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ARMED CONFLICT AND CHILD LABOR: EVIDENCE FROM IRAQ

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Working Paper No. 1225

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Abstract

This paper examines the relationship between armed conflict intensity and child labor using household level data from Iraq and taking advantage of a quasi-experimental setup. Armed conflict intensity is measured as the number of deaths related to conflict and child labor is separated by type of work: economic and household. After controlling for individual and household characteristics that determine child labor, we find that armed conflict intensity is associated with a higher likelihood of economic child labor, but is not associated with changes in household labor. These results provide further evidence of the long-term costs of war on households.

JEL Classification: D74; J13; N35
Keywords: Armed conflict, child labor, school attendance, MENA, Iraq

ملخص

تبحث هذه الورقة العلاقة بين كثافة النزاع المسلح وعمالة الأطفال باستخدام بيانات مستوى الأسرة من العراق في إطار شبه إعداد تجريبي. يتم قياس كثافة النزاعات المسلحة حيث يجرى فصل عدد الوفيات المتعلقة بالنزاع وعمالة الأطفال حسب نوع العمل: إقتصادي أو منزلي. فبعد عزل الخصائص الفردية والمنزلية التي تحدد عمالة الأطفال، نجد أن كثافة الصراع المسلح ترتبط باحتمال أكبر لعمالة الأطفال الاقتصادية ، ولكنها لا ترتبط بالتغيرات في العمالة المنزلية. توفر هذه النتائج دليلاً آخر على ما تكلفته الأسر من الحرب على المدى الطويل.

1. Introduction and Motivation

Armed conflict creates direct costs like loss of human life and destruction of property. But it also creates indirect (and often long-term) consequences through its impact on the economy, infrastructure and on household decisions like child labor and early school drop-out (Rodriguez and Sanchez, 2012; Diwakar, 2015). Unfortunately, much of the existing literature on armed conflict sidesteps its effect on household decisions, mainly due to lack of data.

The aim of this paper is to add to the small body of work that examines the relationship between armed conflict and child labor, using household data from Iraq. The contribution to the literature is threefold. Principally, by taking advantage of the structure of the data to employ a difference-in-differences approach, this is the first paper that attempts to identify a causal relationship between armed conflict and child labor. By exploiting large geographical and time differences in conflict levels across governorates, we can identify a treatment group that was exposed to intense armed conflict during the most violent period and a control group that was not. Second, the paper expands the current body of knowledge by adding empirical evidence that uses a more precise measure of conflict intensity. While there is a growing literature on the relationship between armed conflict and household decisions, the current body of work mainly focuses on educational outcomes. Existing empirical studies that examine armed conflict and child labor (Rodriguez and Sanchez, 2012; Di Maio and Nandi, 2013) use the number of attacks on infrastructure or the closure of border crossings as proxies for conflict intensity. By contrast, our paper measures conflict intensity with the actual number of civilian casualties attributable to armed conflict. The number of casualties is a better measure of conflict intensity because it represents a consistent and easily measurable outcome. A border closing or the occurrence of an attack could encompass a wide range of events (e.g. variations in level of severity, length of the attack, etc.), and the literature on armed conflict is largely in consensus that death records are the most reliable measure of the level of conflict intensity (Looney, 2006; Berman et al. 2011). Fox and Sandler (2006) explicitly recommend using casualties as a proxy for the level of violence when examining the impact of conflict on the civilian population.

Finally, our paper presents evidence from one of the most conflict prone regions and one of the youngest populations in the world. With active armed conflicts in Libya, Syria and Yemen, knowledge from Iraq's experience can help policymakers design and implement policies that alleviate the effects of armed conflict on child labor. This is crucial to the MENA region, in particular, because it features one of the youngest populations among the main regions of the world, with an average of almost 35% of the population under 15 years old over the last 25 years (from 1992 to 2015). Only Sub-Saharan African countries have a higher mean share of the population between 0 and 14. The MENA region is not only young demographically, but is also unfortunately home to the largest number of armed conflicts in any major region since World War II. Even without counting events associated with the Arab Spring, the MENA region has experienced at least 28 conflicts since 1945 (Naufal, 2011), meaning that an armed conflict has occurred in the MENA region once every 2.3 years on average. While the MENA's population represents around 5% of the world's total population, the region accounts for 12% of all armed

conflicts that occurred in the world between 1945 and 2010.[4] Moreover, while the number of conflicts has been on the decline overall since 1945 (Gates et al, 2016), the world experienced a spike in armed conflicts in 2014, which featured the largest number of conflict casualties in any year since 1989 (Pettersson and Wallensteen, 2015). The deadliest conflicts in 2014 occurred in the Middle East region, with Iraq and Syria accounting for more than 65% of total conflict related casualties (Gates et al, 2016).

The paper proceeds as follows. The next section summarizes the current literature on armed conflict and household decisions. The subsequent section expands on the specific case of Iraq. We follow with a discussion of the data and methodology, results, and conclusion.

2. Literature Review

While casualties and property losses are obvious costs of armed conflict, there are other effects that are not as obvious, but which have large consequences for the well-being of civilian populations in conflict zones. At a basic level, conflict impacts decision-making at the household level as households undertake efforts to cope with its repercussions, particularly the effect of conflict on economic activity. Such strategies include income and consumption smoothing, locational displacement, as well as a whole host of changes to employment, health and schooling decisions. Recent literature examines many dimensions of the household-level effects of armed conflict, such as education (Diwakar, 2015), consumption spending and returns to land and labor (Serneels and Verpoorten, 2013), domestic violence (La Mattina, 2017), social capital and trust (De Luca and Verpoorten, 2015a), and civic participation (De Luca and Verpoorten, 2015b).

The most substantial body of work is on the relationship between armed conflict and education. Conflict is associated with lower educational attainment among exposed children (See for instance: Akresh, de Walque, 2010; Merrouche, 2011; Rodriguez and Sanchez 2012; Singh and Shemyakina, 2013; Swee, 2011; Shmeyakina, 2011). Armed conflict is also linked to reductions in *quality* of education, as measured by test scores (Brück et al 2013; Kibris, 2013). However, little is known about the impact of armed conflict on a closely related household decision: child labor. Using data from Colombia, Rodriguez and Sanchez (2012) define conflict as the number of attacks on infrastructure, civilians and government forces (including actions taken by common criminals) and find that armed conflict reduces school attendance and increases child labor. Another study, Di Maio and Nandi (2013), uses border closures between Israel and the West Bank as a proxy for conflict intensity. Their results suggest that high conflict intensity (defined in their study as a ten-day border closure) is associated with a 16% increase in the probability that a child will be engaged in child labor. Our paper uses a more reliable measure of conflict intensity and, more importantly, we employ a quasi-experimental difference-in-differences approach to examine the relationship between armed conflict and child labor. The next section briefly discusses conflict and youth issues in Iraq.

3. Iraq

Iraq has experienced several major wars in the last three decades, starting with the Iran-Iraq war in the 1980s, followed by the Gulf War in 1991, the US invasion in 2003 and the recent armed

[4] Author's calculation based on Harbom and Wallensteen's (2007) report of 232 armed conflicts since World War II. The average MENA share of the world's population is around 5.3% for the 1992 to 2015 period.

conflict with the Islamic State. This series of armed conflicts killed and injured hundreds of thousands of Iraqis and destroyed much of the Iraqi economy and its infrastructure. The Iraq Body Count (IBC) project estimates the number of recorded civilian deaths from the start of the US invasion of Iraq on March 20, 2003 to December 31, 2016 to be at least 171,175 (IBC, 2017). The Iraqi economy shrank in real terms by 64% in 1991 and by 33% in 2003 (World Bank, 2017). Wars in Iraq have also seriously damaged its educational infrastructure (including physical structures and displacement of teachers and students) to the point that the youth literacy rate actually *fell* from 85% to 82% between 2000 and 2011, with the number of children in primary school falling by over 88,000 between 2004 and 2007 (Diwakar, 2015).

Moreover, Iraq is home to one of the youngest populations in the world. The mean share of the population between 0 and 14 years of age was about 43% over the period 1995-2015, and it featured annual population growth of 2.9%, which is higher than that of Sub-Saharan African countries. The mean ratio of young dependents (less than 15 years old), to the working-age population (15-64 years old) is 79%. In 2015, the median age of an Iraqi was 19.3 years, which places it in the top 40 youngest countries in the world, and at the top of the MENA region along with Palestine and Yemen (United Nations, 2017). In sum, Iraq provides a unique opportunity to study the relationship between armed conflict, child labor and school dropout. Iraq also has excellent micro-level quantitative data on issues related to young children, which we discuss in the next section.

4. Data and Methodology

Data

This paper uses micro level data from the Iraq Multiple Indicator Cluster Survey (MICS). MICS is a nationally representative data set of Iraqi households that is collected by a joint effort of the Iraqi government and the United Nations International Children's Emergency Fund (UNICEF). Three waves of data are publicly available: 2000, 2006, and 2011, and the surveys include data on all 18 Iraqi governorates.[5] The primary objective of MICS is to monitor the situation of children and women in the countries in which it is administered. Hence, the surveys include a number of specific modules that cover many issues related to children in great detail. Specifically, the 2006 and 2011 waves include a child labor module that asks whether any child in the household aged 5 to 14 has been involved in any type of work, and the number of hours. The module distinguishes between economic and domestic work. Economic work is defined as work for someone who is not a member of the household. Domestic work mainly includes chores around the house (caring for other children, animals and livestock, cleaning, etc.). The age of the child, the type of work and work hours determine whether a child is engaged in child labor. We define child labor based on UNICEF's definition.[6]

- Child labor economic dummy – for children between 5 and 11, equal to 1 if the child was engaged in economic work for at least one hour in the week preceding the survey; for children between 12 and 14, equal to 1 if the child was engaged in economic work for at least 14 hours in the week preceding the survey; zero otherwise

[5] A 1996 wave is not publicly available, and UNICEF is currently working on the 2017 wave.

[6] See UNICEF's definition of child labor at https://www.unicef.org/infobycountry/stats_popup9.html (accessed on June 11, 2018).

- Child labor household dummy – equal to 1 if a child between 5 and 14 years old was engaged in at least 28 hours of domestic work in the week preceding the survey; zero otherwise

We estimate separate models for economic and household work to account for the different factors that might influence each type of child labor. Further, child labor is a household decision that is intertwined with school attendance. Being involved in child labor and dropping out of school are frequently associated with each other, and thus a potential source of endogeneity; children who do not attend school are more likely to work. To address this problem, we take advantage of the MICS education module that asks about the current schooling status of each member of the household above the age of five. We limit our sample to children in school in order to address child labor as an independent decision from school attendance.[7]

The 2006 wave includes 18,136 households, and the 2011 wave includes 36,592 households, for a total of 54,728 households in the pooled dataset. For households with children between the ages of 5 and 14, each child within this age range who is enrolled in school is a separate observation. Ultimately, the total number of observations is 68,476, with 21,507 children from the 2006 wave and 46,969 from the 2011 wave.

The primary regressor of interest is a measure of the level of armed conflict in the governorate where the child resides. To develop this measure at the household level, our paper merges the MICS dataset with data on armed conflict from the IBC project, which allows the construction of a measure of conflict intensity specific to the governorate in which the child resides. The IBC project has recorded civilian causalities since the beginning of the US invasion of Iraq. The IBC counts are not estimates, but are actual records of deaths that are substantiated by different sources (media reports, hospital, morgue, NGO and other official records).

Methodology

To study the determinants of child labor, we draw from MICS and from the IBC. Regressors include a measure of armed conflict intensity, demographics on children (the main unit of observation), and household characteristics. Specifically, we control for the child's age, gender, birth order (whether the child is the oldest), the relationship of the child to the head of the household (whether respondent is the child of the head of the household), the gender and age of the head of the household, whether the father is alive, whether the mother is alive, the education level of the father and mother, number of rooms for sleeping (as a proxy for wealth because the 2006 wave does not include household information on wealth), and location of the household (urban or rural).

To study the relationship between armed conflict and child labor we take advantage of time differences and geographical differences in conflict intensity across governorates to develop a difference-in-differences strategy. The level of violence in Iraq and the number of casualties due to armed conflict events fell very substantially between 2006 and 2011. Thus, we first create a dummy variable (A) that is equal to 1 for observations from 2006 (the high-conflict year) and equal to 0 otherwise. The second dummy is a treatment dummy (T) that takes the value 1 for governorates that experienced high conflict intensity and takes the value 0 otherwise. The

[7] The school attendance rate of the pooled sample is 91%, so we do not lose a large share of the full sample with this limitation. An earlier version of this paper includes the full sample. The results are similar to those presented here.

treatment (high-conflict) governorates are those with $T = 1$ and the control (low-conflict) governorates are those with $T = 0$. We define the treatment governorates as those with casualties due to armed conflict (per 1000 population) above the 75th percentile of the casualty rates, lagged one year, across governorates. Later in the paper, we try a number of robustness checks that vary the measure of conflict intensity and the cutoff level of conflict for the treatment group.[8] The difference-in-differences estimator is then the coefficient on the interaction between the two dummies ($A * T$).

Using the probit function to model our binary outcomes, the equation of interest is:

$$P(ChildLabor = 1) = \Phi(\beta_0 + \beta_1 A + \beta_2 T + \beta_3 (A * T) + \beta_4 X + \beta_5 HH + u)$$

Where A (high conflict year dummy) and T (high conflict governorate dummy) are defined above. X is a vector of individual characteristics of the child and HH is a vector of characteristics of the household. We also present results using a Probit without the difference-in-differences setup by simply including the casualty rate for the relevant survey year in the governorate in which the child resides as a regressor. We should note that, for the specific case of Iraq, endogeneity from reverse causation is not a serious issue. Until recently there has been no evidence of systematic use of child soldiers in Iraq. Even with the latest reports on the potential use of child soldiers by the Islamic State, estimates place fighters under 18 years old at less than 3% of new recruits (Human Rights Watch, 2016). Furthermore, the data for this study precede the formal creation of the Islamic State in Iraq.

5. Results

Main Results

Table 1a presents a descriptive summary of the child demographics used in the analysis, separately for each wave and for the pooled sample. The average age is 9.7 years, with the youngest and oldest being limited to 5 and 14 years to conform to the UNICEF definition of child labor. Slightly more than half of the sample are boys (54%) and around 16% are first born. The majority of the sample is either the son or daughter of the head of the household; 8% are grandchildren, siblings, or other relatives (nephews and nieces) of the head of household. Around 7% of the sample in 2006 are engaged in economic child labor activity, declining to 4% in 2011.

Table 1b presents summary statistics for household characteristics. As expected, the majority of households are headed by males, with 44 as the average age of the head of the household. Around 95% of the fathers and around 98% of the mothers of the children in our sample are living. In terms of education of the parents, about one third of the fathers completed primary school only, and about half completed secondary school. The pattern is inverted for mothers, with around 40% having completed primary school only, and one third with secondary education. The mean number of bedrooms is 2.3 and the size of the household is on average 8.4 members. Finally, the majority (60%) of the households are located in urban areas.

Table 1c presents statistics on five different armed conflict intensity measures:

1. Casualty rate - current year
2. Casualty rate - lagged 1 year
3. Casualty rate - lagged 2 years

[8] We also allowed the 75th percentile threshold to vary by year, and the result holds.

4. Casualty rate - mean lag 2 years
5. Casualty rate - accumulated 2 years

The average casualty rate per 1,000 population across all 19 governorates is 0.66 for 2006 and 0.11 for 2011, reflecting a large decline in conflict intensity within the five-year window. We see similar declines in conflict intensity for the other four measures.

Figure 1 shows the distribution of mean child labor incidence, by type, across all 18 governorates in Iraq. Economic child labor seems to be more prevalent in the west central part of Iraq, while household child labor is more widespread in the east, with presence in northern and southern governorates. These geographic differences reflect cultural and religious heterogeneity as well as dissimilar economic environments. The distribution across governorates appears to be similar for 2006 and 2011.

Tables 2a and 2b show estimates of a Probit model for economic and household child labor activities, using armed conflict intensity as a standalone variable. The conflict intensity measure in Tables 2a and 2b is the casualty rate per 1,000 population, lagged one year, in the governorate in which the child resides. Higher conflict intensity is associated with an increase in the probability that a child is engaged in economic labor, significant at the 1% level across all three samples (2006, 2011 and pooled). With respect to household labor, the coefficient is again positive for all three samples, but is statistically significant only for the 2011 sample. Consistently across samples and types of child labor, child age and the size of the household (number of members) are associated with higher likelihood of engaging in child labor activities. Females are more likely to be engaged in household child labor activities than their male counterparts. The age of the head of household, educational attainment of the father and mother (relative to the reference base of no school completion), location of the household in an urban area, and the 2011 year dummy are all associated with reductions in the likelihood that a child is engaged in child labor, although interestingly the mother's education is a significant determinant of economic labor, but not of household labor.

The results in Tables 2a and 2b should be interpreted as descriptive, and our main results are from the difference-in-differences model discussed earlier. Table 3 presents a comparison of mean characteristics across the treatment and control groups, as defined in the previous section. There are no substantial differences in the mean values of the observed child and household characteristics, with the exception of the education levels of the mother and father. Of course, by design, the treatment group displays higher means across all five conflict intensity measures. With this in mind, Table 4 presents the main results of the paper. Our variable of interest is the interaction term, and its coefficient represents the difference-in-differences estimator. The coefficient is positive and significant at the 5% level for economic child labor, but is not significant at conventional levels for household work activities. The signs and significance levels of the control variables are in line with the results presented in Tables 2a and 2b. In terms of magnitude, there is unfortunately no way to consistently calculate marginal effects for an interaction term in a nonlinear model.[9] Nevertheless, the results of Table 4 suggest that children

[9] For more details on the debate see Ai and Norton (2003) which first suggested a way to calculate marginal effects for interaction terms in nonlinear models, and Greene (2010) which cautions against their interpretation of partial effects in this case.

in households that experience armed conflict are more likely to engage in economic labor, but that conflict does not necessarily have an impact on household work. Turning to transmission mechanisms, being the first-born is a marginally significant predictor of economic child labor (t-statistic of 1.88), but is not a significant predictor of household labor. It is also interesting to note that the coefficient on the child's father being alive is *positive*, and significant at the 5% level, suggesting that working children are complementary to paternal labor, rather than substitutes. Again, this result is for economic labor only.

Robustness Checks

We conclude the results section with a series of robustness checks. First, we examine variations in the definition of conflict intensity. Our main results use a 1-year lag of the casualty rate (number of casualties due to armed conflict per 1000 population in the governorate in which the child resides) as our proxy for conflict intensity. The lag accounts for factors at the household level, like loss of income or loss of a household member, which could mediate an impact of conflict on child labor, but with a time delay. To examine the effect of variations in this definition on our main result, we run the same regressions as in Table 4 again, but using all five of the proxies for armed conflict that we outlined earlier. Figure 2 illustrates the coefficients on the interaction terms in all five models. For all models, the difference-in-differences estimator is positive and significant for economic labor, but not for household labor.

Second, we use the same setup as our main results, but also interact year and governorate dummies. There are perhaps confounding factors, such as economic activity, that influence the effect of conflict differently by governorate, so these interaction terms control for such factors. Table 5a presents the results, and they confirm our main findings in Table 4.

Third, we separate the sample by gender. The motivation is that our main results suggest fundamental gender differences for both economic and household labor; male children are more likely to engage in economic work but less likely to engage in household work. Further, while parental education reduces the likelihood of child labor in general, the mother's education does not appear to play a role in household child labor. Table 5b shows the results of our main model, but separated by gender. Interestingly, while the interaction term for economic child labor is positive for both boys and girls, it is significant only for girls. One interpretation of this finding is that armed conflict could push girls outside of the household for work, while it does not appear to influence the likelihood of household work which it seems, to a certain extent, is expected of some girls irrespective of conflict levels.

Fourth, for our main results, the child labor variables are dummies based on UNICEF's cutoffs with respect to the number of work hours by age group. It is perhaps worth examining the number of hours worked as a continuous measure of child labor. Table 5c presents Tobit regressions of the number of hours worked for both economic labor and for household labor, using the same difference-in-differences strategy as in our main results. In this case, the coefficients on the interaction term are positive and significant both for economic labor and for household labor. This suggests that conflict is associated with increases in *intensity* of child household work, even if we do not have evidence that it drives new *entry* into household labor under UNICEF's definition of engagement in child labor. Again, we cannot give an estimate of

magnitude, as there is no consistent way to calculate marginal effects for an interaction term in a nonlinear model.

Finally, we consider varying the definition of high conflict that we use to identify the treatment and control groups. Our main results use the 75th percentile of conflict intensity as a cutoff for the treatment group (high conflict intensity), but Figure 3 shows the coefficients on the interaction term under alternative thresholds for separating the high-conflict governorates from the low-conflict governorates, varying from the 30th percentile to the 80th percentile of casualty rates. The main results hold, both for economic and household labor, for all but the lowest threshold.

6. Conclusion

This paper uses household level data and pairs it with conflict data to examine the effect of armed conflict on child labor, by type of child labor (economic work versus household work). The data come from Iraq, and are paired with conflict data measuring the intensity of armed conflict by number of deaths at the level of the governorate. We take advantage of time and geographic differences in conflict intensity to create a quasi-experimental setup, identifying treatment and control groups. Using a difference-in-differences strategy, the results suggest that armed conflict is positively associated with economic child labor activities, but not household child labor. However, conflict is positively related to number of child labor hours for both types of child labor.

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Table 1a: Descriptive Statistics - Child's Demographics

Variable	Description	Year	Obs.	Mean	Std. Dev.	Min	Max
Child age	Child's age in years	2006	21,507	9.7	2.46	5	14
		2011	49,969	9.7	2.48	5	14
		Pooled	68,476	9.7	2.47	5	14
Child gender	=1 if child is male	2006	21,507	0.54	0.49	0	1
		2011	49,969	0.54	0.49	0	1
		Pooled	68,476	0.54	0.49	0	1
First born	=1 if child is first born	2006	21,507	0.17	0.37	0	1
		2011	49,969	0.16	0.37	0	1
		Pooled	68,476	0.16	0.37	0	1
Relationship to Head	=1 if child to head of household	2006	21,507	0.92	0.26	0	1
		2011	49,969	0.92	0.26	0	1
		Pooled	68,476	0.92	0.26	0	1
Child labor economic	=1 if child is engaged in child labor (economic)	2006	21,507	0.07	0.26	0	1
		2011	49,969	0.04	0.19	0	1
		Pooled	68,476	0.05	0.22	0	1
Child labor household	=1 if child is engaged in child labor (household)	2006	21,507	0.01	0.10	0	1
		2011	49,969	0.01	0.07	0	1
		Pooled	68,476	0.01	0.08	0	1

Table 1b: Descriptive Statistics - Household's Characteristics

Variable	Description	Year	Obs.	Mean	Std. Dev.	Min	Max
Head gender	=1 if head of household male	2006	21,507	0.94	0.23	0	1
		2011	46,969	0.94	0.22	0	1
		Pooled	68,476	0.94	0.22	0	1
Head age	Head of household age in years	2006	21,507	44.6	10.4	22	95
		2011	46,969	44.3	10.5	22	95
		Pooled	68,476	44.4	10.5	22	95
Father alive	=1 if father is alive	2006	21,507	0.95	0.21	0	1
		2011	46,952	0.96	0.19	0	1
		Pooled	68,429	0.95	0.20	0	1
Mother alive	=1 if mother is alive	2006	21,507	0.98	0.13	0	1
		2011	46,968	0.98	0.10	0	1
		Pooled	68,448	0.98	0.11	0	1
Father primary	=1 if father completed primary school	2006	21,507	0.28	0.45	0	1
		2011	46,969	0.33	0.47	0	1
		Pooled	68,476	0.31	0.46	0	1
Father secondary	=1 if father completed secondary school	2006	21,507	0.53	0.49	0	1
		2011	46,969	0.48	0.49	0	1
		Pooled	68,476	0.49	0.49	0	1
Mother primary	=1 if mother completed primary school	2006	21,507	0.40	0.49	0	1
		2011	46,969	0.45	0.49	0	1
		Pooled	68,476	0.43	0.49	0	1
Mother secondary	=1 if mother completed secondary school	2006	21,507	0.32	0.46	0	1
		2011	46,969	0.24	0.43	0	1
		Pooled	68,476	0.27	0.44	0	1
Rooms	# of rooms for sleeping	2006	21,507	2.2	1.0	1	12
		2011	46,969	2.3	1.0	1	13
		Pooled	68,476	2.3	1.0	1	13
Members	# of household members	2006	21,507	8.3	2.9	2	37
		2011	46,969	8.4	3.3	2	36
		Pooled	68,476	8.4	3.2	2	37
Urban	=1 if household is in urban area	2006	21,507	0.66	0.47	0	1
		2011	46,969	0.57	0.49	0	1
		Pooled	68,476	0.60	0.48	0	1

Table 1c: Descriptive Statistics - Conflict Measures

Variable	Description	Year	Obs.	Mean	Std. Dev.	Min	Max
Conflict rate	Casualties per 1,000 population, current year	2006	21,507	0.66	0.78	0.01	2.61
		2011	46,969	0.11	0.13	0.01	0.38
		Pooled	68,476	0.28	0.51	0.01	2.61
Conflict rate	Casualties per 1,000 population, lagged 1 year	2006	21,507	0.38	0.45	0.01	1.45
		2011	46,969	0.09	0.11	0.00	0.40
		Pooled	68,476	0.19	0.30	0.00	1.45
Conflict rate	Casualties per 1,000 population, lagged 2 years	2006	21,507	0.35	0.43	0.00	1.75
		2011	46,969	0.12	0.14	0.00	0.45
		Pooled	68,476	0.19	0.28	0.00	1.75
Conflict rate	Casualties per 1,000 population, mean lagged 2 years	2006	21,507	0.37	0.40	0.00	1.29
		2011	46,969	0.11	0.12	0.00	0.42
		Pooled	68,476	0.19	0.27	0.00	1.29
Conflict rate	Casualties per 1,000 population, accumulated lagged 2 years	2006	21,507	0.74	0.80	0.00	2.59
		2011	46,969	0.22	0.25	0.00	0.85
		Pooled	68,476	0.38	0.55	0.00	2.59

Table 2a: Determinants of Child Labor Economic - Probit Regression

	Year = 2006	Year = 2011	Pooled
Casualty Rate	0.560***	1.846***	0.169***
	(0.163)	(0.440)	(0.057)
Child Age	0.012**	0.021***	0.017***
	(0.006)	(0.005)	(0.004)
Child Male	0.299***	0.374***	0.337***
	(0.029)	(0.026)	(0.019)
First Born	0.047	0.046	0.042*
	(0.036)	(0.031)	(0.023)
Child to Head of Household	-0.170**	0.088	-0.031
	(0.078)	(0.064)	(0.049)
Head Male	0.018	0.074	0.031
	(0.104)	(0.087)	(0.065)
Head Age	-0.005**	-0.005***	-0.005***
	(0.002)	(0.002)	(0.001)
Father Alive	0.192	0.109	0.167**
	(0.124)	(0.096)	(0.075)
Mother Alive	-0.001	0.120	0.059
	(0.158)	(0.167)	(0.111)
Father Primary	0.037	-0.185***	-0.102***
	(0.059)	(0.045)	(0.036)
Father Secondary	-0.033	-0.256***	-0.171***
	(0.060)	(0.046)	(0.037)
Mother Primary	-0.064	-0.005	-0.023
	(0.044)	(0.038)	(0.029)
Mother Secondary	-0.168***	-0.156***	-0.162***
	(0.052)	(0.050)	(0.036)
# of Bedrooms	0.037*	0.009	0.021
	(0.020)	(0.017)	(0.013)
# of Household Members	0.001	0.022***	0.014***
	(0.007)	(0.006)	(0.004)
Urban	-0.648***	-0.368***	-0.482***
	(0.037)	(0.032)	(0.024)
Year is 2011			-0.358***
			(0.031)
Governorate Dummies	Yes	Yes	Yes
Observations	21,473	46,951	68,424

Notes: Probit regression used throughout. Constant output is omitted. Casualty rate measures conflict-related casualties per 1,000 population in province in which respondent lives, lagged by one year. Clustered standard errors appear in parentheses. * indicates significance at 10%; ** indicates significance at 5%; *** indicates significance at 1%.

Table 2b: Determinants of Child Labor Household - Probit Regression

	Year = 2006	Year = 2011	Pooled
Casualty Rate	0.341	3.829***	0.093
	(0.523)	(1.364)	(0.117)
Child Age	0.138***	0.158***	0.142***
	(0.013)	(0.011)	(0.009)
Child Male	-0.400***	-0.347***	-0.354***
	(0.062)	(0.053)	(0.039)
First Born	0.067	0.048	0.044
	(0.079)	(0.064)	(0.048)
Child to Head of Household	0.167	0.420**	0.249**
	(0.175)	(0.196)	(0.123)
Head Male	-0.211	-0.262	-0.228*
	(0.185)	(0.188)	(0.125)
Head Age	-0.008*	-0.012***	-0.010***
	(0.004)	(0.004)	(0.003)
Father Alive	0.459**	0.072	0.208
	(0.210)	(0.203)	(0.143)
Mother Alive	-0.104	0.374	0.063
	(0.231)	(0.352)	(0.176)
Father Primary	-0.126	-0.127	-0.143**
	(0.109)	(0.088)	(0.067)
Father Secondary	-0.322***	-0.227**	-0.280***
	(0.110)	(0.089)	(0.068)
Mother Primary	-0.037	-0.035	-0.031
	(0.093)	(0.067)	(0.054)
Mother Secondary	-0.134	-0.018	-0.073
	(0.106)	(0.085)	(0.066)
# of Bedrooms	-0.050	-0.032	-0.040
	(0.045)	(0.032)	(0.026)
# of Household Members	0.048***	0.022**	0.034***
	(0.014)	(0.011)	(0.008)
Urban	-0.494***	0.030	-0.201***
	(0.071)	(0.058)	(0.045)
Year is 2011			-0.329***
			(0.056)
Governorate Dummies	Yes	Yes	Yes
Observations	20,362	44,021	68,424

Notes: Probit regression used throughout. Constant output is omitted. Casualty rate measures conflict-related casualties per 1,000 population in province in which respondent lives, lagged by one year. Clustered standard errors appear in parentheses. * indicates significance at 10%; ** indicates significance at 5%; *** indicates significance at 1%.

Table 3: Mean Comparisons Across Control and Treatment Groups

		Control	Treatment
Child Demographics	Child age	9.7	9.7
	Child gender	0.54	0.55
	First born	0.16	0.16
	Relationship to Head	0.92	0.92
	Child labor economic	0.04	0.07
	Child labor household	0.007	0.007
Household Characteristics	Head gender	0.94	0.94
	Head age	44.2	45.1
	Father alive	0.96	0.95
	Mother alive	0.98	0.98
	Father primary	0.33	0.26
	Father secondary	0.46	0.59
	Mother primary	0.43	0.42
	Mother secondary	0.24	0.35
	Rooms	2.2	2.3
	Members	8.4	8.2
	Urban	0.59	0.62
Casualties per 1,000 Population	Current year	0.08	0.89
	Lagged 1 year	0.06	0.58
	Lagged 2 years	0.09	0.48
	Mean lagged 2 years	0.08	0.53
	Accumulated lagged 2 years	0.16	1.07

Table 4: Difference-in-Difference Estimates of Determinants of Child Labor

	Economic	Household
Year is 2006	0.394***	0.366***
	(0.036)	(0.060)
=1 if High Conflict	-0.137*	0.135
	(0.071)	(0.146)
Interaction of Year * High Conflict	0.142**	-0.131
	(0.071)	(0.141)
Child Age	0.017***	0.142***
	(0.004)	(0.009)
Child Male	0.337***	-0.354***
	(0.019)	(0.039)
First Born	0.042*	0.045
	(0.023)	(0.048)
Child to Head of Household	-0.033	0.247**
	(0.049)	(0.123)
Head Male	0.030	-0.230*
	(0.065)	(0.125)
Head Age	-0.005***	-0.010***
	(0.001)	(0.003)
Father Alive	0.170**	0.209
	(0.075)	(0.143)
Mother Alive	0.062	0.069
	(0.111)	(0.176)
Father Primary	-0.103***	-0.142**
	(0.036)	(0.067)
Father Secondary	-0.173***	-0.278***
	(0.037)	(0.068)
Mother Primary	-0.024	-0.034
	(0.029)	(0.054)
Mother Secondary	-0.162***	-0.075
	(0.036)	(0.066)
# of Bedrooms	0.020	-0.040
	(0.013)	(0.027)
# of Household Members	0.015***	0.034***
	(0.004)	(0.008)
Urban	-0.481***	-0.199***
	(0.024)	(0.044)
Governorate Dummies	Yes	Yes
Observations	68,424	68,424

Notes: Probit regression used throughout. Constant output is omitted. High conflict is one if number of casualties due to armed conflict per 1,000 population is above the 75th percentile of the number of casualties per 1,000 population lagged one year across all governorates. Clustered standard errors appear in parentheses. * indicates significance at 10%; ** indicates significance at 5%; *** indicates significance at 1%.

Table 5a: Robustness Checks: Interacting Year and Governorate Dummies

	Economic	Household
Year is 2006	-0.053	-0.206
	(0.090)	(0.142)
=1 if High Conflict	-0.015	0.512
	(0.122)	(0.385)
Interaction: Year * High Conflict	0.548***	0.163
	(0.116)	(0.228)
Child Age	0.017***	0.145***
	(0.004)	(0.009)
Child Male	0.341***	-0.360***
	(0.019)	(0.040)
First Born	0.045*	0.050
	(0.024)	(0.049)
Child to Head of Household	-0.030	0.266**
	(0.049)	(0.123)
Head Male	0.036	-0.251*
	(0.066)	(0.129)
Head Age	-0.005***	-0.010***
	(0.001)	(0.003)
Father Alive	0.163**	0.223
	(0.076)	(0.147)
Mother Alive	0.060	0.037
	(0.111)	(0.185)
Father Primary	-0.100***	-0.126*
	(0.036)	(0.069)
Father Secondary	-0.170***	-0.259***
	(0.037)	(0.069)
Mother Primary	-0.029	-0.036
	(0.029)	(0.055)
Mother Secondary	-0.162***	-0.070
	(0.036)	(0.067)
# of Bedrooms	0.020	-0.041
	(0.013)	(0.027)
# of Household Members	0.014***	0.031***
	(0.004)	(0.008)
Urban	-0.491***	-0.211***
	(0.024)	(0.046)
Governorate Dummies	Yes	Yes
Interaction: Year * Governorate	Yes	Yes
Observations	68,424	64,383

Notes: Probit regression used throughout. Constant output is omitted. High conflict is one if number of casualties due to armed conflict per 1,000 population is above the 75th percentile of the number of casualties per 1,000 population lagged one year across all governorates. Clustered standard errors appear in parentheses. * indicates significance at 10%; ** indicates significance at 5%; *** indicates significance at 1%.

Table 5b: Robustness Checks: Limiting Sample by Gender

	Economic		Household	
	Female	Male	Female	Male
Year is 2006	0.454***	0.367***	0.332***	0.418***
	(0.055)	(0.040)	(0.070)	(0.090)
=1 if High Conflict	-0.340***	-0.044	0.109	0.191
	(0.110)	(0.080)	(0.198)	(0.206)
Interaction: Year * High Conflict	0.306***	0.064	-0.055	-0.222
	(0.110)	(0.080)	(0.192)	(0.193)
Child Age	-0.020***	0.034***	0.157***	0.122***
	(0.006)	(0.004)	(0.011)	(0.013)
First Born	0.033	0.050*	0.011	0.094
	(0.043)	(0.029)	(0.069)	(0.070)
Child to Head of Household	-0.024	-0.037	0.319**	0.171
	(0.077)	(0.057)	(0.152)	(0.171)
Head Male	0.002	0.053	-0.044	-0.446***
	(0.098)	(0.072)	(0.157)	(0.160)
Head Age	-0.006***	-0.005***	-0.007**	-0.015***
	(0.002)	(0.001)	(0.003)	(0.004)
Father Alive	0.226*	0.139	-0.054	0.532***
	(0.117)	(0.086)	(0.168)	(0.205)
Mother Alive	-0.003	0.110	-0.002	0.264
	(0.165)	(0.120)	(0.214)	(0.332)
Father Primary	-0.188***	-0.068*	-0.150*	-0.109
	(0.056)	(0.039)	(0.086)	(0.087)
Father Secondary	-0.202***	-0.166***	-0.228***	-0.335***
	(0.056)	(0.041)	(0.088)	(0.093)
Mother Primary	-0.093**	0.013	0.024	-0.115
	(0.044)	(0.032)	(0.068)	(0.077)
Mother Secondary	-0.183***	-0.144***	-0.035	-0.148
	(0.055)	(0.041)	(0.079)	(0.104)
# of Bedrooms	-0.010	0.035**	-0.046	-0.039
	(0.021)	(0.014)	(0.034)	(0.040)
# of Household Members	0.018***	0.013***	0.030***	0.042***
	(0.007)	(0.005)	(0.010)	(0.011)
Urban	-0.581***	-0.434***	-0.112*	-0.342***
	(0.038)	(0.027)	(0.057)	(0.066)
Governorate Dummies	Yes	Yes	Yes	Yes
Observations	30,941	37,483	30,941	36,259

Notes: Probit regression used throughout. Constant output is omitted. High conflict is one if number of casualties due to armed conflict per 1,000 population is above the 75th percentile of the number of casualties per 1,000 population lagged one year across all governorates. Clustered standard errors appear in parentheses. * indicates significance at 10%; ** indicates significance at 5%; *** indicates significance at 1%.

Table 5c: Robustness Checks: Estimating Number of Child Labor Hours

	Economic	Household
Year is 2006	8.979***	1.571***
	(0.506)	(0.149)
=1 if High Conflict	-2.836***	-1.467***
	(1.043)	(0.331)
Interaction of Year * High Conflict	2.180**	1.531***
	(1.033)	(0.326)
Child Age	2.041***	1.639***
	(0.073)	(0.021)
Child Male	8.296***	-4.786***
	(0.354)	(0.096)
First Born	1.051**	1.614***
	(0.462)	(0.133)
Child to Head of Household	-0.752	-0.206
	(0.767)	(0.231)
Head Male	1.359	-0.473
	(1.000)	(0.288)
Head Age	-0.107***	-0.032***
	(0.019)	(0.006)
Father Alive	2.381**	1.202***
	(1.153)	(0.338)
Mother Alive	2.360	0.163
	(1.439)	(0.423)
Father Primary	-1.754***	-0.197
	(0.516)	(0.160)
Father Secondary	-3.115***	-0.396**
	(0.529)	(0.162)
Mother Primary	-0.421	-0.241*
	(0.408)	(0.125)
Mother Secondary	-3.005***	-0.319**
	(0.515)	(0.149)
# of Bedrooms	0.402**	-0.013
	(0.188)	(0.057)
# of Household Members	0.373***	-0.036*
	(0.063)	(0.020)
Urban	-10.135***	-1.395***
	(0.360)	(0.103)
Governorate Dummies	Yes	Yes
Observations	68,424	68,424

Notes: Tobit regression. Constant output is omitted. High conflict is one if number of casualties due to armed conflict per 1,000 population is above the 75th percentile of the number of casualties per 1,000 population lagged one year across all governorates. Clustered standard errors appear in parentheses. * indicates significance at 10%; ** indicates significance at 5%; *** indicates significance at 1%.

Figure 1

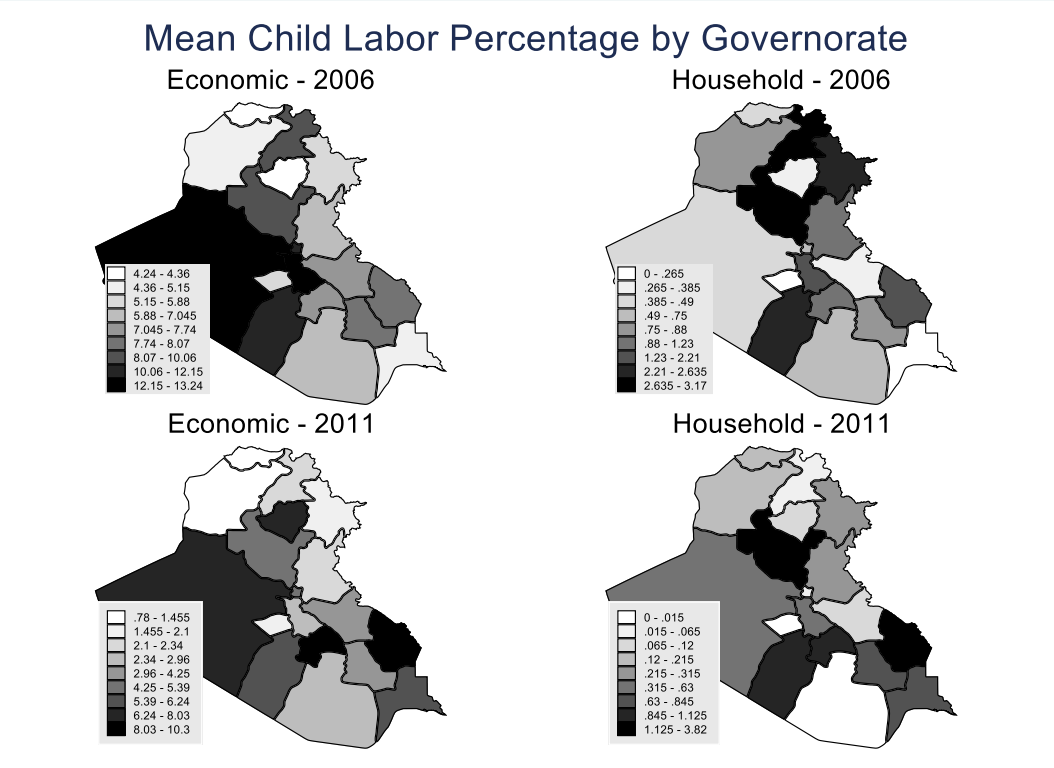

Mean Child Labor Percentage by Governorate
Economic - 2006
4.24 - 4.36
4.36 - 5.15
5.15 - 5.88
5.88 - 7.045
7.045 - 7.74
7.74 - 8.07
8.07 - 10.06
10.06 - 12.15
12.15 - 13.24
Household - 2006
0 - .265
.265 - .385
.385 - .49
.49 - .75
.75 - .88
.88 - 1.23
1.23 - 2.21
2.21 - 2.635
2.635 - 3.17
Economic - 2011
.78 - 1.455
1.455 - 2.1
2.1 - 2.34
2.34 - 2.96
2.96 - 4.25
4.25 - 5.39
5.39 - 6.24
6.24 - 8.03
8.03 - 10.3
Household - 2011
0 - .015
.015 - .065
.065 - .12
.12 - .215
.215 - .315
.315 - .63
.63 - .845
.845 - 1.125
1.125 - 3.82

Figure 2

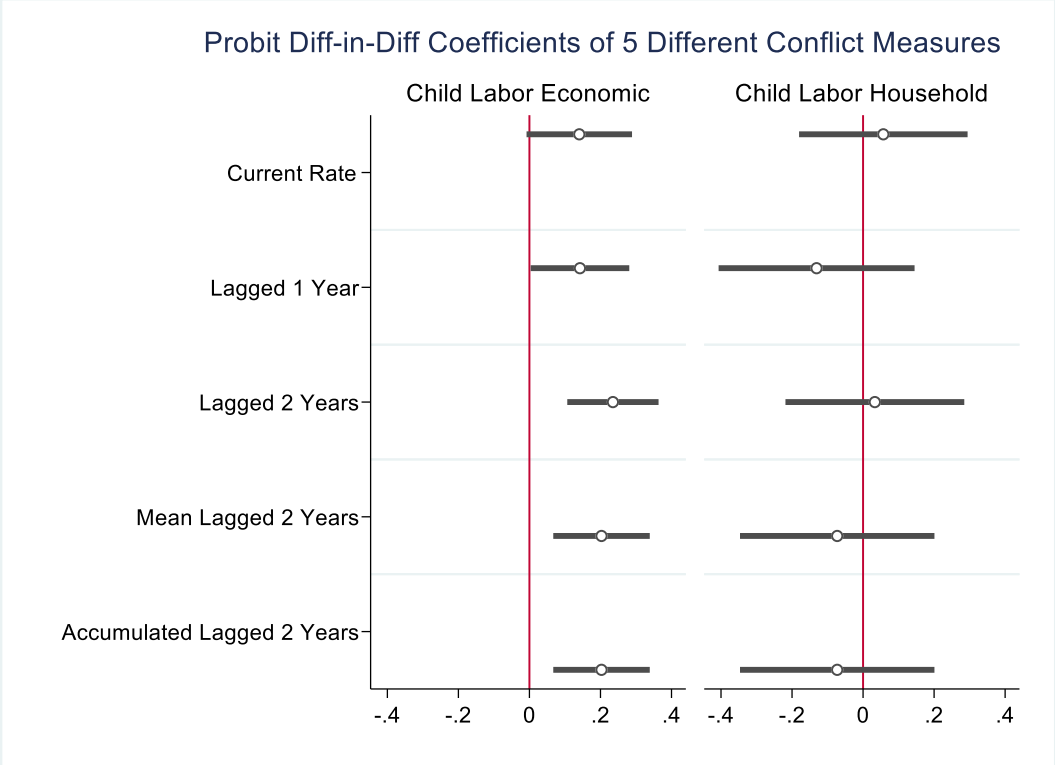
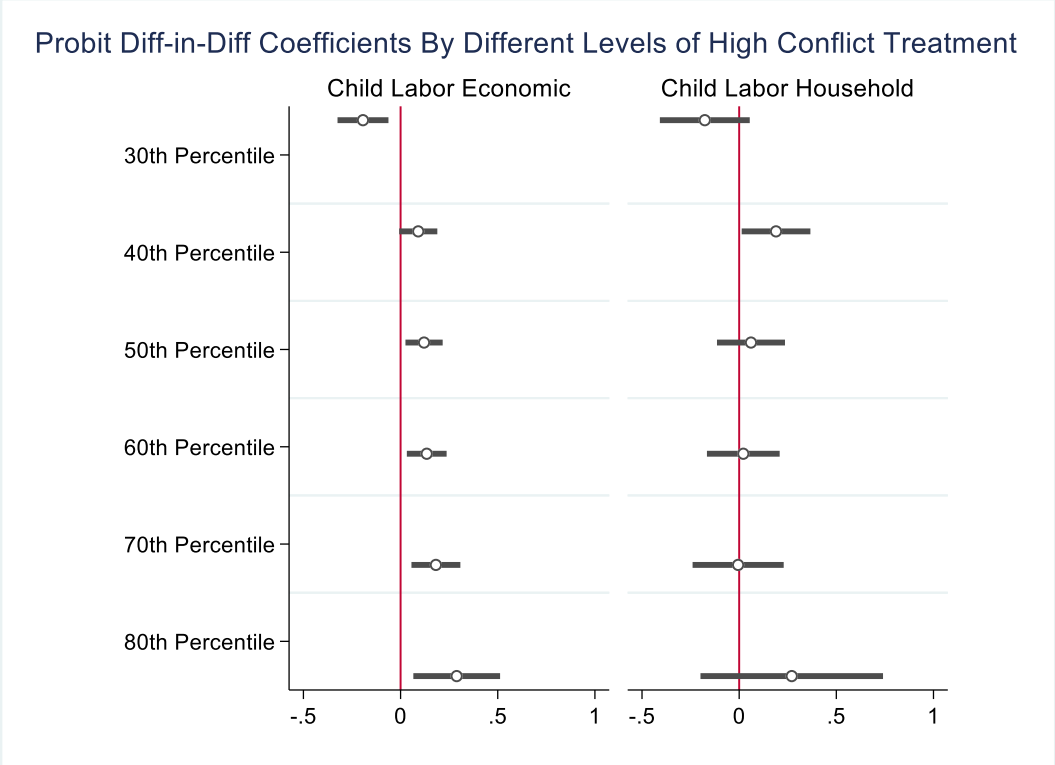

Probit Diff-in-Diff Coefficients of 5 Different Conflict Measures
Child Labor Economic
Child Labor Household
Current Rate
Lagged 1 Year
Lagged 2 Years
Mean Lagged 2 Years
Accumulated Lagged 2 Years
-.4
-.2
0
.2
.4

Figure 3


Probit Diff-in-Diff Coefficients By Different Levels of High Conflict Treatment
Child Labor Economic
Child Labor Household
30th Percentile
40th Percentile
50th Percentile
60th Percentile
70th Percentile
80th Percentile
-.5
0
.5
1
-.5
0
.5
1