work mobility across the Israeli-Palestinian border.

Table 5.5 reveals several interesting facts about the gender-specific distribution of employment across sector-workplace cells - each of which playing a role in explaining the rising relative demand for female labor indicated in Table 5.4. In each cell the female employment share is lower than the male one. Additionally, in each sector the share of Palestinian women working in Israel is substantially lower than the share of Palestinian men commuting. This explains why the workplace shift from Israel to the local labor market with the Second Intifada negatively affects male labor demand as seen in Table 5.4. Most of the Palestinian women work in agriculture or in services and are mainly active in the local labor market. While women are also engaged in manufacturing and in commerce in the local labor market, female labor participation in construction and transport is neglectable.

Table 5.5: Gender Employment Share by Sector-Workplace Cell

	MEN		WOMEN	
	Work in		Work in	
	Palestine	Israel	Palestine	Israel
agriculture	0.5068	0.9138	0.4932	0.0861
manufacture	0.8170	0.9761	0.1830	0.0239
construction	0.9949	0.9979	0.0051	0.0021
commerce	0.9066	0.9883	0.0934	0.0116
transport	0.9862	0.9917	0.0137	0.0083
service	0.7517	0.8875	0.2483	0.1125

The above listed facts about the gender-specific distribution of labor can be related to the observed employment shifts over workplace and sectors that followed the outbreak of the Second Intifada. Those shifts are presented in Table 5.6. The

Table 5.6: Sector-Workplace Employment Shifts

	1996-1999		2001-2005		difference	
	Palestine	Israel	Palestine	Israel	Palestine	Israel
agriculture	0.1130	0.0172	0.1587	0.0088	0.0457	-0.0084
manufacture	0.1127	0.0249	0.0897	0.0160	-0.0229	-0.0089
construction	0.0766	0.1105	0.0666	0.0413	-0.0100	-0.0692
commerce	0.1453	0.0209	0.1539	0.0107	0.0086	-0.0102
transport	0.0502	0.0033	0.0567	0.0017	0.0065	-0.0015
service	0.3124	0.0130	0.3889	0.0070	0.0764	-0.0060

relative employment between these cells change in favor of employment in the service sector and agriculture in the Palestinian Territories. The employment share of workers in manufacturing and construction in the Palestinian local labor market shrinks. The relative employment of Palestinian workers in Israel is generally decreased. The strongest reduction is observed in the Israeli construction sector. All the sector-workplace changes stated above, but in particular the increase in employment of local agriculture and services and the decrease in the constructions in Israel, favor the female workforce. Sectors which sustain the Palestinian labor market in times of political instability happen to be sectors with a high intensity in female labor. Within the Palestinian society women seem to take over secure jobs inside the Palestinian Territories which guarantee a constant but low pay relative to jobs held in Israel. Men, on the other hand, increase their pay by commuting to workplaces across the border but risk zero pay in 'bad' times. In these periods the labor market activity of women gains importance in securing households' income.

5.6 Conclusions

This work analyzes the gender wage trend in the Palestinian Territories before and during the Second Palestinian Uprising. First, I quantify the unadjusted wage gap between male and female Palestinian workers over the period from 1996 to 2006. I find that the wage differential between male and female workers in Gaza and the West Bank increased till 1999. Interestingly, this trend is reversed with the outbreak of the Second Palestinian Uprising in September 2000 and rapidly approaches zero at the end of the observation period. Second, I assess how much of the change in the male-female wage differential can be attributed to changes

in workers' characteristics relative to changes in the workers' composition. I find that the reversed wage trend in favor of female workers can be explained by both a change in relative prices of observed characteristics of male and female workers but also by a change in the workers' composition. Price effects in favor of women can be found in returns to schooling, occupation and sector affiliation. The larger effect, however, can be attributed to compositional changes, more specifically to relative employment shifts across workplaces and sectors. Reinforced border policies after the outbreak of the Second Palestinian Uprising reduce the share of Palestinian labor employed in Israel and at the same time change the industry mix of Palestinian labor. The shift from employment in Israel to employment in the local labor market explains 57.8 percent of the closing wage gap between men and women. The related change in the sectoral composition explains another 26.5 percent of the wage convergence. Contrary to empirical findings on developed countries, human capital formation does not explain the narrowing wage gap in Palestinian Territories from 1996 to 2006. Third, I use a simple equilibrium framework to analyze sector-workplace shifts that accompanied the Second Palestinian Uprising. Both the change in sectoral composition and the change in workplace composition are found to favor female employment. In periods of low conflict it is mainly male Palestinian labor which profits from higher wages in Israel. This is because employment opportunities for Palestinian workers in Israel predominantly exist in occupations which comprise physical strength - an occupational field in which male labor is favored over female. An analysis of the sector-workplace composition reveals that with the outbreak of the Second Intifada employment in the local labor market gains relative importance. Sectors that withstand the political distress are the service and agricultural sectors located in Gaza and West Bank whereas the construction sector located in Israel loses employment. All these compositional changes largely favor female employment since the local agriculture and service sectors are the ones with the highest share of female employment. The labor demand for women increases by an estimated total of 19 percent while the demand for male labor decreases by 4.5 percent. The womens' gain in labor demand thus explains a substantial part of the observed narrowing wage differences between men and women. The sectors which sustain the Palestinian economy in times of political distress happen to be the ones that benefit female labor. A policy maker which is interested in protecting the economy against political shocks and at the same time wishes to enhance gender equality in the labor market should thus focus on the agricultural and service sectors in the local market. Relating the results from this work to findings from Rendall (2013) economic policies that strengthen "brain"- rather than "brawn"-intensive industries, however, seem more promissing in raising women's labor market outcomes.

5.7 Appendix

Table 5.7: Wage Regressions

	male T_1	female T_1	male T_2	female T_2
university degree	0.0272	0.0297	0.0291	0.1188
	[0.0062]	[0.0166]	[0.0056]	[0.0138]
years of schooling	0.0225	0.0418	0.0266	0.0400
	[0.0007]	[0.0024]	[0.0007]	[0.0020]
experience	0.0205	0.0131	0.0149	0.0086
	[0.0006]	[0.0014]	[0.0006]	[0.0011]
experience^2	-0.0003	-0.0000	-0.0002	0.0001
	[0.0000]	[0.0000]	[0.0000]	[0.0000]
urban	-0.0092	0.0130	0.0321	0.0895
	[0.0039]	[0.0097]	[0.0037]	[0.0074]
camp	-0.0316	-0.0026	0.0127	0.0462
	[0.0051]	[0.0132]	[0.0044]	[0.0093]
Gaza	-0.0874	-0.0191	-0.1522	-0.0465
	[0.0039]	[0.0106]	[0.0035]	[0.0076]
work in Israel	0.5046	0.5366	0.5845	0.5950
	[0.0044]	[0.0222]	[0.0049]	[0.0241]
manufacturing	0.1401	0.1058	0.2549	-0.0015
	[0.0106]	[0.0454]	[0.0097]	[0.0370]
construction	0.3325	0.4635	0.3885	0.3239
	[0.0096]	[0.0622]	[0.0089]	[0.0646]
commerce	0.2073	0.3568	0.2465	0.1044
	[0.0108]	[0.0427]	[0.0100]	[0.0386]
transport	0.1083	0.3787	0.1919	0.1821
	[0.0140]	[0.0614]	[0.0121]	[0.0505]
service	0.0680	0.2155	0.2468	0.1512
	[0.0104]	[0.0365]	[0.0087]	[0.0304]
legislators, managers	0.4543	0.2174	0.4768	0.2774
	[0.0119]	[0.0307]	[0.0100]	[0.0229]
professionals, technical workers	0.1896	0.0620	0.2298	0.0618
	[0.0067]	[0.0237]	[0.0058]	[0.0172]
salesmen	0.0719	0.0200	0.0867	0.0157
	[0.0075]	[0.0293]	[0.0059]	[0.0228]
skilled agricultural workers	0.0334	0.1743	0.0382	0.2238
	[0.0197]	[0.1013]	[0.0222]	[0.1381]
craft & related trade workers	0.1722	0.0191	0.1803	0.0359
	[0.0049]	[0.0340]	[0.0055]	[0.0284]
machine operators	0.1514	0.1851	0.1251	-0.0474
	[0.0078]	[0.0641]	[0.0069]	[0.0296]
constant	3.1826	2.7822	2.9516	2.7521
	[0.0134]	[0.0388]	[0.0121]	[0.0330]
adj R^2	0.497	0.316	0.448	0.333
N	36628	5308	47133	10099

Note: T_1 and T_2 specify years before and after the Second Intifada, respectively. Robust standard errors in parentheses.

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Selbständigkeitserklärung

Ich bezeuge durch meine Unterschrift, dass meine Angaben über die bei der Abfassung meiner Dissertation benutzten Hilfsmittel, über die mir zuteil gewordene Hilfe sowie über frühere Begutachtungen meiner Dissertation in jeder Hinsicht der Wahrheit entsprechen.

Berlin, 5. August 2013 Nannette Swed, geb. Schliebner