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Child Mortality and the War on Terror: Afghanistan from 2007 to 2010

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Abstract:
To estimate the impact of armed conflict on child mortality, I use annual variations in violence across provinces in Afghanistan to identify children more affected by war than others. I find that children in provinces with higher level of violence have a higher chance of survival until the age of five compared to children in provinces with lower levels of violence. This finding is unexpected and surprising, however, it can be explained by higher development efforts in these provinces. In the provinces with more violence (e.g. Kabul, Kandahar), and therefore more terrorist attacks on mainly US-led ISAF troops, higher investments in the local infrastructure are more likely. This is because the US is the major donor of development aid in Afghanistan. Thus, I capture improvements in the health system as an effect of a higher influx of development aid in the US controlled provinces. Therefore, a positive effect of improvements in the health system outweighs a potentially negative effect of violence on child mortality.

Keywords: Armed Conflicts, Mortality, Children

JEL-Classification: I12, O12

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1. Introduction

Reducing child mortality is a major goal of development policies and the earliest indicator for the actual level of health and thus development in a country (Preston 1975, Strauss and Thomas 1998, Deaton 2003, Renton, Wall and Lintott 2012). Understanding the underlying mechanisms affecting child mortality is crucial in designing development projects and consequently targeted investments in the local health infrastructure. Hence, many of the underlying channels affecting child mortality are well understood. These channels can include nutrition (Wolfe and Behrman 1982, Pelletier, Frongillo, Schroeder and Habicht 1994), living conditions (Lee, Rosenzweig and Pitt 1997) and access to health care services (Lavy, Strauss, Thomas, de Vreyerd 1996).

Armed conflicts can be another channel affecting not just child mortality, but also other health outcomes, through weakening already fragile living and health conditions. This can include the destruction of local infrastructure, the reduced access to necessary resources or the stress experienced by mothers. However, research on the effect of armed conflicts on child mortality is relatively sparse and quite often limited to the country level. Most mortality studies on the effect of armed conflicts, e.g. war or civil war, focus on the country as a whole or broadly defined regions within a country. These studies compare the mortality rates before and after the conflict to compute excess mortality rates over the entire population. Examples for country studies include the genocide in Rwanda in 1994 (de Walque and Verwimp 2010, Verpoorten 2012), the 2003 invasion in Iraq (Burnham et. al 2006) and the conflict in Darfur (Degomme and Debarati 2010). There is only one dated study with a focus on child mortality explicitly and it can be found in the epidemiology literature. Ascherio et al. (1992) compute (excess) infant and child mortality rates for Iraq and the short Gulf War in 1991 and find excess child mortality due to the war.

This relatively crude approach ignores the effect of armed conflict at the household level and within smaller defined areas than a whole country, like provinces or even districts. Moreover, with this crude approach it is assumed that the conflict experience is uniform across a country. However, most conflicts vary spatially and over time in their intensity. Yet, understanding the effect of armed conflict at the household level is crucial in designing targeted health projects to mitigated the negative effects of armed conflicts for the households affected the most.

Most of the war-related mortality studies focus only on excess mortality rates. Kiros and Hogan (2001) do also compute excess child mortality rates for the famine in Tigral-Ethopia during the conflict period 1973-1991 but additionally estimate the effects of parental education on child mortality at the community level. They distinguish between low and high intensity conflict-affected communities in a robustness check. This is more relevant for my approach to estimate the effect of war on the individual risk of children surviving to the age of five.

In this paper, I use Afghanistan as a case study to estimate the effect of armed conflict on child mortality. To this end, I utilize the 2010 Afghan Mortality Survey (AMS) and data on the spatial and temporal distribution of civilian victims during 2007 and 2010. This allows me to identify provinces which are more affected by violence than others and therefore the estimation of a casual effect on child mortality of the so-called "War on Terror". With this approach I may add to following research fields.

First, I identify another and less explored possibly negative exogenous shock affecting child mortality in developing countries. These shocks can include weather shocks like droughts (Rukumnuaykit 2003, Flato and Kotsadam 2015) or rainfall shocks (Rose 1999), recessions (Bhalotra 2010, Baird, Friedman, and

Schady 2011), and of course the shock identified in this paper.

Second, in estimating the effect of armed conflict on a health outcomes, I add to the economic cost of conflict literature. Armed conflicts can affect health outcomes at the micro level. These outcomes include low birth weight (Camacho 2008, Mansour and Rees 2012) and lower height early in life (Bundervoet, Verwimp and Akresh 2009, Guerrero-Serdan 2009, Akresh, Akresh and Verwimp 2011, Lucchetti and Thirumurthy 2012). These conditions affect child mortality, especially infant mortality, and are also likely to predict health and mortality later in life (Barker 1998, Case 2005, Verwimp 2012)

Another, and third strand is the literature on coping strategies when households face constraints in their daily lives. The Afghan population has been experiencing violence and war almost without an interruption since the Soviet invasion in 1979. The US-led invasion in 2001 to end the disastrous Taliban rule could be just another war for the conflict-striven households. In this light, households could have adopted strategies mitigating the effect of war. It is known from other negative shocks that households in developing countries do adapt to these shocks in shifting within households resources to other families members (Skoufias, 2003, Wainwright and Newman 2011, Dhanaraj 2016) including a possible preferential treatment of boys (Rose 1999) or adapt to changing market environments. In this light, Bove and Gavrilova (2014) find that the war in Afghanistan does not affect commodity prices in their sample of provinces, because households adopted to the uncertain environment.

Fourth and a final related field could be the effectiveness of development aid during crisis. The influx of tens of billions of dollars into the country and the presence of countless governmental and non-governmental organization assisting the civilian population, could mitigate the effect of war on the population (Tarp 2000, Paris 2004). Examples for relatively successful development projects can be found in Beath, Christia and Enikolopov (2014) focusing on economic well-being of households in selected districts and in Coleman and Lemmon (2011). Coleman and Lemmon discuss the success of the nationwide midwifery program in improving maternal health and thus reducing still births and complications at birth. Especially, these early complications could also lead to higher child mortality.

My main finding is that children living in provinces with higher levels of violence, actually have a higher chance to survive until the age of five. This finding is not predicted by the literature, but can be explained by likely higher investments in the health care systems in these provinces. These provinces have a higher presence of foreign troops and along with them higher efforts of rebuilding the country. Given that the Taliban left a country with almost no health care infrastructure, investments in the health system should have strong positive effects on the population. These positive effects are likely higher than the negative effects of war on children health and therefore mortality. My results complement the observed and decreasing crude mortality rates for Afghanistan (AMS 2010 Report, Rasooly et al. 2014).

In estimating the effect of war, I inadvertently and unexpectedly measure the effect of development efforts. This effect is more pronounced for the poor and households living in remote areas and therefore even less developed areas within the more war-affected provinces. Thus, the strategy of foreign troops to fight the Taliban but also to slowly rebuild the country has some success, at least in reducing child mortality. However, it should be kept in mind, that these are also the provinces with the most terrorist attacks and collateral damages in terms of civilian lives lost.

My paper is organized as follows. It follows a discussion of the data, my identification strategy in section 2. In section 3, I discuss the empirical model and my main results and in section 4, I perform a series of robustness checks. In section 5, I conclude the discussion.

2. Data, descriptive statistics and identification strategy

2.1. Data and descriptive statistics

In this paper, I utilize the Afghan Mortality Survey 2010 (AMS) to estimate the effect of war on child mortality. The AMS is an extensive and nationally representative survey on household deaths including the complete birth history of children and their date of death, in case of a death. The AMS is the first survey covering all 34 provinces of Afghanistan and includes 24,032 households and information on 113,784 children including 52,600 children in the age range relevant for my empirical models. Additionally, the AMS offers data on mortality of adults (sibling questionnaire, verbal autopsy reports) which could be used in future work. The survey itself includes basic socioeconomic information on all women (age 12 to 49) present in the household at the time of the interview, on household assets and the living situation and the utilization of health services during pregnancy and at birth.[1]

In Table 1, I present basic descriptive information on the households for the entire country and already areas differently affected by the war. Women are relatively young on the average and more than 73% do not even have basic education. Due to the war and the Taliban rule, Afghanistan has a relatively high rate of children dead (20%) and a relatively low rate of children ever born. Almost 50% of the households have access to electricity but only a minority can afford a refrigerator. The more war-affected areas have a slightly higher level of development and lower rates of dead children for the entire birth history. However, the focus of my paper is on children up to the age of five. Thus, I

[1] There are no anthropometric measures (weight, size) of the children at birth which could explain mortality later in life.

calculate mortality rates for children up to the age of five (U5MR) by province and for the years 2007 to 2010 to have a first descriptive glance at child mortality. The actual mortality rates can be found in the appendix (Table A1). Given their spatial distribution it is helpful to visualize these mortality rates using GIS. Hence, in Figure 1, I visualize these mortality rates. It can already been seen that the U5MRs vary by province and by year. In the next section, I show that these mortality rates do vary with war-intensity and therefore allow me to identify provinces differently affected by war and sequentially to estimate a war-effect on child mortality.[2]

[Figure 1 about here]

2.2. Identification strategy

To estimate the (local) average treatment effect of war on child mortality, I need to identify children who are more affected by war than others. This requires to identify children who get the treatment *war* and children who do not got this treatment. The non-treated are also known as the control group. In a perfect (quasi) natural experiment setting, the control group would have no treatment at all. However, given Afghanistan has incidences of violence across the entire country, an adapted identification strategy is needed, e.g. the identification of children living in high war intensity provinces and low war intensity provinces.

I use annual data on civilian victims (dead and injured) to identify provinces more affected by war than others. My principal sources are the 2007 to 2010 United Nations Assistance Mission in Afghanistan reports (UNAMA 2016) and 2007 to 2010 incident data published by USAID (USAID 2016).[3] I have 30,218

[2]It would be possible to compute excess mortality rates for the provinces but excess mortality rates at least at the regional level can already be found in AMS 2010 report and are not in the scope of my paper.

[3]There are no systematic information on violent incidences available before 2006. Thus, the time frame chosen here.

data points for the period covered with sufficient observations for most provinces. However, violent incidences reported are generally a lower bound for the actual level of violence in a country and sometimes plagued with selection biases and misreporting. Hence, UNAMA and USAID double check the incidences for accuracy. Despite possible data problems, the incidence data allow me to identify patterns of violence across provinces well enough compared to conflict studies without any identification based on actual incidence data.

In Figure 2, I visualize the spatial distribution of violent incidences over time for all provinces in Afghanistan. The underlying data can be found in the appendix (Table A2). First, a spatial pattern is clearly visible with a concentration of violence in the north-east of the country and in provinces mainly controlled by ISAF troops led by the US (NATO 2016). This is not too surprising, given that insurgents are more likely to attack their proclaimed main aggressor and the government agencies they oppose (Kalvyas 2006). In the case of Afghanistan, this would be the US and their "War on Terror" and provinces like Kabul, especially Kabul city, Helmand and Kandahar (McNally and Bucala 2015). However, with even more troops present guarding potential targets, insurgents can move over time to other province where "successful" attacks might seem more manageable .

[Figure 2 about here]

Second, violence varies over time for some provinces. Thus, I need to account for this development in my identification strategy. For my treatment variable, I decide to code all provinces as high war intensity provinces if they are above a certain threshold, e.g. 400 cases for 2008 to 2010 for all four years observed. Given that a few provinces (e.g. Kabul, Kandahar) show very high rates of incidences, I code these provinces as very high intensity provinces for another set of models. All other provinces will be coded as low intensity (e.g. non-treated). The few provinces (e.g. Panjsher, Sari-Pul) with almost no incidences are also the least populated areas of Afghanistan. A possible limitation of this strategy is that the binary nature of the treatment variable cannot account well enough for the variation of incidences over time, at least in a simple difference in difference setting. Thus, to overcome this issue, I construct a continuous exposure variable as well. I use monthly exposure to violence for each child as an alternative measurement for war exposure. I illustrate the maximum months of exposure possible by birth cohorts in Figure 3.

[Figure 3 about here]

3. The empirical model and main findings

3.1. The empirical model

My goal is to estimate the effect of war on child mortality at the individual level. I use the variation of exposure to violence to estimate a local average treatment effect in my regression models. In using another channel affecting child mortality, I complement the child mortality literature identifying individual risk factors such as the role of parental education, the living situation of households or the access to health services. Previous work on the effect of war, focused only on calculating excess mortality rates for broadly-defined regions within a country or whole countries ignoring confounding developments. However, child mortality can be affected by many channels and not just war, and thus, including other confounding channels into an empirical model is necessary to identify an effect of war. Hence, the use of household survey data allows me to control for other confounding factors. My empirical model is a variation of health production function and a binary linear probability model to estimate an average treatment effect of war on child mortality.

$$\text{U5MR}_{ijt} = \alpha + \gamma\text{War}_{ijt} + \beta_1\text{Child}_{ijt} + \beta_2\text{Mother}_{ij} + \beta_3\text{SES}_{ij} + \tau + \epsilon_{ijt} \quad (1)$$

U5MR is the mortality risk (or probability) and is defined as one if a child died before the age of five and zero otherwise. Given that infants (below age one) are the most vulnerable group of children and likely even more affected by war, I specifically use this sub-sample in a robustness check later. The coefficient γ captures the local average treatment effect of war on child mortality. The vector of child characteristics *child* includes the age of the child in months and the sex of the child. To control for the parental background, I use information on the age of the mother, her education and the marital status. These variables are included in the vector *mother*. Information on the socioeconomic background of the household are included in the vector *SES*. To control for time invariant variables (fixed effects) I include the variable τ. Typically, province and (or) year fixed effects would be used, however, my treatment variable could also capture some of these fixed effects. I decide to use household fixed effects and show birth year and province fixed effects models for comparison purposes. This allows me to control for variables which are specific to the households and I cannot control perfectly for, e.g. access to community health services, durable household assets not asked for in the survey or the short term living situation. The short term living situation could be the food situation of a household. With this approach I should also cover most information potentially related to the socio-economic status (SES) of the households. ϵ is the error-term and I use robust and clustered standard errors. The standard errors are clustered at the province level.

3.2. Main findings

In Table 2, I present results for my main models. For comparison purposes I show a baseline model without the treatment variable as well. In this baseline model, the child mortality rate is mainly explained by mother's education and age as well as the age of the child. Educated mothers are more likely to know how to cope with changing living situations. They are also typically more likely to utilize health services if access to them is given. This also explains why the children of older women have a higher risk to die. Older women have less education on the average, than younger women in Afghanistan. However, older women could make up the lack of education with a higher level of experience in raising children. Though, if mothers start already at a low level education, experience may not be enough to counteract the lack of education. Additionally, the effect of education is absorbed by the inclusion of a binary variable indicating if households live in rural areas or not. More than 90% of the women in rural areas have no education at all. Furthermore, and in general, the survival chance is higher for older children. Older children have a higher chance to survive given that they are stronger from a biological point of view than younger children. Thus their bodies are more adapted to changing environment they live in. However, this also requires that the child is actually surviving. Furthermore, older children could also have been less exposed to violence early in their lives. Violence against civilians started to increase slowly from 2007 onwards (UNAMA 2016). In this light, the age of a child itself does not contain much guidance from a development policy point of view. Finally, there is some evidence that boys have a higher chance to survive than girls, and thus, some of the scarce household resources are allocated to male children to increase the chance of their survival given their role as potential breadwinners later in life. The results remain relatively robust with the inclusion of my treatment variable, hence I focus on effect of war in the discussion of the models following the baseline model.

In the second part of Table 2, I show results for the effect of war on child mortality. I present models for high war intensity provinces and very high war intensity provinces in increasing the control group for the latter.[4] I expect a stronger effect of war in provinces with very high level of violence. I find that war decreases the mortality of children living in more war-affected areas. The effect is smaller in magnitude for very high intensity areas. These findings are surprising and not matched with results in the literature on the effects of armed conflict on mortality or health outcomes in general. Most studies find strong negative effects or at least negative but non-significant effects of armed conflicts on health outcomes like birth weight, birth size and height later in life. Moreover, the studies on child mortality (or adult mortality) do not offer much guidance either in explaining my finding given that only excess mortality rates are computed and armed conflict is not explored as an individual risk factor. Thus, this finding needs a plausible explanation and further exploration.

I offer a relatively intuitive explanation for my finding that children in more war-affected areas actually do have a higher chance of survival. The provinces affected by the war on terror the most, are also the provinces mainly controlled by US forces and therefore likely the provinces with the most influx of development aid. One of the main goals of the ISAF mission is to rebuild the country and consequently invest heavily in development projects. Thus, so far billion of dollars have been spent to rebuilt a country which was left by the Taliban as one of the least developed countries in the world. Specifically, all countrywide health indicators place Afghanistan in the group of countries at the bottom of the Human Development Index and specifically as the lowest ranked country in South Asia (HDR 2015).[5] In this light, bringing in development aid into a

[4]This includes following provinces: Kunduz, Paktia, Paktika, Uruzgan, Hilmand, Zabul, Kunar, Nangahar, Kabul, and Khost as high intensity and Kunar, Kabul, Khost, and Nangahar as very high intensity.

[5]These health indicators can include life expectancy at birth, infant and U5MR mortality. Afghanistan ranks 171 out of 187 countries in 2013. In 2013 life expectancy at birth was 49.1

country starting at a very low level of development and therefore investments into the health system, these investment, even with sometimes limited effectiveness, can improve the situation for the households and thus maternal and child health significantly. Given that the US government is one of the main contributors of development aid, it is very likely that investments take place in US controlled areas. However, these are also the areas with the most violence. Thus, in estimating the effect of war on child mortality, I unexpectedly measure the effect of development efforts in these provinces. This of course, needs additional exploration to make this hypothesis more plausible. To do so, I re-estimate my models by wealth quintiles and by the remoteness of the households. I expect that households with less resources, e.g. the poor and household further away from resources, e.g living more remote, benefit from development aid substantially. In this light, their mortality risk should be lower.

[Table about 2 here]

In Table 3, I present results by wealth quintiles for the treatment variable *war* only to conserve space. I find that the reduction of child mortality is higher in magnitude for the poor (1.1%) and loses its significance for the wealthy who may possess enough resources to ease the war situation. This is coherent with my above hypothesis. Within this argumentation, the poorest do not benefit from development aid as much because the poorest of the poor are sometimes hard to reach within a country, e.g. because of their living situations like living in unorganized and hard to reach slums or because of the focus of international donors or the national government on different groups than the poorest (Shephard and Cabral 2008, Briggs 2015). In this light, I find limited

years, infant mortality was 70.2 and U5MR was 97.3 per 1000 births respectively (HDR 2015).

evidence that wealthy groups within very high intensity provinces are actually affected by the war and not exposed to development aid. However, the estimates could also be an artifact of the choice of fixed effects.

[Table 3 about here]

To further link my finding to possible development aid, I estimate my models by remoteness scores, e.g. how far households live from the nearest center, usually the place where health and other facilities are present. The results are presented in Table 4. I find that the effect of war is the strongest for the most remote households. Additionally, there is no significant (or negative) effect for the least remote households in high intensity areas, e.g. the households closest to the center. This finding is expected when development aid is allocated to the households needing it the most. Again, I find limited evidence that households living in very high intensity areas but also close to the center, are actually affected by the war and do not benefit from development aid.

[Table 4 about here]

With these results, I feel comfortable to explain my finding that war actually reduces child mortality is a story of development aid. However, the case of Afghanistan is not your typical war.[6] Many wars (or civil wars) do have limited development aid present during active conflict situations while there are many aid agencies in Afghanistan. In this light, the efforts to rebuild the country have some success, at least in reducing child mortality.

[6]However, even it is called the ”War on Terror”, the conflict situation can be classified as war, at least in regards to number of battle related deaths. Wars have at least 1,000 battle related deaths (Small and Singer 1982).

4. Robustness checks and infant mortality

4.1. Robustness checks

In this section, I perform a serious of robustness checks to examine the link between exposure to violence, and thus exposure to development aid, to child mortality. For this, I explore the effects of possible internal displacement, data issues, a different measure of violence and the choice of parental education. Most of these potential could potentially threaten the validity of my above results.

Typically, an issue with household data from war regions is if internal displacement (e.g. migration) affects the structure of the household and therefore the sample. Internal displacement takes place when households leave their homes to move to safer areas within a country, e.g. stay at relatives or in camps. If households move from more war-prone areas to somewhat safer areas, mortality rates in safer areas could be higher than in the war-prone areas because children were already affected by the war at their original homes. However, despite the high number of internally displaced people in Afghanistan[7], they move paradoxically to provinces like Kabul and Kandahar because they feel safer there (UNHCR 2008, IDMC 2016) and live mostly in camps organized by UNHCR (UNHCR 2008) which are not covered by the AMS 2010. This movement can be explained by the higher presence of foreign troops and the higher degree of urbanization in these provinces, and thus likely higher access to resources and foreign help. With this observation, I do not expect that accounting for household migration will affect my child mortality results significantly. In Table 5, I show results for my models accounting for migration. I utilize information on household members who moved after 2005 into the household. However, I have

[7] As of June 2015, there were 948,000 internally displaced persons (IDP) in Afghanistan. However the number of IDPs jumped significantly after 2014 (IDPs reported for 2013 was 513,000) when foreign troops mostly left the country and the security situation decreased significantly in Afghanistan. For the years, I cover the number of IDPs were relatively moderate but increasing due to the increase in violence, e.g 153,700 in 2007 and 317,065 in 2011.

no information on their exact reasons or where they originated from and assume it is mainly because of security concerns. Moreover, the observed migration is relatively limited, and thus I find that migration does not change my results significantly.

[Table 5 about here]

Another potential issue with data from conflict regions is that some parts of the country are less accessible because of security issues and thus may be underrepresented in household samples. Hill (2012) argues that especially the South of Afghanistan may be underrepresented and shows that the computed and decreasing mortality rates reported in the AMS 2010 report are biased and likely driven by politics expecting positive developments. Data issues may be true for household data of conflict regions in general, but his specific view is not shared with AMS report officials and I also find decreasing overall rates at least for some parts of the country. However, I check this particular issue by excluding the South (broad region and provinces) from my models. This may be a helpful strategy given that two and less populated districts have no deaths reported at all (Zabul, Panjsher) and mortality rates for these provinces could not be computed for my descriptive statistics.[8] Yet, I do not expect my results for the heavily war-exposed provinces to be affected for two reasons. First, the number of war-exposed and less-war exposed households is distributed relatively evenly between my treatment and control group provinces. Second, I do estimate the individual risk and for this I need information for children who died and did not die. In the provinces likely affected by sampling biases, I still have cases of children surviving to the age of five and beyond. In Table 6, I present the treat-

[8] The AMS 2010 report provides mortality rates for broader regions and some of their optimistic findings could have been driven by just a few provinces.

ment variable for excluding the South and find the results are similar compared to my full sample of provinces but somewhat higher in magnitude, e.g. because of excluding these areas.[9]

[Table 6 about here]

Another issue concerning the validity of my results could be the choice of my exposure to war variable. Through the binary nature of my treatment variable, I allow for little variation over time in the conflict experience itself. To remedy this concern I use monthly exposure to violence. With using monthly exposure to violence, I can control for a more heterogeneous conflict experience across the provinces and over time. In Table 7, I present results for under five mortality. I find that an additional month of exposure to violence reduces the risk of dying by roughly 0.09%. The cumulative effect over a period of 48 months is slightly smaller compared to my above models. However, the direction of the effect remains similar and children more exposed to violence have a higher chance of survival.

[Table 7 about here]

One final but likely minor concern could be the role of parental education. Parental education is an important factor influencing child mortality because the demand for health services increases with education and educated parents are more able to cope with difficult situations. So far I only used a binary variable in my above models indicating if mothers received any form of education or not. I do have information on the specifics of the educational status of the

[9] A potentially remedy could be using a weighted least squares estimation and eye bulling the weights from this exercise. However, given the effect found here is small, I do not include weighted least square models in my paper.

mothers who actually received education. However, only 30% of the women received education at all and I only have specifics on these mothers. This reduces the sample size substantially. Additionally, half of these women just have primary education or less because some did not finish their first year of schooling. Still, I find that the effect of war for women actually having education is not significant anymore and education itself may have a stronger effect then external development aid. In sum, educated women could be more likely to cope with the fragile situation at hand. The results are presented in Table 8.

[Table 8 about here]

4.2. An additional view at child mortality: Infant mortality

In this section, I explore the effect on infant mortality (age less then one) additionally and therefore focus on the most vulnerable group of children, and thus, I expect a stronger effect of war on child mortality. The empirical model is similar to my above specification:

$$\text{IMR}_{ijt} = \alpha + \gamma \text{War}_{ijt} + \beta_1 \text{Child}_{ijt} + \beta_2 \text{Mother}_{ij} + \beta_3 \text{SES}_{ij} + \tau + \epsilon_{ijt} \quad (2)$$

Instead of using children up to the age of five, I limit the outcome to infants and estimate the risk of dying by the age of one. Given that infant mortality is mostly explained by birth circumstances, I add additional controls for the situation at birth, before and shortly after. This includes the role of antenatal care, place of delivery and if the mother got a tetanus injection during pregnancy. Results are presented in Table 9. Table 9 has two parts. First, I present a baseline model without additional controls for the health care utilization and then I add these controls.

I do find a somewhat stronger effect of war on infant mortality but similar in direction as in my previous models. Assuming that the treatment variable does capture underlying development efforts, the effect is stronger for the most vulnerable group of children by having increased access to resources improving maternal health and birth conditions. Coleman and Lemmon (2011) report that maternal health (including less still births) has increased substantially in Afghanistan, e.g. because of increased numbers of midwifes. Using properly trained midwifes at birth reduces birth complications and the risk of infection and thus, infant mortality in general. I capture this possible effect by where the birth take place. Most births do take place at home, instead of public hospital and other places where trained assistance is present. Thus, giving birth at home increases infant mortality. However, if women use services available to them (e.g. antenatal care, tetanus injections), the risk to die as an infant decreases. With controlling for the factors, I isolate the effect of war from other confounding factors and still find an effect similar in size and magnitude, and thus a final puzzle piece to attribute the positive effect of war on child mortality to higher development assistance present in the more war-affected provinces.

[Table 9 about here]

5. Conclusion

Armed conflicts like wars or civil wars can have devastating effects on health outcomes for children. These health outcomes can include lower birth weight and size but also lower height later in life. Child mortality is another and likely more important health outcome in the short run because reducing child mortality saves lives. Thus, understanding the potential negative effect of armed conflict on child mortality is imperative.

However, most studies on the effect of armed conflict focus on calculating just excess mortality rates and ignore the variation of armed conflict within a country and over time. Furthermore, this relatively crude approach ignores the effects of other confounding developments taking place parallel to a conflict (e.g. droughts) and the role of household resources as well as the role of the parents, likely one of the major factors mitigating negative external impacts on child health.

In this study, I focus on the effects of armed conflict at the household level and control for other factors affecting individual mortality to estimate an average treatment effect of armed conflict. I use the war in Afghanistan as a case study because of two reasons. First, I can utilize the 2010 Afghan mortality survey (AMS), a nationwide household survey including the complete birth history of mothers living in the households. Second, I can use detailed (event) data on violence for the period 2007 to 2010 to have a relatively complete picture of the distribution of violence across provinces and over time. This allows me to identify children who are more exposed to violence and children who are less exposed to violence and therefore to estimate a casual effect of the war on under age of five (and one) mortality of children in Afghanistan.

I find that the exposure to violence actually decreases the risk of dying for the children more affected by war by about 1 %. This finding is surprising and unparalleled so far in the literature and needs an explanation. The provinces mostly affected by violence (e.g. Kabul, Kandahar) are likely the provinces with more development agencies present and thus more help for the local population. This is because the US-led coalition fighting the so-called "War on Terror" is also aiming to rebuilt a country left at a very low level of development by the Taliban. Billions of US Dollars have been spent and thus, a positive effect on health outcomes should be observed. Given the US is the major donor of development aid in Afghanistan most help would be expected in provinces controlled by US troops. By estimating an effect of war on child mortality, I actually identified an effect of development aid in these provinces. The positive effect is stronger for the poor households and the households living in the most remote areas. These findings complement a story about successful development aid in these provinces.

Despite many reports in the media that most of the development aid spent in Afghanistan is ineffective (e.g. "shadow aid" or due to corruption), examples for successful local projects can be found in Afghanistan (see Coleman and Lemmon 2011). Reducing child mortality at least in some (and the most populated) provinces is a positive story in a slow and sometimes dire process of state rebuilding. However, these provinces are also the provinces where most civilians die because of attacks of the insurgents and as collateral in fights. Thus, once these children become of school age, they will have a higher risk of becoming another victim of the increasing levels of violence observed since 2007 and increasing even more since 2014, the year a majority of the ISAF forces left the country.

Moreover, my study also shows that just calculating mortality rates for a whole country or just broadly defined regions within a country does not give a complete picture of the effects of war on child mortality. If the data allow for the estimation of excess mortality rates at the province or even district level, I recommend it should be done, given this allows for better targeted development aid and state efforts to help the own population. Furthermore, future research should revisit other conflicts and use the household data collected (e.g. for the Iraq) to complete the understanding of the effects of armed conflict at the household level. Finally, more research could also be done on adult mortality, using the sibling and autopsy questionnaire as additional sources of information.

References

[1] Abouharb Rodwan and Kimball Anessa (2007) "A New Dataset on Infant Mortality 1816-2002", Journal of Peace Research, Vol.44 No.6, pp.743-754

[2] Akresh Richard and Verwimp Philip (2011) "Civil War, Crop Failure, and Child Stunting in Rwanda" Economic Development and Cultural Change, Vol. 59 No.4, pp.777-810

[3] Akresh Richard, Lucchetti Leonardo, and Thirumurthy Harsha (2012) "Wars and Child Health: Evidence from the Eritrean-Ethopian Conflict", Journal of Development Economics, Vol. 99 No.2, pp.330-440

[4] Ascherio Alberto, Chase Robert, Cot Tim, Dehaes Godelieave, Hoskins Eric, Laaouej Jilali, Passey Megan, Qaderi Saleh, Shuqaidef Saher, Smith Mary C., and Zaidi Sarah (1992) "Effect of the Gulf War on Infant and Child Mortality in Iraq", The New England Journal of Medicine, Vol.327, No.13, pp.931-936

[5] Baird Sarah, Friedman Jed, and Schady Norbert (2011) "Aggregate Income Shocks and Infant Mortality in the Developing World", The Review of Economics and Statistics, Vol. 93 No.3, pp.847-856

[6] Barker D.J.P. (1998) Mothers, Babies and Health in later Life", Second Edition, Churchill Livingston

[7] Bartlett Linda, Mawji S, Whitehead S, Crouse C, Dalil S, and Ionete D, Salama P (2005) "Where giving birth is a forecast of death: maternal mortality in four districts of Afghanistan, 1999-2002", Lancet, Vol.365, pp.864-70

[8] Bhalotra Sonia (2010) "Fatal fluctuations? Cyclicality in infant mortality in India", Journal of Development Economics, Vol. 93 No.1, pp.7-19

[9] Bloom David and Canning David (2005) "Health and Economic Growth: Reconciling the Micro and Macro Evidence", CDDRL Working Paper No. 42

[10] Bove Vincenzo and Gavrilova Evelina (2014) "Income and Livelihoods in the War in Afghanistan", World Development, Vol.60, pp.113-131

[11] Briggs Ryan (2015) "Does Foreign Aid Target the Poorest?", AidData Working Paper Series No.13, http://aiddata.org/sites/default/files/wps13_does_aid_target_the_poorest.pdf, last accessed 04/20/2016

[12] Bundervoet Tom, Verwimp Philip, and Akresh Richard (2009) "Health and Civil War in Rural Burundi", The Journal of Human Resources, Vol.44 No.2, pp. 536-563

[13] Burnham Gilbert, Lafta Riyadh, Doocy Shannon, and Roberts Lee (2006) "Mortality after the 2003 invasion of Iraq: a cross-sectional cluster sample survey", Lancet, Vol.368, pp.1421-1428

[14] Camacho Adriana (2008) "Stress and Birth Outcomes: Evidence from terrorist attacks", The American Economic Review, Vol. 98 No.2, pp.511-515

[15] Carvalho Natalie, Salehi Shah Ahmad, and Goldie Sue (2013) "National and sub-national analysis of the health benefits and cost-effectiveness in Afghanistan", Health Policy and Planning Advances, Vol. 18 No.1, pp.62-74

[16] Case Anne, Fertig Angela, and Paxson Christina (2005) "The lasting impact of childhood health and circumstance", Journal of Health Economics, Vol.24, pp.365-389

[17] Coleman Isobel and Lemmon Gayle (2011) "Maternal Health in Afghanistan - Improving Health and Strengthening Society", Council on Foreign Relations, Working Paper, `http://www.cfr.org/afghanistan/maternal-health-afghanistan/p25915`, last accessed 04/04/2016

[18] Deaton Angus (2003) "Health, Inequality, and Economic Development", Journal of Economic Literature, Vol. 41 No.1, pp.113-158

[19] Degomme Olivier and Guha-Sapir Debarati (2010) "Patterns of mortality rates in Darfur conflict", Lancet, Volume 375 No. 9711, pp.294-300

[20] De Walque, D. and Verwimp, P.(2010) "The Demographic and Socio-Economic Distribution of Excess Mortality During the 1994 Genocide in Rwanda", Journal of African Economies, Vol. 19 No.2, pp. 141-162

[21] Flato Martin (2015) "Droughts and Gender Bias in Infant Mortality in Sub-Saharan Africa", University of Oslo, Working Paper, `https://www.sv.uio.no/esop/forskning/aktuelt/aktuelle-saker/2015/dokumenter/flato-kotsadam.pdf`, last accessed 04/09/2016

[22] Gates Scott, Hegre Havard, Nygard Havard, and Strand Havard (2012) "Development Consequences of Armed Conflict", World Development, Vol. 40 No. 9, pp.1713-1722

[23] Guerrero-Serdan Gabriela (2009) "The effects of War in Iraq on Nutrition and Health: An analysis using anthropometric outcomes of children", HICN Working Paper 55

[24] Hagopian A, Flaxman AD, Takaro TK, Esa Al Shatari SA, Rajaratnam J, Becker S, Levin-Rector A, Galway L, Hadi Al-Yasseri BJ, Weiss WM, Murray CJ, Burnham G. (2013) "Mortality in Iraq associated with the 2003-2011 war and occupation: findings from a national cluster sample survey by the university collaborative Iraq Mortality Study", PLoS Med, Vol. 10 No.10, pp.1-15

[25] HDR (2015) "Human Development Report 2015 - Work for Human Development", UNDP, http://hdr.undp.org/sites/default/files/2015_human_development_report.pdf, last accessed: 04/17/2016

[26] Hill Kenneth (2012) "Gains in Afghan Health: Too Good To Be True?", Harvard Center for Population and Development Studies, Presentation, http://www.cgdev.org/doc/blog/Gains_in_Afghan_Health_CGD_Talk_pdf.pdf, last accessed 04/20/2016

[27] IDMC (2016) "Afghanistan IDP Figure Analysis", Internal Monitoring Displacement Centre, http://www.internal-displacement.org/south-and-south-east-asia/afghanistan/figures-analysis, last accessed: 04/18/2016

[28] Kiros Gebre-Egziabber and Hogan Dennis (2001) "War, famine and excess child mortality in Africa: the role of parental education", International Journal of Epidemiology, Vol. 30, pp. 447-455

[29] Lavy Victor, Strauss John, Thomas Duncan, and de Vreyer Philippe (1996) "Quality of health care, survival and health outcomes in Ghana", Journal of Health Economics, Vol. 15 No. 3, pp.333-357

[30] Lee Lung-Fei, Rosenzweig Mark, and Pitt Mark (1997) "The effect of improved nutrition, sanitation, and water quality on child health in high mortality populations", Journal of Econometrics, Vol. 77 No.1, pp.209-235

[31] Li Quan and Wen Ming (2005) "The Immediate and Lingering Effects of Armed Conflict on Adult Mortality: A Time-Series Cross-National Analysis", Journal of Peace Research, Vol. 42 No.4, pp.471-492

[32] Mansour Hani and Rees I. Daniel (2012) "Armed conflict and birth weight: Evidence from the al-Aqsa Intifada", Journal of Development Economics Vol. 99 No.1, pp.190-199

[33] Mcnally Lauren Bucala Paul (2015) "The Taliban Resurgent: Threat to Afghanistan's Security", Institute for the Study of War , http://www.understandingwar.org/sites/default/files/AFGH$\%$20Report.pdf, last accessed 04/13/2016

[34] Nato (2016) "ISAF Placemat Archives", http://www.rs.nato.int/isaf-placemat-archives.html, last accessed 04/13/2016

[35] O'Hare Bernadette and Southall David (2007) "First do no harm: the impact of recent armed conflict on maternal and child health in Sub-Saharan Africa", Journal of the Royal Society of Medicine, Vol. 100, pp.564-570

[36] Paris Roland (2004) "At War's End: Building Peace After Civil Conflict", Cambridge University Press

[37] Pelletier DL, Frongillo EA, Schroeder DG, and Habicht JP (1995) "The effect of malnutrition on child mortality in developing countries", Bulletin World Health Organization, VOl. 73 No.4, pp.443-448

[38] Preston Samuel (1975) "The changing relation between mortality and level of economic development", Population Studies, Vol. 29 No. 2, pp. 231-248

[39] Rasooly MH, Govindasamy P, Aqil A, Rutstein S, Arnold F, Noormal B, Way A, Brock S, and Shadoul A. (2014) "Success in reducing maternal and child mortality in Afghanistan", Global Public Health, Vol. 9 No.1, pp.829-842

[40] Renton A., Wall M., and Lintott J. (2012) "Economic Growth and decline in mortality in developing countries: An analysis of the World Bank development datasets", Public Health, Vol.126, pp.551-660

[41] Roberts Les, Ngoy Pascal, Mone Colleen, Lubula Charles, Mwezse Luc, Zantop Mariana, and Despines Michael (2003) "Mortality in the Democratic Republic of Congo: Results from a Nationwide Survey", Rescue.org, `https://www.rescue.org/sites/default/files/migrated/resources/drc_mortality_iii_report.pdf`, last accessed: 04/04/2016

[42] Rukumnuaykit P. (2003) "Crises and Child Health Outcomes: The Impact of Economic and Drought/smoke Crises on Infant Mortality and Birthweight in Indonesia", mimeo, East Lansing: Michigan State University.

[43] Rose Elaina (1999) "Consumption Smoothing and Excess Female Mortality in Rural India", Review of Economics and Statistics, Vol.81 No.1, pp.41-49

[44] Shepherd Andrew and Cabral Lidia (2008) "Aid approaches and strategies for reaching the poorest", CPRC Working Paper No.122, `http://www.chronicpoverty.org/uploads/publication_files/WP122_Cabral-Shepherd.pdf`, last accessed 04/20/2016

[45] Small, Melvin and Singer, David (1982) "Resort to arms: International and civil war, 1816-1980", Sage Publication

[46] Skoufias Emmanuel (2003) "Economic Crisis and Natural Disasters: Coping Strategies and Policy Implications", World Development, Vol. 31 No. 7, pp.1087-1102

[47] Strauss John and Thomas Duncan (1998) "Healh, Nutrition, and Economic Development", Journal of Economic Literature, Vol. 36, pp.766-817

[48] Tarp Finn (2000) "Foreign Aid and Development - Lessons learnt and directions for the future", Routledge

[49] UNAMA (2016) "Reports on the Protection of Civilians", https://unama.unmissions.org/protection-of-civilians-reports, last accessed 04/12/2016

[50] UNHCR (2008) "National Profile of Internal Displaced Persons (IDPs) in Afghanistan", UNHCR Report, http://www.unhcr.org/49ba33a02.html, last accessed: 04/18/2016

[51] USAID (2016) "Spatial density of security incidents observed for the period 2008 to 2013 for all the categories monitored", http://reliefweb.int/sites/reliefweb.int/files/resources/1263.pdf, last accessed 04/12/2016

[52] Verpoorten Marijke (2012) "Detecting hidden violence: The spatial distribution of excess mortality in Rwanda", Political Geography, Vol. 31, pp.44-56

[53] Verwimp Philip (2012) "Undernutrition, subsequent risk of mortality and civil war in Burundi", Economics and Human Biology, Vol.10, pp.221-231

[54] Wang Limin (2002) "Health Outcomes in Poor Countries and Policy Options", World Bank, Policy Research Working Paper 2831

[55] Wainwright Fiona and Newman Carol (2011) "Income Shocks and Household Risk-Coping Strategies: Evidence from rural Vietnam", Institute for International Integration Studies, Discussion Paper No. 358

[56] Walque de D. and Verwimp P. (2010) "The Demographic and Socio-Economic Distribution of Excess Mortality during the 1994 Genocide in Rwanda", Journal of African Economies, Vol.19 No.2, pp. 141-162

[57] Wolfe Barbara and Behrman Jere (1982) "Determinants of Child Mortality, Health, and Nutrition in a Developing Country", Journal of Development Economics, Vol. 11 No.2, pp.163-193

Figures

Figure 1: Mortality rates across provinces - 2007 to 2010

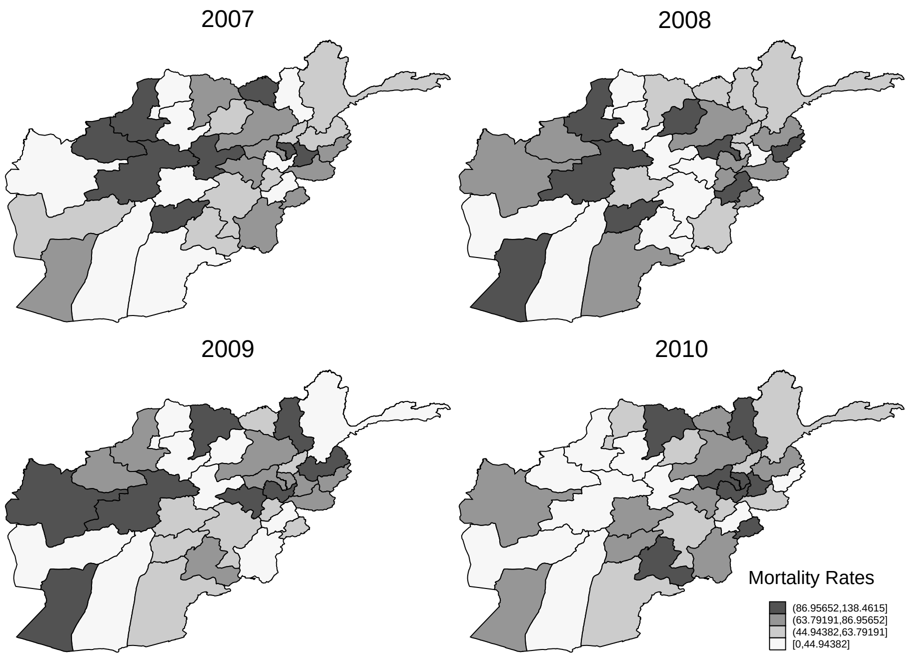


Figure 2: Civilians dead and injured across provinces - 2007 to 2010

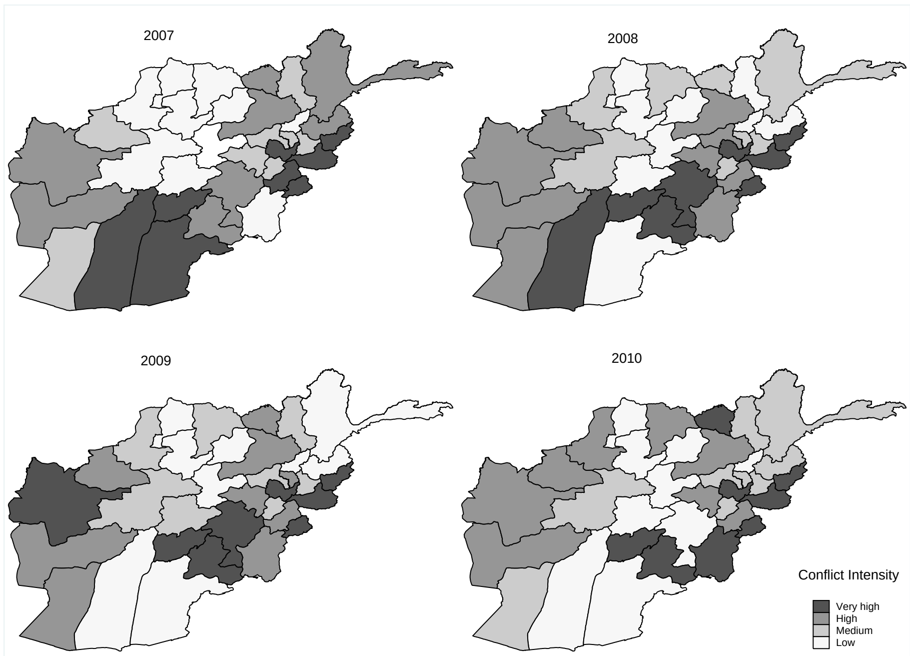
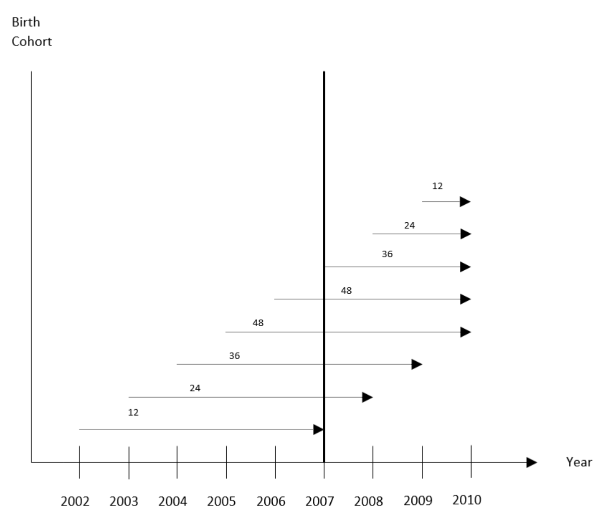


Figure 3: Maximum possible exposure in months by birth cohorts



Tables

Table 1: Descriptive statistics - AMS 2010

	All	Low intensity	High intensity
Age mother	24.39	24.25	24.49
no Education	73.33%	72.20 %	74.85 %
currently married	54.05%	54.90 %	52.90%
Children ever born	4.34	4.34	4.34
Children dead	21.49%	25.51%	15.83%
Current age child	10.96	10.85	11.10
Boys	53.22%	52.39%	54.38%
Currently pregnant	18.07 %	16.67 %	20.02 %
Urban	31.26 %	25.88 %	38.52 %
Unprotected water source	23.08%	24.02%	19.46%
Electricity	48.12%	51.48%	43.59%
Refridgerator	11.85%	11.41%	12.41%
Household deaths	0.29	0.30	0.28

Intensity refers to the number of civilians dead in a province. I sum these provinces up to low and high intensity regions.

Table 2: Child mortality - DiD regressions

Variables	Baseline		High intensity			Very high intensity		
War			-.0075**	-.0064**	-.0057***	-.0050**	-.0021	-.0057***
			(.0028)	(.0031)	(.0016)	(.0024)	(.0034)	(.0016)
Age mother	.0010***	.0010***	.0011***	.0011***	.0004***	.0010***	.0011***	.0004***
	(.0001)	(.0000)	(.0001)	(.0001)	(.0001)	(.0001)	(.0001)	(.0001)
Education	-.0053**	-.0028	-.0029	-.0020	-.0005	-.0025	-.0016	-.00057
	(.0021)	(.0020)	(.0021)	(.0025)	(.0018)	(.0021)	(.0025)	(.0018)
Married	.0000	.0003	-.0004	-.0014	.0027	-.0000	-.0011	.0027
	(.0057)	(.0057)	(.0055)	(.0054)	(.0040)	(.0055)	(.0055)	(.0040)
Sex of child	-.0023*	-.0022	-.0025*	-.0025*	-.0018*	-.0024*	-.0023*	-.0018*
	(.0013)	(.0013)	(.0013)	(.0013)	(.0010)	(.0013)	(.0013)	(.0010)
Age in months	-.0013***	-.0013***	-.0013***	-.0013***	-.0265***	-.0013***	-.0013***	-.0265***
	(.0000)	(.0000)	(.0000)	(.0000)	(.0006)	(.0000)	(.0000)	(.0006)
Rural		.0065***	.0054***	.0062***	-.0015	.0057***	.0068***	-.0015
		(.0021)	(.0019)	(.0021)	(.0027)	(.0019)	(.0021)	(.0027)
HH Fixed Effects	no	no	no	yes	no	no	yes	no
Province / Birth FE	no	no	no	no	yes	no	no	yes
N	50176	50176	50176	50176	50176	50176	50176	50176
R^2	0.16	0.16	0.16	0.16	.12	0.16	0.16	0.12

Notes: Standard errors are clustered at the province level and are shown in parentheses. * p<0.10, ** p<0.05, *** p<0.01

Table 3: Child mortality - by wealth quintiles

Wealth	Poorest	f.e.	Poorer	f.e.	Middle	f.e.	Richer	f.e.	Richest	f.e.
High	-.0053	.0014	-0109***	-.0145***	-.0089*	-.0091*	-.0011	.0006	.0014	.0063
intensity	(.0088)	(.0082)	(.0054)	(.0048)	(.0042)	(.0051)	(.0066)	(.0057)	(.0027)	(.0052)
N	8375	8375	8470	8470	9380	9380	10972	10972	12979	12979
R^2	0.18	.18	.17	.16	0.15	0.14	0.15	0.11	.14	0.11
Very high	-.0001	.0020	-.0192***	-.0235**	-.0093**	-.0099**	.0049	.0085*	.0024	.0104*
intensity	(.0175)	(.0343)	(.0058)	(.0078)	(.0032)	(.0028)	(.0049)	(.0046)	(.0027)	(.0044)
N	8375	8375	8470	8470	9380	9380	10972	10972	12979	12979
R^2	0.18	0.15	0.17	0.16	0.15	0.14	.15	0.11	0.14	0.11

Notes: Standard errors are clustered at the province level and are shown in parentheses.
* p<0.10, ** p<0.05, *** p<0.01

Table 4: Child mortality - by remoteness score

Remoteness	1	f.e.	2	f.e.	3	f.e.	4	f.e.	5	f.e.
High intensity	-.0136***	-.0161***	-.0081*	-.0077*	-.0033	.0043	-.0040	-.0069	-.0021	.0049
	(.0039)	(.0041)	(.0046)	(.0045)	(.0047)	(.0048)	(.0044)	(.0047)	(.0057)	(.0084)
N	11730	11730	13010	13010	10009	10009	9273	9273	6154	6154
R^2	0.17	0.12	0.16	0.11	.15	.15	.15	0.15	.15	0.15
Very high intensity	-.0128***	-.0150***	-.0054	-.0052	-.0010	.0118***	-.0005	.0017	-.0029	.0155*
	(.0044)	(.0055)	(.0059)	(.0061)	(.0040)	(.0034)	(.0037)	(.0041)	(.0058)	(.0082)
N	11730	11730	13010	13010	10009	10009	9273	9273	6154	6154
R^2	0.17	0.17	0.16	0.11	0.15	0.13	0.15	0.15	0.15	0.15

Notes: Standard errors are clustered at the province level and are shown in parentheses. Remotes scores range from 1 (= most remote) to 5 (= least remote) from the district center.
* p<0.10, ** p<0.05, *** p<0.01

Table 5: Robustness check - Migration

Variables	High intensity		Very high intensity	
War	-.0062**	-.0052*	-.0051*	-.0030
	(.0028)	(.0028)	(.0025)	(.0034)
HH Fixed Effects	no	yes	no	yes
N	41438	41438	41438	41438
R^2	0.15	0.15	0.15	0.15

Notes: To conserve space, I only report results for the war variable. Standard errors are clustered at the province level and are shown in parentheses. * p<0.10, ** p<0.05, *** p<0.01

Table 6: Robustness check - Data issues - Excluding the South

Variables	Whole country	Without South	f.e.	Without South II	f.e.
High intensity	-.0078**	-.0091**	-.0081**	-.0092***	-.0082***
	(.0029)	(.0036)	(.0030)	(.0025)	(.0026)
Very high intensity	-.0053*	-.0115***	-.0119***	-.0102***	-.0094***
	(.0027)	.0023	(.003)	(.0021)	(.0030)
N	50898	31000	30544	40364	39723
R^2	0.16	0.16	0.16	0.16	0.16

Notes: To conserve space, I only report results for the war variable. Standard errors are clustered at the province level and are shown in parentheses. I exclude the South (region and provinces). * p<0.10, ** p<0.05, *** p<0.01

Table 7: Exposure in months - DiD regressions

Variables	U5MR		
Exposure	-.0009***	-.0011***	-.0016***
	(.0001)	(.0002)	(.0003)
Age mother	.0011***	.0011***	.0004***
	(.0001)	(.0001)	(.0001)
Education	-.0020	-.0020	-.0001
	(.0042)	(.0028)	(.0020)
Married	-.0029	-.0027	.0034
	(.0053)	(.0056)	(.0043)
Sex of child	-.0035**	-.0034*	-.0019*
	(.0014)	(.0013)	(.0010)
Age in months	-.0013***	-.0013***	-.0260***
	(.0000)	(.0000)	(.0006)
Rural	.0004	.0007	-.0015
	(.0046)	(.0039)	(.0027)
HH FE	no	yes	no
Province / Birth FE	no	no	yes
N	50176	50176	50176
R^2	0.16	0.16	.12

Notes: Standard errors are clustered at the province level and are shown in parentheses. Exposure in months is based on low and high intensity areas and its variation over time. Fixed effects are at the province level.
* p<0.10, ** p<0.05, *** p<0.01

Table 8: Child mortality - DiD regressions - Role of parental education

Variables	Baseline	High intensity	Very high intensity
War		-.0023	-.0030
		(.0046)	(.0041)
Education	-.0028*	-.0028*	-.0028*
	(.0015)	(.0015)	(.0015)
HH Fixed Effects	no	no	no
N	6128	6128	6128
R^2	0.15	0.15	0.15

Notes: To conserve space, I only report results for the war variable and parental education. Including fixed effects renders every variable insignificant which could be due to the small sample size. Standard errors are clustered at the province level and are shown in parentheses. * p<0.10, ** p<0.05, *** p<0.01

Table 9: Infant mortality - DiD regressions

Variables	Baseline	High intensity			Very high intensity			Exposure		
War		-.0055**	-.0050	-.0095***	-.0048*	-.0025	-.0095***	-.0002***	-.0002**	-.0011**
		(.0027)	(.0034)	(.00170)	(.0023)	(.0039)	(.0017)	(.0000)	(.0000)	(.0004)
Age mother	.0006***	.0006***	.0006***	.0003**	.0006***	.0006***	.0003**	.0006***	.0006***	.0003**
	(.0001)	(.0001)	(.0001)	(.0001)	(.0001)	(.0001)	(.0001)	(.0001)	(.0001)	(.0001)
Education	-.0006	-.0007	-.0007	-.0003	-.0002	-.0004	-.0003	-.0003	-.0005	-.0001
	(.0026)	(.0027)	(.0029)	(.0026)	(.0027)	(.0030)	(.0026)	(.0027)	(.0030)	(.0025)
Married	-.0071	-.0079***	-.0057	-.0044	-.0075	-.0054	-.0044	-.0084	-.0062	-.0055
	(.0075)	(.0074)	(.0087)	(.0054)	(.0074)	(.0087)	(.0054)	(.0074)	(.0087)	(.0052)
Sex of child	-.0000	-.0002	-.0003	-.0014	-.0002	-.0002	-.0014	-.0003	-.0004	-.0015
	(.0017)	(.0017)	(.0018)	(.0014)	(.0017)	(.0018)	(.0014)	(.0017)	(.0018)	(.0013)
Age in months	-.0016***	-.0016***	-.0015***	-.0207***	-.0016***	-.0015***	-.0207***	-.0015***	-.0015***	-.0205***
	(.0001)	(.0001)	(.0001)	(.0009)	(.0001)	(.0001)	(.0009)	(.0001)	(.0001)	(.0008)
Rural	.0084***	.0076***	.0083***	.0033	.0076***	.0087***	.0033	.0069***	.0076***	.0033
	(.0023)	(.0021)	(0024)	(.0024)	(.0022)	(.0025)	(.0024)	(.0022)	(.0025)	(.0025)
Household FE	no	no	yes	no	no	yes	no	no	yes	no
Province / Birth FE	no	no	no	yes	no	no	yes	no	no	yes
N	26463	26463	26463	26463	26463	26463	26463	26463	26463	26463
R^2	0.13	0.13	0.13	0.12	0.13	0.13	0.12	0.13	0.13	0.12

Variables	Baseline	High intensity			Very high intensity			Exposure		
War		-.0053*	-.0052	-.0096***	-.0043*	-.0025	-.0096	-.00023***	-.00025***	-.0011***
		(.0026)	(.0034)	(.0017)	(.0024)	(.0039)	(.0017)	(.0000)	(.0000)	(.0004)
Home Delivery	.0046**	.0038*	.0032	.0017	.0037*	.0033	.0017	.0032	.0027	.0015
	(.0021)	(.0020)	(.0020)	(.0021)	(.0021)	(.0021)	(.0021)	(.0021)	(.0021)	(.0021)
Tetanus	-.0061***	-.0063***	-.0072***	-.0043**	-.0062***	-.0071***	-.0043**	-.0067***	-.0075***	-.0042**
	(.0018)	(.0018)	(.0019)	(.0020)	(.0018)	(.0018)	(.0020)	(.0019)	(.0019)	(.0020)
Antenatal Care	-.0048**	-.0051**	-.0049**	-.0022	-.0052**	-.0049**	-.0022	-.0054**	-.0053**	-.0020
	(.0022)	(.0022)	(.0020)	(.0019)	(.0022)	(.0020)	(.0019)	(.0022)	(.0021)	(.0019)
Household FE	no	no	yes	no	no	yes	no	no	yes	no
Province / Birth FE	no	no	no	yes	no	no	yes	no	no	yes
N	26227	26227	26227	26227	26227	26227	26227	26227	26227	26227
R^2	0.13	0.13	0.13	0.12	0.13	0.13	0.12	0.13	0.13	0.12

Notes: Standard errors are clustered at the province level and are shown in parentheses. Infant mortality is defined as one if a child died before the age of one.
* p<0.10, ** p<0.05, *** p<0.01

Appendix A. Underlying data for the GIS maps

Table A1: Crude age of under five mortality rates (U5MR) by provinces and year.

Province	U5MR 2007	U5MR 2008	U5MR 2009	U5MR 2010
Kabul	50.50	44.77	41.93	66.91
Kapisa	106.38	67.79	88.88	n.a.
Parwan	86.95	73.77	90.90	112.67
Wardak	75.47	44.24	97.22	1000
Logar	102.94	12.50	50.63	31.74
Nangarhar	32.68	44.96	56.27	126.18
Laghman	63.58	31.64	47.94	38.46
Panjsher	100.00	120.00	95.23	n.a.
Baghlan	57.97	35.03	71.17	68.06
Bamyan	138.46	142.85	117.64	n.a.
Ghazni	14.44	10.25	16.12	56.39
Paktika	15.87	76.33	100.00	139.53
Paktya	15.50	34.48	30.43	58.82
Khost	44.91	62.50	99.00	203.12
Kunar	24.19	73.27	64.93	72.84
Nuristan	118.64	44.77	90.90	217.39
Badakhsha	78.51	69.86	77.62	186.56
Takhar	84.80	84.15	95.61	57.59
Kunduz	89.68	58.82	59.13	97.56
Samangan	127.27	35.39	94.11	142.85
Balkh	58.65	60.60	62.11	64.93
Sari pul	66.66	61.06	92.30	64.51
Ghor	64.00	98.21	134.61	136.84
Daykundi	55.55	71.42	108.10	125.00
Urozgan	64.51	42.37	50.00	111.11
Zabul	n.a.	100.00	n.a.	n.a.
Kandahar	60.81	56.33	76.92	84.74
Jawzjan	79.47	95.23	78.74	140.84
Faryab	55.83	107.34	46.15	85.10
Helmand	n.a.	13.88	40.81	40.00
Badghis	44.94	54.79	114.28	270.83
Herat	111.11	109.19	69.18	105
Farah	80.80	23.80	97.82	101.12
Nimroz	55.55	29.41	88.23	172.41

Mortality rates per thousand and year. The mortality rate is defined as the number of deaths in a year divided by number of all births. For some provinces there were no deaths in a given year reported and the timing of the interview , e.g. this is especially an issue in 2010 where interviews were conducted from the beginning to the end of the year. Own calculations based on the AMS (2010).

Table A2: Incidences of Violence

province	2007	2008	2009	2010
Badakhshan	51	97	86	125
Badghis	4	153	258	383
Baghlan	59	215	244	368
Balkh	0	123	128	268
Bamyan	0	62	59	34
Daykundi	0	44	98	70
Farah	81	210	257	356
Faryab	0	97	203	353
Ghazni	83	431	547	1,178
Ghor	3	84	110	133
Hilmand	668	972	1,240	2,498
Hirat	40	232	371	496
Jawzjan	0	44	74	71
Kabul	342	618	865	539
Kandahar	393	1,746	2,151	2,512
Kapisa	17	129	325	168
Khost	215	624	710	876
Kunar	198	479	580	725
Kunduz	45	144	343	674
Laghman	37	135	172	110
Logar	26	148	187	256
Maydan Wardak	25	242	311	417
Nangarhar	121	563	682	862
Nimroz	12	330	249	246
Nuristan	45	65	64	108
Paktika	0	283	345	619
Paktya	240	264	266	513
Panjsher	0	1	8	5
Parwan	14	203	143	100
Samangan	0	20	12	18
Sari Pul	0	8	22	49
Takhar	16	52	103	256
Uruzgan	210	360	544	524
Zabul	81	511	528	622
Sum	3,026	7,945	8,897	10,350

Base for the GIS map in the text. Sources are the UNAMA 2007 to 2010 reports and USAID (2016).