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# ABSTRACT

## Conflict and Poverty in Afghanistan's Transition

Despite record economic growth in the decade that followed the fall of the Taliban regime, poverty remained stubbornly high in Afghanistan, and especially so in regions that suffered less from conflict. This paper aims to explain this puzzle by combining a model of conflict intensity at the province level in 2007–14 with a model of consumption at the household level in 2011. The estimates show that large troop deployments reduced conflict intensity but also boosted local consumption, an effect reinforced by foreign aid flows being larger in conflict-affected areas. Out-of-sample simulations suggest that declining international troops and foreign aid after 2014 would lead to an increase in conflict intensity and a decline in consumption per capita, two trends validated by independent data sources.

**JEL Classification:** D74, E21, F35, I32, O17

**Keywords:** Afghanistan, conflict, poverty, foreign aid, troops, growth

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## Introduction

Until earlier in this decade Afghanistan experienced record economic growth, at an average rate of about 9 percent between 2004 and 2013. Massive foreign aid inflows to fight the insurgency, ensure security, and finance development supported this remarkable performance. And yet poverty remained stubbornly high, with more than one third of the population having expenditures per capita below the poverty line.[1] The poverty incidence nationwide was 35.8 percent in 2011, compared to 36.3 percent in 2007.[2] During this period, consumption per capita was stagnant for the bottom 40 percent of the population, and it even declined for the poorest population quintile (figure 1).

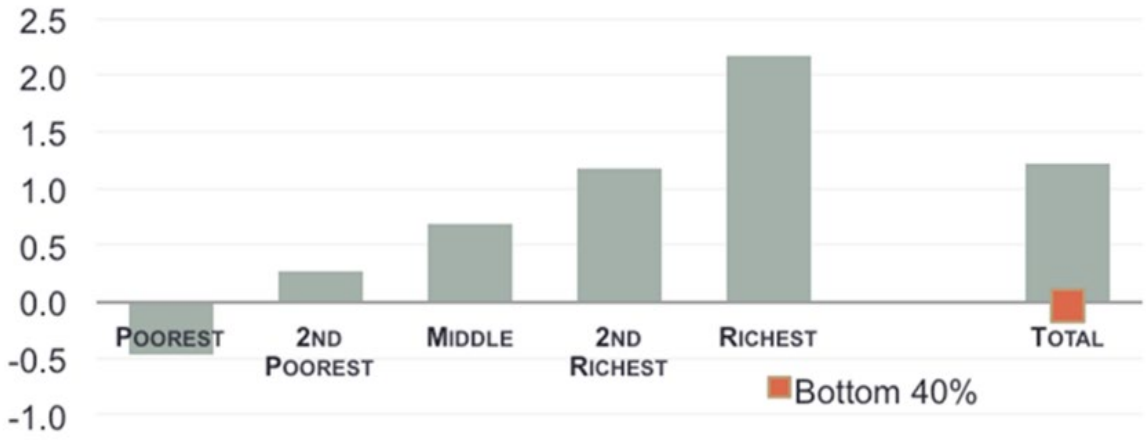


Figure 1. Annualized rate of consumption per capita (2007-11).

*Source:* World Bank (2015).

Living standards were lowest in the North, Northeast, and Central regions, where poverty rates ranged between 40 and 50 percent in 2011. About a third of Afghanistan's poor reside in these more remote parts of the country. By contrast, poverty rates were below 30 percent in the

South and Southwest regions. The gap between the poorest and least poor regions even widened over time. In the period from 2007 to 2011, poverty incidence increased in the North, Northeast, and Central regions, while it remained stable or decreased in the South and Southwest (figure 2).

There is a puzzle in poverty rates being persistently lower in the South and Southwest, because those are the regions where conflict has been more prevalent. Between 2007 and 2011, the provinces facing the highest increase in casualties experienced the fastest decline in poverty (figure 3). Conflict is believed to be especially damaging for the poor (Blattman & Miguel, 2010; World Bank, 2011; Brück, Justino, Verwimp, Avdeenko & Tedesco, 2013; D'Souza & Joliffe, 2013; Beath, Enikolopov & Christi, 2014; Parlow, 2016; Asongu & Nwachuku, 2017). But Afghanistan's experience challenges this belief.

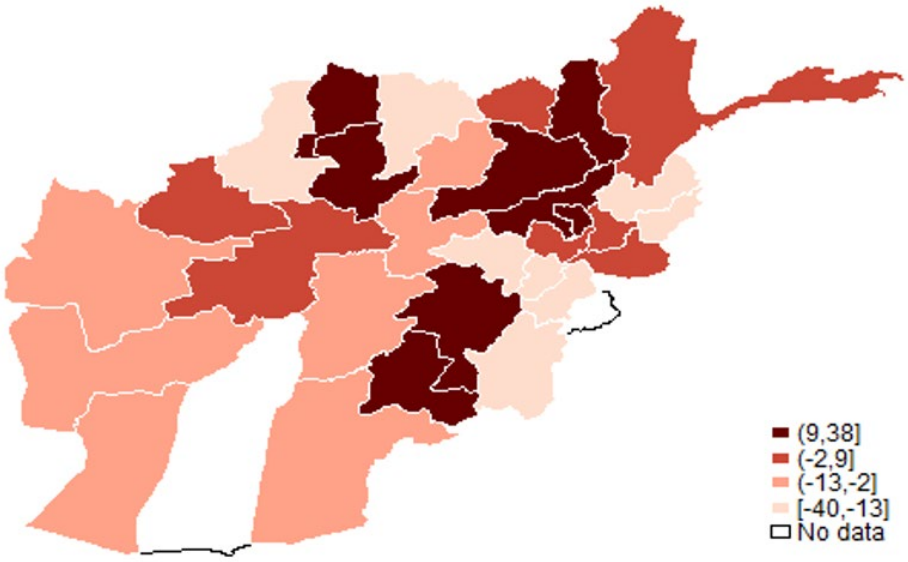


Figure 2. Changes in poverty headcount (2007-11)

*Source:* Own estimates using the National Risk and Vulnerability Assessments (NRVA).

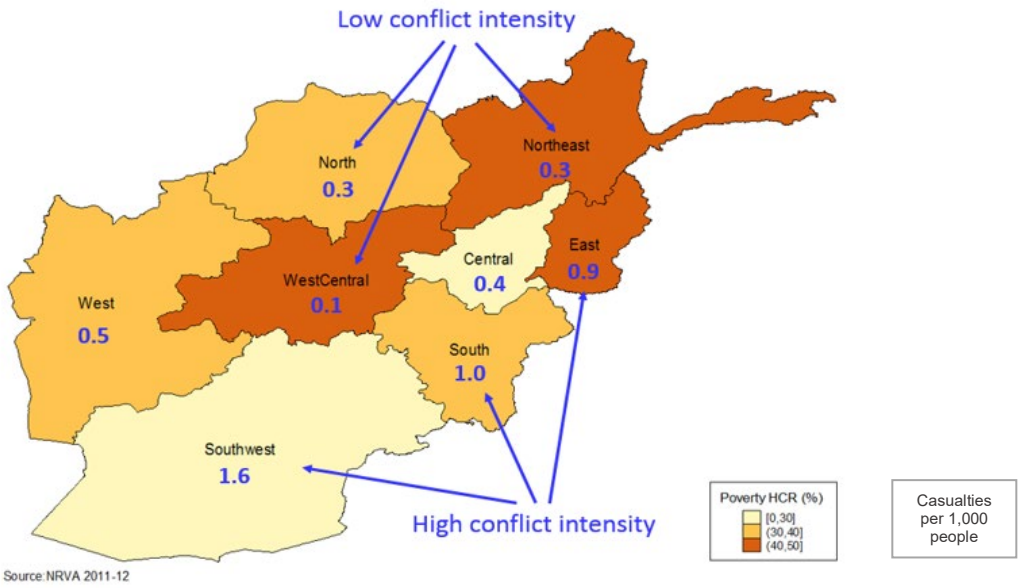


Figure 3. Lower poverty rates in conflict-affected areas (2011)

*Sources:* Own estimates using NRVA and United Nations Assistance Mission in Afghanistan (UNAMA, 2015).

There is also a concern as the international presence in Afghanistan recedes. While the number of international troops had started to decline in 2011, after the 'surge', the pace accelerated markedly after 2014. The expectation was that they would be replaced by Afghan troops. By the end of 2017, approximately 14,000 international troops remained on the ground, a far cry from the more than 130,000 present in 2011. This transition was accompanied by a decline in foreign aid, especially from the U.S. government and development agencies.

When these decisions were made, there was optimism that this transition would not have major impacts on economic growth and Afghanistan would remain on an upward course. Kapstein & Kathuria (2012) concluded that foreign aid had set the country on a more inclusive growth trajectory, despite the political and social tensions. The study *Afghanistan in Transition* (World Bank, 2013) concurred that foreign aid had an important role in driving economic growth

in the country. But it did not see the transition as a concern as long as other sources of economic growth—such as commercial agriculture and mining corridors—were developed to fill the void.

Analyses of this sort were generally muted on casualties, and how they would evolve as a result of the withdrawal of international troops. Yet the security situation was already deteriorating in 2012, with casualties increasing markedly in the following years (UNAMA, 2015). The greater prevalence of conflict and uncertainty about the future held back business and consumer confidence. Since 2014, economic growth has been muted, averaging 2 percent, a rate well below current demographic growth.

The goal of this paper is to gain a better understanding of the relationship between conflict, aid and poverty in Afghanistan. In doing so, the paper aims to explain the puzzle of lower poverty in areas more severely affected by conflict. It also addresses current concerns about the transition, shedding light on its possible impact on the dynamics of conflict and poverty in the medium term.

The paper makes three contributions to the work on conflict in Afghanistan. First, it provides a framework to analyse the dynamics of casualties considering the presence of troops and the levels of aid. Previous studies focus on at most two of these variables, while this paper brings all three together. Second, the paper explicitly introduces casualties, the presence of troops and the levels of aid into poverty analysis. In doing so, it builds on models like the one developed by D'Souza & Joliffe (2013), which links casualties and food prices at the local level. But the analysis is expanded here by considering a larger number of conflict-related variables. Third, these two analyses—on casualties and poverty—are combined to simulate the consequences of declines in foreign aid and international troops. There are a few papers in the literature on conflict that carry out such simulations, and they tend to be narrower in focus.

The implementation of the analyses relies on provincial-level data on conflict over the period 2007–14, and on a cross-sectional Household Survey from 2011. Spatial data on conflict is used to estimate a dynamic model of casualties at the provincial level, as a function of the current and lagged presence of troops. Household data on expenditures allows to model the determinants of consumption per capita, and specifically helps to assess the roles played by casualties, the level of aid, and the presence of troops. These two models are combined to simulate casualties at the provincial level from 2015 onward, and consumption per capita from 2012 onward. Comparing these out-of-sample predictions with actual figures on economic activity validates the proposed empirical approach.

**Previous research**

This paper is part of a growing literature on empirical studies of conflict. Departing from a longer tradition with roots in political science and strategic analysis, this literature builds on disaggregated data and empirical approaches. Until recently, the lack of reliable data tended to dissuade this empirical approach. Conducting censuses and surveys is challenging in conflict-affected areas, and administrative records tend to be incomplete in highly informal environments. But these obstacles are gradually being overcome, thanks to the availability of nontraditional sources of data, from military statistics to satellite imagery and mobile phone activity.

This new literature shows that military presence can reduce conflict. Studies on Iraq and cross-country analyses find that large deployments of troops can be effective in reducing violence, even in the most challenging environments. In practice, the effectiveness of large deployments depends on the number of troops and their equipment, the timing of the

interventions, and a clear mandate to use military force to prevent conflict (Biddle, Friedman & Shapiro, 2012; Hultman, Kathman & Shannon, 2013).

The key role played by international troops is confirmed by other studies. For example, using cross-country data, Hegre, Hultman & Nygard (2010) conclude that the size of UN peacekeeping operations—as measured by troop strength or budget—is the main determinant of the ability to effectively curb conflicts. In the cases of Iraq and the Philippines, researchers find that violence, as perceived by households, declines with the presence of international troops (Berman, Shapiro & Felter, 2011; Berman, Felter, Shapiro & Troland, 2013; Crost, Felter & Johnston, 2014).

However, military interventions can take a long time to achieve results and do not necessarily deter conflict. Condra, Felter, Iyengar & Shapiro (2010) document the persistence and pervasiveness of the conflict in Afghanistan, claiming that local exposure to civilian casualties caused by international forces has led to increased insurgent violence over the long run. Also using data from Afghanistan, Trebbi & Weese (2015) show that the insurgency is capable of acting strategically across districts and provinces, which further prolongs the conflict and military intervention.

The impact of the military presence on casualties typically varies spatially. The above-mentioned study by Hegre, Hultman & Nygard (2010) suggests that it is important to take time and location into account, in addition to troop numbers. Using data from the Kunduz and Badakhshan Provinces in Afghanistan's Northeast region, Derksen & Ruttig (2013) provide further evidence that the ability of troop deployments to contain conflict varies by locality.

Conflict also affects poverty and wellbeing. Brück et al. (2013) review the World Bank's Living Standard Measurement Surveys to suggest ways of capturing in these surveys the causes,

functioning, and consequences of conflict at the local level by better capturing the timing and location of the incidents of violence. Dercon (2006) and Verwimp (2005) analyse the effects of local violence on household wellbeing in Ethiopia and Rwanda and again, important geographic differences emerge. Similarly, Yanagizawa-Drott (2012) provides further evidence that geography matters in a study of how Rwanda radio stations encouraged people to participate in the genocide. The broadcast reach of these stations varied depending on the terrain, resulting in concentrations of violence in areas with strong reception from inciting stations.

In the case of Afghanistan, the prevailing consensus is that poverty increased as a result of the conflict. Using household data from 2007, D'Souza & Jolliffe (2013) find robust evidence that casualties and food security are negatively correlated. They attribute this relationship to disruptions of local markets leading to spikes in food prices. Callen, Isaqzadeh, Long & Sprenger (2014) show that the persistence and intensity of a conflict affects household expectations, with the poorest sections of the population having the most negative perception of their future wellbeing. Consistent with this perception, Ciarli, Kofol & Menon (2015) find that conflict reduces employment opportunities by making business investment less attractive while boosting self-employment in activities with low returns.

However, in conflict-affected states the allocation of international aid is often driven by political and security considerations. Douglas (2012) shows that in Afghanistan, foreign aid is positively correlated with conflict at the provincial level. This correlation holds both in the case of security assistance and—to a lesser extent—in the case of development aid. Parlow (2016) finds that in Afghanistan children in provinces with higher levels of violence have a higher chance of survival until the age of five compared to children in provinces with lower levels of violence. Although this finding is unexpected and surprising, it can be explained by higher

development efforts in more violent provinces. According to Johnson, Ramachandran & Walz (2012), development aid in Afghanistan has been fully anchored into the counterinsurgency strategy. Economic development in conflict areas is seen as essential to reducing local support for insurgents, in line with the 'winning hearts and minds' doctrine (Chou, 2012; Douglas, 2012; Sexton, 2016).

The extent to which development aid has defused conflict in Afghanistan is less clear. There have been unambiguous successes in small-scale and community-driven development projects. Beath, Fotini & Enikolopov (2014) conducted a thorough evaluation of the National Solidarity Program (NSP) relying on randomized control trials. Their findings show that this program had a positive effect on economic wellbeing and attitudes towards international and Afghan troops. However, Sexton (2016) claims that successes have been confined to areas already controlled by pro-governmental forces. In disputed areas, it has been claimed that aid fuels violence or is at best ineffective (Chou, 2012; Beath, Enikolopov & Christi, 2014). Findings have been similar in other fragile settings such as Iraq (Berman, Shapiro & Felter, 2011) and the Philippines (Crost, Felter & Johnson, 2014).

In Afghanistan's case, Bove & Gavrilova (2014) show that the presence of troops has a positive impact on wages at the provincial level. Using nonexperimental methods over the period 2003–09, they argue that this positive impact on wages more than offsets the negative impact of conflict. According to the estimates, the presence of troops in this period increased provincial wages by 0.5 to 1.7 percent. A plausible explanation for this effect is that troops procure supplies locally. But data availability is an important limitation in this area of work, as empirical analyses tend to rely on either relatively small samples.

A few working hypotheses emerge from this literature. First, the presence of troops appears to be effective at reducing casualties, albeit with a possible time lag and with varying effectiveness depending on the characteristics of the deployment and those of the communities affected. Second, casualties negatively affect household wellbeing by undermining food security, economic activity, and employment opportunities. Third, even in conflict-affected countries, foreign aid can have a positive impact on economic growth and household wellbeing. And fourth, military deployments also benefit households directly (by curbing the negative effects of casualties on households' welfare) and indirectly, presumably because the demand for goods and services to support the troops boosts local labour earnings.

**Approach and data**

Following Berman & Mattanock (2015), this paper adopts an integrated approach to study the dynamics of conflict, bringing together conflict dynamics and household expenditures. The approach is adapted to allow its empirical implementation in Afghanistan's case, taking into account the nature of the available data. In practice, two simple econometric models are combined (figure 4).

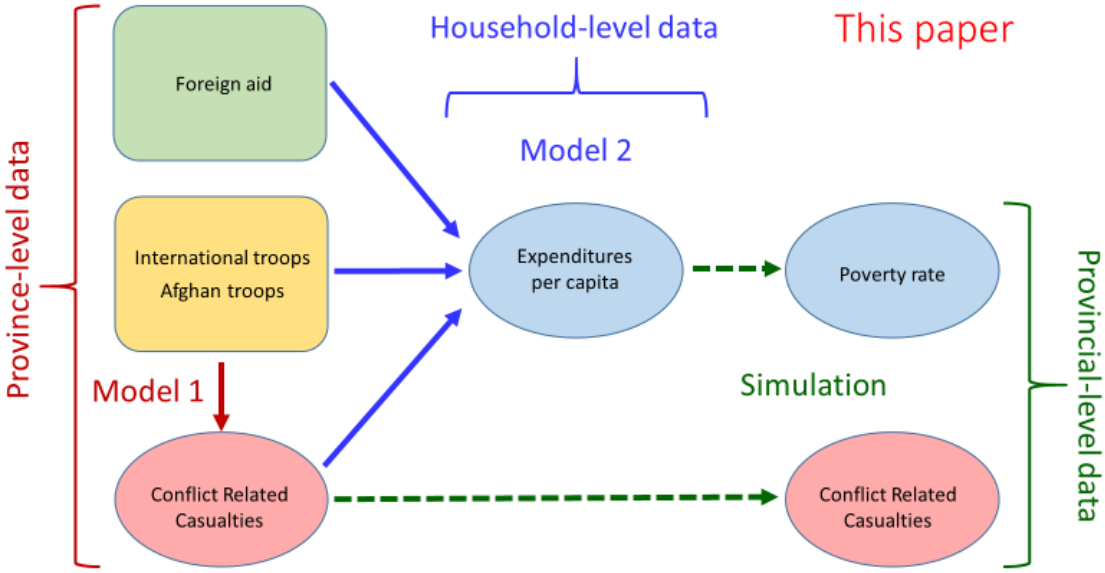


Figure 4. An integrated approach to explain trends in conflict and household wellbeing

*Source:* Authors.

Model 1 traces the evolution of total casualties relative to the population, at the provincial level. Its explanatory variables are the presence of international and Afghan troops on the ground. In turn, Model 2 estimates expenditures per capita across households at a point in time; expenditures per capita depend not only on household characteristics such as demographics and education, but they are also affected by conflict intensity, by foreign aid, and by the presence of troops at the local level.

The specifications chosen are such that the outcome of Model 1 can be directly plugged into the estimated Model 2. Combined with assumptions about the pace at which the presence of foreign troops and the level of foreign aid will decline, this approach yields predictions on casualties and household expenditures moving forward.

Since there is no readily available information to estimate Model 1, a database capturing the various dimensions of fragility at the provincial level had to be constructed for this paper. This database includes variables related to the presence of troops, and the total number of casualties (the number of deaths plus the number of injured among civilians, insurgents, and military forces). It also includes the level of foreign aid. The unit of observation is the province, and the data spans for the entire period where such information were made publicly available: between 2007 and the end of 2014.[3] Information is available for 32 provinces.

Publicly available data on international troops for each provinces come from the NATO International Security Assistance Force (ISAF) placemat for each Regional Military Command. Similarly, data on Afghan troops are from the NATO ISAF Public Affairs Office (NATO 2015). The main source of information on conflict-related casualties is the United Nations Assistance Mission in Afghanistan (UNAMA 2015). Foreign aid at the local level is estimated based on commitments at the provincial level reported by USAID, as well as data from the Afghan Ministry of Economy on budget aid commitments that are reported by line ministries**.** Even though alternative global databases cover casualties and aid flows in Afghanistan, the data sources selected are the only ones granular enough to provide yearly province-level indicators. As such, they cater better to the local context and were deemed more comprehensive, consistently with other welfare studies (World Bank, 2015, 2017). A technical note on the construction of the database and summary statistics of the variables (tables A-1 and A-2) are provided in Appendixes A and B to this paper.

Model 2 is estimated using the National Risk and Vulnerability Assessments (NRVA) household surveys fielded in 2007 and 2011. The NRVA surveys are nationally representative at the district level, with the 2011 edition providing detailed information on 18,399 households

across all but two provinces. The data include household composition, household expenditures, educational attainment, and a complete range of other socioeconomic indicators. The NRVA surveys also contain measures related to the specificity of Afghanistan's fragility, including perceptions on security, revenues from opium, as well as security and weather shocks.

The credibility of the proposed approach hinges on the consistency of the data used in the two models. Since the databases used in each case are built on unrelated primary sources, disconnects cannot be ruled out. One key indicator that the two models share is casualties. A high correlation between the conflict-related indicators in the two databases should give some reassurance about the consistency of the two models. A further assessment of the reliability of the data used in the analysis comes from its consistency with data from extraneous sources.

The provincial database used to estimate Model 1 includes information on casualties, the number of incidents, and the number of terrorism-related casualties. The NRVA survey used to estimate Model 2 includes data on theft and violence directly suffered by households and on household perceptions of insecurity. Using the household survey weights provided by the NRVA, this data can be aggregated at the province level. To ensure that correlations are meaningful, all seven indicators are scaled by population. Separately, the Asia Foundation *Survey of the Afghan People* (several issues) includes perception questions regarding the household's fear for safety and household's concerns about security conditions.

Some of the correlation coefficients between the various indicators of conflict are quite high (table I). Not surprisingly, households that report having suffered from theft or violence also have higher perceptions of insecurity. Similarly, casualties are higher in provinces experiencing a larger number of conflict-related incidents. While these two correlation coefficients involve indicators from the same database, there is also a relatively high and statistically significant

correlation between casualties reported by the provincial database and the perception of insecurity estimated based on the NRVA survey. This pattern is corroborated by households' perception of security from 2015 edition of the *Survey of the Afghan People* (Asia Foundation, several issues).

Table I. Correlation between conflict-related indicators from diverse sources

| | Casualties (per 1,000 inhabitants) | Incidents (per 1,000 inhabitants) | Terrorism Casualties (per 1,000 inhabitants) | Theft/Violence (% Households victim at the provincial level) | Insecurity/Violence (% Households victim at the provincial level) | Fear for Safety (% Households Responding) | Bad Security Condition (% Households Responding) |
|---|---|---|---|---|---|---|---|
| Casualties (per 1,000 inhabitants) | 1 | | | | | | |
| Incidents (per 1,000 inhabitants) | 0.8377 | 1 | | | | | |
| Terrorism Casualties (per 1,000 inhabitants) | 0.5255 | 0.581 | 1 | | | | |
| Theft/Violence (Households victim, % of province) | 0.1824 | 0.1474 | 0.1618 | 1 | | | |
| Insecurity/Violence (% Households victim at the provincial level) | 0.2867 | 0.1742 | 0.1627 | 0.2568 | 1 | | |
| Fear for Safety (% Households Responding) | 0.4648 | 0.4733 | 0.1698 | 0.0563 | 0.2278 | 1 | |
| Bad Security Condition (% Households Responding) | 0.6797 | 0.6877 | 0.3327 | 0.1346 | 0.3034 | 0.6027 | 1 |

*Sources:* Own estimates using the provincial database assembled for this paper; the subsequent two indicators are from the NRVA survey; and the two last indicators are from the 2015 edition of the *Survey of the Afghan People* (Asia Foundation, several issues). Correlation coefficients are computed for 2011.

## Modeling casualties

The econometric specification of Model 1 builds on the analyses by Biddle, Friedman & Shapiro (2012) and Hultman, Kathman & Shannon (2013). The model focuses on changes in casualties at the local level and how they are affected by changes in the presence of troops on the ground. To allow for richer dynamics, the specification considers two periods: the current year and the

previous year. It also differentiates between international troops and Afghan troops, as their effectiveness at reducing conflict may be different. Troops and casualties are weighted by provincial population.

The equation to be estimated is:

$$\Delta(Casualties)_{j,t} = \alpha + \beta_1.\Delta\binom{International}{troops}_{j,t} + \beta_2.\Delta\binom{International}{troops}_{j,t-1} + \\ +\gamma_1.\Delta\binom{Afghan}{troops}_{j,t} + \gamma_2.\Delta\binom{Afghan}{troops}_{j,t-1} + \mu.\Delta(Casualties)_{j,t-1} + \Omega.(Year)_{j,t} + \varepsilon_{j,t} \quad (1)$$

where $j$ stands for province, $t$ for year, $\Delta$ indicates change with respect to the previous year, and $\varepsilon$ is an independently distributed error term. Coefficients $\beta_1$ and $\beta_2$ capture the impact of changes in the number of international troops on casualties within the same year and the year after, respectively. The interpretation is similar for coefficients $\gamma_1$ and $\gamma_2$, in relation to Afghan troops. Coefficient $\mu$ captures the persistence of conflict; a negative coefficient indicates that shocks in the number of casualties tend to be attenuated over time. $\Omega$ includes a set of control for the time dimension, alternatively linear year trend or year dummies. $\varepsilon$ is an independently distributed error term.

To ensure the robustness of the results, this equation was estimated using different econometric techniques, including ordinary least squares (OLS), panel fixed effects, and the Arellano–Bond estimation. Given the presence of a lagged value of the explained variable in the right-hand side of the equation, and the potential bias this generates, the Arellano and Bond method is the preferred econometric technique. The Arellano–Bond model assumptions are satisfied as in the preferred specification, in column 6 of Table II, the hypothesis of serial autocorrelation can be rejected at the 5 percent significance level.

Reassuringly, the signs and magnitudes of the coefficients are consistent across specifications (table II). For example, in all cases an increase in the number of international troops is associated with an increase in casualties within the same year, but with a reduction the year after. The negative second-year effect is large, in absolute terms, across all specifications. The pattern is similar for an increase in the presence of Afghan troops: the relationship with the change in casualties is positive in the same year but negative the year after.

Table II. Main estimation results for Model 1

| | (1) OLS | (2) FE | (3) AB | (4) OLS | (5) FE | (6) AB | (7) OLS | (8) FE | (9) AB |
|---|---|---|---|---|---|---|---|---|---|
| VARIABLES | | | | | | | | | |
| International Troops (per 1, 000 inhabitant) t - t-1 | 0.0283* | 0.0369** | 0.0190 | 0.0227 | 0.0290* | 0.0226 | 0.0349** | 0.0415** | 0.0228 |
| | (0.0146) | (0.0161) | (0.0640) | (0.0162) | (0.0174) | (0.0807) | (0.0154) | (0.0167) | (0.0612) |
| International Troops (per 1, 000 inhabitant) t-1 - t-2 | -0.130*** | -0.146*** | -0.150*** | -0.0927*** | -0.109*** | -0.109*** | -0.127*** | -0.143*** | -0.144*** |
| | (0.0185) | (0.0205) | (0.0178) | (0.0202) | (0.0230) | (0.0175) | (0.0186) | (0.0206) | (0.0182) |
| Afghan Troops (per 1, 000 inhabitant) t - t-1 | 0.0122 | 0.00481 | 0.0610* | 0.00189 | -0.00435 | 0.0389 | 0.0292 | 0.0196 | 0.0997*** |
| | (0.0366) | (0.0384) | (0.0349) | (0.0390) | (0.0410) | (0.0437) | (0.0387) | (0.0410) | (0.0258) |
| Afghan Troops (per 1, 000 inhabitant) t-1 - t-2 | 0.00503 | -0.0200 | 0.000606 | 0.0118 | -0.0106 | -0.00490 | -0.00501 | -0.0231 | -0.00332 |
| | (0.0371) | (0.0515) | (0.0215) | (0.0383) | (0.0540) | (0.0386) | (0.0378) | (0.0516) | (0.0241) |
| Casualties (per 1,000 inhabitant) t-1 - t-2 | -0.148** | -0.153** | -0.162** | -0.176** | -0.193*** | -0.191** | -0.143** | -0.150** | -0.148** |
| | (0.0649) | (0.0681) | (0.0709) | (0.0689) | (0.0727) | (0.0787) | (0.0649) | (0.0681) | (0.0619) |
| Year Trend | | | | | | | 0.0400 | 0.0328 | 0.0630** |
| | | | | | | | (0.0302) | (0.0316) | (0.0293) |
| Constant | 0.154*** | 0.188*** | 0.135*** | 0.0312 | 0.121 | 0.0846 | 0.0500 | 0.0983 | -0.0362 |
| | (0.0494) | (0.0598) | (0.0435) | (0.109) | (0.140) | (0.130) | (0.0924) | (0.105) | (0.0865) |
| Year Dummies | No | No | No | Yes | Yes | Yes | No | No | No |
| Observations | 192 | 192 | 160 | 192 | 192 | 160 | 192 | 192 | 160 |
| Adjusted R-squared | 0.227 | 0.133 | | 0.292 | 0.196 | | 0.230 | 0.133 | |
| Number of province | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 |

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

*Source:* Own estimates using the provincial database assembled for this paper. Note: Standard errors are reported below the estimated coefficients. Statistically significant coefficients at the 10%, 5%, and 1% level are indicated by one, two and three asterisks respectively. The preferred specification is highlighted in yellow. AB = Arellano–Bond; FE = fixed effects; OLS = ordinary least squares. The hypothesis of serial autocorrelation can be rejected at the 5% significance level.

In all specifications, the sum of the coefficients measuring the impact of increased troops on conflict related casualties after one year ($\beta_2 + \gamma_2$) is greater, in absolute terms, that the sum of

the coefficients capturing the impact within the same year ($\beta_1 + \gamma_1$). In other words, more troops are associated with higher casualties in the short term, but lower casualties in the medium term.

This result is in line with previous research showing that large deployments are effective at reducing conflict, albeit after a certain delay (Biddle, Friedman & Shapiro, 2012; Hultman, Kathman & Shannon, 2013). But in this model, most of the effectiveness comes from international troops. The key coefficient in Model 1 is the sizeable and highly significant $\beta_2$, which captures the impact of international troops after one year. In contrast, the coefficients associated with changes in the number of Afghan troops ($\gamma_1$ and $\gamma_2$) are statistically insignificant in all specifications.

On the surface the fit of the Model 1 is not particularly high, given that the adjusted $R^2$ coefficient is around 0.2 across specifications. However, it is important to keep in mind that the specification refers to the change in casualties, not to their absolute level. When the latter is considered instead, the correlation between predicted and actual casualties is 0.71, and the share of the variance in casualties explained by the model is 0.85. For half of the provinces, the share of the variance explained by the model exceeds 0.5. Furthermore, the correlation coefficient between predicted and actual intensity of conflict exceeds 0.8 for more than a third of provinces.

To allow for the possibility of spatial autocorrelation in the error term, the preferred specification is re-estimated introducing a spatial lags model, still using random effects and the Arellano-Bond linear dynamic regression (table III). The coefficients obtained are like the ones of the preferred specification, especially for the variables of interest. In addition, the Moran and Geary indices of spatial autocorrelation are small, revealing the absence of spatial autocorrelation in the preferred specification.

Table III. Estimation of Model 1 allowing for spatial autocorrelation

| | Preferred Specification | Spatial Panel Random Effects Lag Model | Spatial Arellano-Bond Linear Dynamic Regression - spatial lag |
|---|---|---|---|
| International Troops (per 1, 000 inhabitant) t - t-1 | 0.0226 | 0.0193 | 0.01739 |
| International Troops (per 1, 000 inhabitant) t-1 - t-2 | -0.109*** | -0.085*** | -0.0874*** |
| Afghan Troops (per 1, 000 inhabitant) t - t-1 | 0.0389 | -0.0109 | -0.0067 |
| Afghan Troops (per 1, 000 inhabitant) t-1 - t-2 | -0.00490 | 0.021 | 0.0139 |
| Casualties (per 1,000 inhabitant) t-1 - t-2 | -0.191** | -0.166** | -0.390*** |
| Global Moran MI | | -0.0023 | 0.064*** |
| Global Geary GC | | 0.0434** | 0.7492*** |

*Source:* Own estimates using the provincial database assembled for this paper.

A potentially important caveat to these results concerns the possible changes in the military capabilities of Afghan troops over time. Arrangements for the withdrawal of international troops included a sustained effort to upgrade the effectiveness of Afghan troops. At the same time, the complementarity between the two military forces suggests that the withdrawal of international troops could make Afghan troops less effective. Because the model assumes that coefficients are constant over the entire period 2007–14, it may fail to capture these two effects.

To address this concern, the preferred specification is re-estimated in two different ways (the results are available upon request). First, interaction terms for international troops and Afghan troops are introduced. The results confirm the hypothesis of a complementarity between the two military forces. An increase in international troops is more effective at reducing casualties after one year when it is accompanied by a parallel increase in Afghan troops, and vice versa. From this perspective, the withdrawal of international troops should be expected to reduce

the effectiveness of Afghan troops, which is consistent with recent reports (Giustozzi & Mohamad Ali, 2016).

The second variation of the preferred specification is to allow for the coefficients associated with Afghan troops to be different before and after 2011. This is accomplished by introducing a dummy variable for the first sub-period and interacting it with the current and lagged change in the number of Afghan troops. The results suggest that during the first sub-period an increase in the number of Afghan troops was accompanied by much higher casualties within the same year. But the difference between the two sub-periods in casualties the year after is not statistically significant.

Taken together, these two exercises suggest that the upgrade of Afghan troops in recent years might have resulted in a reduction in conflict in the short term, but not necessarily in the medium term. And given the complementarity between the two military forces, the improvement in the capabilities of Afghan troops may be offset, at least partially, by the decline in the number of international troops on the ground.

**Modeling household expenditures**

The econometric specification used to estimate welfare builds on previous work on the correlates of poverty in Afghanistan (D'Souza & Joliffe, 2013; World Bank, 2015). This work follows a well-established line of research in the tradition of Ravallion & Wodon (1999) and Wodon et al. (2001), among others. The main innovation of this paper is to include several conflict-related variables among the determinants of household expenditures. The indicators considered in this respect are the level of foreign aid, casualties, and the presence of both international and Afghan troops at the provincial level.

This model also has similarities to the work of Bove & Gavrilova (2014). But instead of looking at the impact of conflict on wages and prices at the provincial level, the analysis focuses on its impact on expenditures per capita at the household level. Expenditures per capita provide a more reliable measure of household wellbeing in a country where farming and self-employment are much more common than wage employment.

The equation used to estimate the model is as follows:

$$\begin{pmatrix} Consumption \\ per\ capita \end{pmatrix}_{i,t} = \theta_0 + \theta_1 . \begin{pmatrix} Household \\ demographics \end{pmatrix}_{i,t} + \theta_2 . \begin{pmatrix} Household \\ education \end{pmatrix}_{i,t}$$

$$+\theta_3 . \begin{pmatrix} Location \\ characteristics \end{pmatrix}_{j,t} + \theta_4 . \begin{pmatrix} Poverty \\ Headcount \end{pmatrix}_{d,t-1} + \theta_5 . \begin{pmatrix} Season \\ Survey \end{pmatrix}_{j,t} \quad (2)$$

$$+ \varphi_1 . \begin{pmatrix} Foreign \\ aid \end{pmatrix}_{j,t} + \varphi_2 . (Casualties)_{j,t} + \varphi_3 . \begin{pmatrix} International \\ troops \end{pmatrix}_{j,t} + \varphi_4 . \begin{pmatrix} Afghan \\ troops \end{pmatrix}_{j,t} + \vartheta_{i,t}$$

where $i$ stands for household, $t$ for year, $j$ for province, and $\vartheta$ is an independently distributed error term. The $\theta$ coefficients capture the effects usually considered in poverty analyses. For instance, they indicate the relationship between household size, or the education of the household head, and household expenditures per capita. These coefficients also capture the relationship with location variables, such as distance to roads, proximity or urban areas, or climate conditions (flood and frost). Depending on the specifications, location variables may also include the prevalence of opium in the district that might be an important determinant of households' welfare in Afghanistan. Specifically, these specifications control for the average share of opium-related income in the district where the household lives.[4] Season dummies are included in all cases, because households were surveyed at different points of the year. Ultimately, to rule out potential endogeneity effects and thus fully capture the effects of Afghanistan's fragility on

households' welfare, the estimations control for the poverty rate at the district level in 2007, at the time when the previous NRVA was completed.

Although poverty analyses devote considerable attention to interpreting the $\theta$ coefficients, in this paper the associated variables are treated as controls aimed at reducing possible biases in the estimation. The focus is instead on the $\varphi$ coefficients, as they directly reflect the impact of foreign aid, troops presence, and casualties on household expenditures.

One legitimate concern is that the $\varphi$ coefficients could be biased if conflict indicators were endogenous, in the sense of being correlated with the error term of equation (2). For example, local poverty could influence casualties as well as the allocation of aid and troops. This concern is partially addressed by measuring the conflict-related variables at the province level, rather than at the household level. It is indeed unlikely that individual households may affected troops or aid allocation for a given province. The potential endogeneity bias is further reduced by controlling for the previous poverty rate at the district level from the 2007 NRVA.

Again, a variety of empirical approaches are used to ensure the robustness of the results. The basic specifications rely on weighted OLS with the household weights included in the NRVA survey used as analytical weights. Standard errors are clustered at the province level in all specifications, to ensure consistency with conflict indicators measured at the province level.

Other specifications try to address potential measurement error by using an instrumental variable two-stage least squares approach (IV 2SLS). While information on troops and casualties is reliable, information on the volume of foreign aid spent locally is not. The indicator provided by the Ministry of Economy, which compiles the various sources of foreign aid, suffers from weak data monitoring and management. This indicator is therefore instrumented with the more reliable but less comprehensive information on USAID aid flows at the provincial level. Because

of their large scale, their diverse provincial and sectoral scope, as well as a robust monitoring framework, USAID aid flows provide reliable estimates of total foreign aid to Afghanistan. In all the first-stage regressions, which also include provincial fixed effects, the r-square and F-statistics show that the specifications are significant at the 1 percent level.

The preferred specification includes the maximum number of control variables and corrects for measurement error (highlighted in yellow in table V). As an additional robustness check, the indicator on casualties is replaced by the proportion of people at the provincial level who raised concerns about bad security conditions in their village (table VI).[5] The signs and magnitudes of the estimated coefficients are similar, although the high correlation between conflict-related indicators makes them less precise than would be ideal.

Conflict-related indicators are jointly significant at the 5 percent level when using the indicator on casualties, and at the 1 percent level when using the indicator on perceptions of bad security. Furthermore, the adjusted R-squared are in the close range of 0.38 which is rather high for household welfare regressions with over 18,000 observations.

In line with previous research, including Jones & Kane (2011) and Berman, Shapiro & Felter (2011), expenditures per capita decrease with casualties but increase with foreign aid and with the presence of troops. Impact estimates vary across specifications. For instance, when controlling for the 2007 poverty rate at the district level, the positive impact of foreign aid is amplified and the negative impact of casualties is substantially dampened. However, the positive impact of troops is relatively stable across specifications. In the case of Afghan troops, it is significant at the 1 percent level in all cases. The impact is two to three times higher than that of international troops. This is possibly a result of Afghan troops procuring and spending more at the local level.

Table V. Estimation results for Model 2 with casualties as conflict indicator

| | Casualties | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| | HH Weighted - OLS | HH Weighted - OLS | HH Weighted - IV 2sls | HH Weighted - IV 2sls |
| VARIABLES | Log per capita Consumption | Log per capita Consumption | Log per capita Consumption | Log per capita Consumption |
| Demographics | Yes | Yes | Yes | Yes |
| Education | Yes | Yes | Yes | Yes |
| Location | Yes | Yes | Yes | Yes |
| Opium Income District | No | Yes | No | Yes |
| Poverty Headcount District (2007) | Yes | Yes | Yes | Yes |
| Season Dummies | Yes | Yes | Yes | Yes |
| Foreign Aid (USD per 1,000 inhabitant) | 0.0493 | 0.0453 | 0.0466 | 0.0426 |
| | (0.0477) | (0.0491) | (0.0461) | (0.0475) |
| Casualties (per 1,000 inhabitant) | 0.00172 | -0.00116 | 0.00112 | -0.00180 |
| | (0.0450) | (0.0439) | (0.0437) | (0.0426) |
| International Troops (per 1,000 inhabitant) | 0.00167 | 0.00179 | 0.00169 | 0.00181 |
| | (0.00543) | (0.00542) | (0.00532) | (0.00530) |
| Afghan Troops (per 1,000 inhabitant) | 0.00648*** | 0.00650*** | 0.00645*** | 0.00647*** |
| | (0.00212) | (0.00210) | (0.00207) | (0.00205) |
| Observations | 18,211 | 18,211 | 18,211 | 18,211 |
| Adjusted R-squared | 0.378 | 0.378 | 0.378 | 0.378 |
| **Joint Significance (Prob > Test)** | **0.0358** | **0.0357** | **0.0148** | **0.0147** |
| **Joint Significance (%)** | **96.4%** | **96.4%** | **98.5%** | **98.5%** |

Robust standard errors (Province) in parentheses

*** p<0.01, ** p<0.05, * p<0.1

*Source:* Own estimates using the NRVA and provincial database assembled for this paper.

*Note:* Standard errors are clustered at the province level are reported below the estimated coefficients. Statistically significant coefficients at the 10%, 5%, and 1% level are indicated by one, two, and three asterisks, respectively. Joint significance tests are performed for the four conflict indicators. That is an F test for the OLS specifications and chi2 for the IV 2LS. The preferred estimation is highlighted in yellow. HH stands for households, OLS for ordinary least squares, and IV 2SLS for instrumental variables two-stage least squares.

Table VI. Estimation results for Model 2 with perceptions as conflict indicator

| | Bad Security Conditions in Village/Neighborhood | | | |
|---|---|---|---|---|
| VARIABLES | (1) HH Weighted - OLS Log per capita Consumption | (2) HH Weighted - OLS Log per capita Consumption | (3) HH Weighted - IV 2sls Log per capita Consumption | (4) HH Weighted - IV 2sls Log per capita Consumption |
| Demographics | Yes | Yes | Yes | Yes |
| Education | Yes | Yes | Yes | Yes |
| Location | Yes | Yes | Yes | Yes |
| Opium Income District | No | Yes | No | Yes |
| Poverty Headcount District (2007) | Yes | Yes | Yes | Yes |
| Season Dummies | Yes | Yes | Yes | Yes |
| Foreign Aid (USD per 1,000 inhabitant) | 0.0331 | 0.0285 | 0.0344 | 0.0298 |
| | (0.0459) | (0.0468) | (0.0467) | (0.0476) |
| Casualties (per 1,000 inhabitant) | -0.114 | -0.120 | -0.112 | -0.118 |
| | (0.158) | (0.157) | (0.157) | (0.156) |
| International Troops (per 1,000 inhabitant) | 0.00293 | 0.00284 | 0.00292 | 0.00283 |
| | (0.00438) | (0.00438) | (0.00430) | (0.00430) |
| Afghan Troops (per 1,000 inhabitant) | 0.00667*** | 0.00666*** | 0.00668*** | 0.00668*** |
| | (0.00187) | (0.00186) | (0.00185) | (0.00183) |
| Observations | 18,211 | 18,211 | 18,211 | 18,211 |
| Adjusted R-squared | 0.379 | 0.380 | 0.379 | 0.380 |
| **Joint Significance (Prob > Test)** | **0.0229** | **0.0207** | **0.00790** | **0.00676** |
| **Joint Significance (%)** | **97.7%** | **97.9%** | **99.2%** | **99.3%** |

Robust standard errors (Province) in parentheses

*** p<0.01, ** p<0.05, * p<0.1

*Source:* Own estimates using the NRVA, Survey of the Afghan People (Asia Foundation, several issues), and provincial database assembled for this paper.

*Note:* Compared to the previous specification, casualties are substituted by the share of households, at the province level, who raise concerns about bad security conditions in their village. Standard errors are clustered at the province level and are reported below the estimated coefficients. Statistically significant coefficients at the 10%, 5%, and 1% level are indicated by one, two, and three asterisks, respectively. Joint significance tests are performed for the four conflict indicators. That is an F test for the OLS specifications and chi2 for the IV 2LS. The preferred estimation is highlighted in yellow. HH stands for households, OLS for ordinary least squares, and IV 2SLS for instrumental variables two-stage least squares.

**The overall impact of conflict**

The estimates for Model 2 above show that conflict-related variables have opposite effects on household expenditures. Foreign aid and the presence of troops have a positive effect, whereas casualties have a negative effect. But these conflict-related variables are not independent from each other. Indeed, the estimates for Model 1 imply that there is a strong correlation between casualties and the presence of troops.

Previous research by Chou (2012), Douglas (2012), Johnson, Ramachandran & Walz (2012) and World Bank (2015) also points to a strong correlation between casualties and the level of foreign aid in Afghanistan. Development aid has been channelled to strategic locations from a conflict perspective and was not necessarily targeted to the poorest regions. This choice reflects the 'winning hearts and mind' doctrine, according to which development aid had a role to play in securing the most bellicose areas of Afghanistan (Berman, Shapiro & Felter, 2011).

Contemporary correlations at the province level between the number of casualties, foreign aid and the presence of troops, range from 0.2 to 0.4. The time structure of these correlations suggests that casualties precede aid, which is in turn followed by an increase in the number of troops, both international and Afghan (figure 5). This dynamic suggests that mobilizing more financial resources is easier than handling the logistics of a larger military presence on the ground.

These correlations provide an insight into the observed puzzle of the negative relationship between changes in poverty and changes in conflict. Because casualties, foreign aid and troop deployments are interlinked, assessing the impact of conflict on household expenditures requires considering all conflict-related variables together, and not in isolation. A simple counterfactual to estimate the overall impact of conflict on household expenditures is to consider a hypothetical

situation in which the levels of foreign aid, casualties, and troops on the ground would be the same as in the province with the lowest level of casualties. The overall impact can be computed as the joint effect of the increase in the level of these variables relative to the level of the province with the lowest intensity of conflict multiplied by the value of the corresponding $\varphi$ coefficients in the preferred specification. This computation is conducted at the level of each individual household in the NRVA sample, but it is straightforward to aggregate—using the household weights included in the survey—the results at the level of the province, the region, or the country.

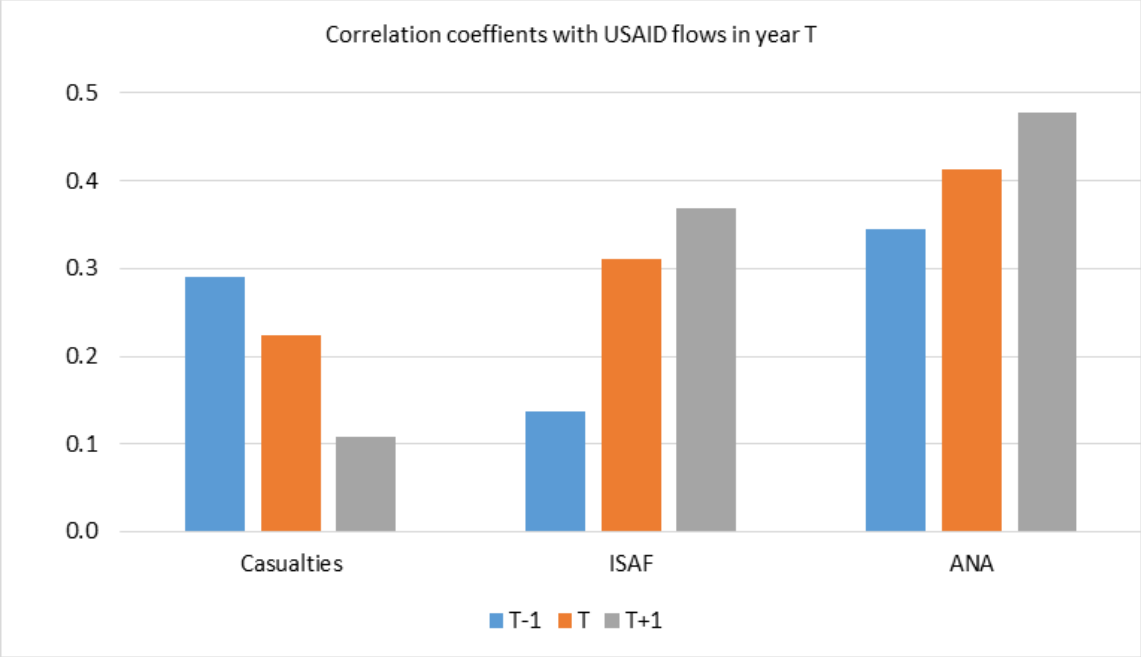


Figure 5. Correlation between aid , casualties and troops over time

*Source:* Own estimates using database the provincial database assembled for this paper.

*Note:* ISAF stands for international troops (ISAF) and ANA for Afghan troops. Observations are at the provincial level between 2009 and 2014.

The results show that the overall impact of conflict on household expenditures is positive at the national level, but also in each of the provinces (figure 6). The impact is particularly strong among the provinces in the East, South, and the Southwest where household expenditures are 10 to 18 percent higher than in the counterfactual, despite the large number of casualties. Conversely, the impact is weakest in the North and the Northeast, where the average increase in household expenditure per capita is less than 8 percent. These findings help explain the puzzle of limited poverty reduction in the Afghan provinces and regions less affected by conflict. These findings are consistent with the work of Bove & Gavrilova (2014), which finds that military deployment has a positive impact on wages, a proxy for wellbeing.

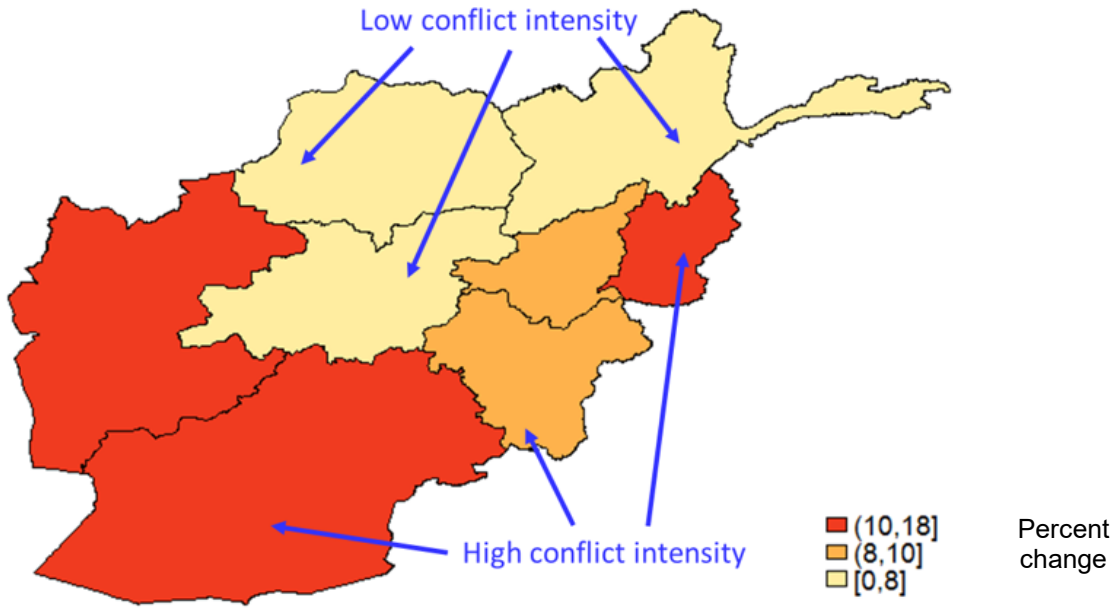


Figure 6. Marginal impact of conflict on household expenditures

*Source:* Own estimates using the provincial database assembled for this paper.

*Note:* The values of the conflict-related indicators used for this exercise are those observed in 2011. Casualties are measured by total casualties per 1,000 inhabitants.

**Out-of-sample simulations**

The estimated models ensure a good fit with the data during the estimation period, but they could be less relevant beyond it. The withdrawal of international troops initiated in 2014 has led to a serious deterioration in security conditions. The United Nations Assistance Mission for Afghanistan (UNAMA) reported in March 2017 that it had recorded more civilian deaths and injuries during 2016 than in any other year since it began its reporting civilian casualties in 2009. The civilian casualties reached to a total of 11,412 in 2016—a 50 percent increase in casualties over 2012 levels. Business and consumer confidence is likely to have suffered as a result. It could therefore be argued that the transition has put the country on a different trajectory and made the estimates in this paper outdated.

One way to address this concern is to assess how well the forecasts in this paper predict actual outcomes out of the estimation period. The coefficients from the preferred specification of the estimated models can be used to simulate the consequences of the decline of foreign aid and the withdrawal of international troops on living standards, as a result of the transition. The year 2014 is chosen as the starting point for the exercise, because it is the last year for which reliable provincial-level data on troops is available. This choice requires updating the data on household expenditures per capita, as the last NRVA survey is for 2011. To do this, household expenditures are projected until 2014 using actual data on foreign aid, the local presence of troops, and the number of casualties.

Forecasting casualties and the level of household expenditures beyond 2014 requires additional assumptions on foreign aid and the presence of troops. Foreign aid flows at the province level are supposed to be 5 percent lower in 2015 than in 2011, and to decline by 5 percent every year subsequently, consistent with information provided by USAID. The level of

international troops is set at 15,900 in 2015, with the distribution by province unchanged relative to 2014. It is assumed to remain constant in 2016, with the same provincial distribution. The presence of Afghan troops is kept constant at the level observed in 2014.

The prediction of casualties at the provincial level beyond 2014 is based on Model 1. For every province, casualties in 2015 are computed as their level in 2014 plus the predicted change in casualties between 2014 and 2015. The same procedure is used recurrently for subsequent years. The simulation yields an increase in casualties across Afghanistan. The increase is sharpest in the Southwest region, but even the relatively peaceful North and Northeast regions see a deterioration of their security situation. Casualties increase sharply in 2015, but the upward trend continues in 2016 which matches current trends in the country. The ranking across provinces remains unchanged, with the larger increase in casualties taking place in the regions where conflict levels were already high in 2014 (figure 7).

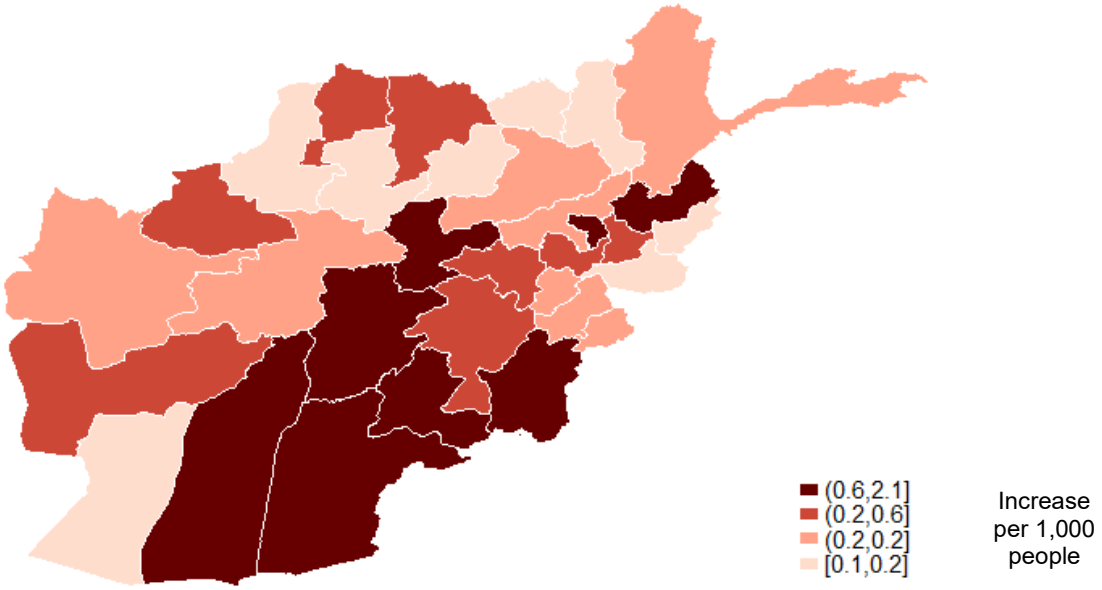


Figure 7. Increase in casualties between (2014-2016)

*Source:* Own estimates using the provincial database assembled for this paper.

For the year 2015 the predicted number of casualties falls short of the actual number by only 0.2 percent, suggesting that the proposed approach is quite accurate at the national level.[6] There is also a reasonable closeness between predictions and actual figures at the provincial level, with the correlation coefficient between the two-series reaching 0.96. However, there are also a few important discrepancies; the model does not fully anticipate the increase in casualties in the Northeast. It overestimates casualties in the Central region, and even more so in the West central region.

The same assumptions on foreign aid and the presence of troops are used to forecast household expenditures beyond 2014, with inputs on casualties coming from the simulation above. The exercise shows that during the transition households are subject to a triple shock: foreign aid declines, casualties increase, and whatever local demand there was from international troops quickly disappears. Admittedly this local demand from international troops is not as strong as that generated by Afghan troops, but it is not negligible.

As a result of this triple shock, household expenditure per capita is simulated to be 1.2 percent lower in 2016 than it was in 2011. Although this may seem a modest figure, the decline is much more pronounced (7.3 percent) relative to the time when the presence of troops and foreign aid flows were at their peak, a couple of years earlier. The magnitude of this triple shock is in fact comparable to that of a major recession.

Given the spatial concentration of the conflict—and consequently of foreign aid and international troops—the impact on household expenditures differs across provinces. According to the simulation, the Southwest region is the most severely impacted by the transition, followed by the South. In the South and Southwest regions, declines in household expenditure per capita relative to their 2013 peak reach 10.8 and 12.4 percent, respectively.

The chosen approach also makes it possible to compute statistics for subsets of the population in each region. In particular, by simulating the impact of the triple shock on each individual household in the NRVA sample, it is possible to assess which share of the population in each region will have expenditures per capita below any given expenditure threshold. When the chosen threshold is the poverty line (as defined in the 2011 NRVA), this procedure yields the estimated poverty rates over the simulation period (figure 8).

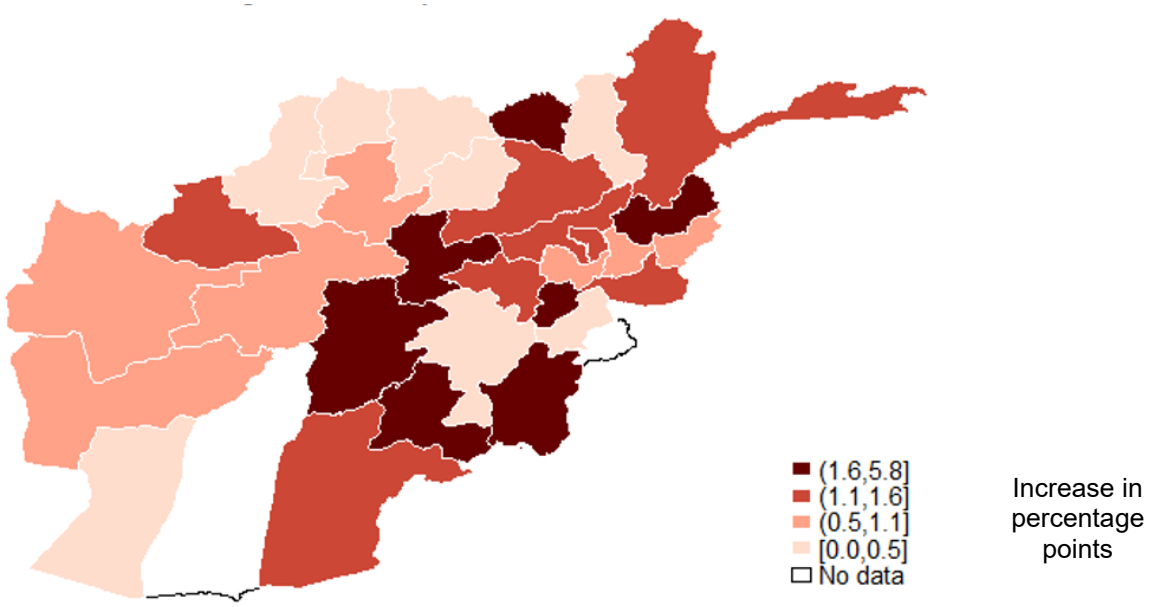


Figure 10. Simulated change in poverty rates (2011-16).

*Source:* Own estimates using the provincial database assembled for this paper.

Using this approach, poverty incidence in Afghanistan increases from 35.8 percent in 2011 to 36.7 percent in 2016. Although this change may seem minor, the increase is much more substantial when comparing the predicted poverty rate for 2016 to that observed around 2013, when foreign aid levels and the presence of troops on the ground were at their peak. The simulated increase in poverty is more marked in the East, South, and Southwest regions.

Validating this result is somewhat more challenging. The latest poverty assessment for Afghanistan also reports an increase of the poverty rate (World Bank, 2017). While previous assessments had shown a high and stable poverty rate, this latest edition concludes that the share of the population living below the poverty line increased from 35.8 percent in 2011 to 39.1 percent in 2013 (World Bank, 2017). This increase is sharper than in the simulations in this paper, and it also happened earlier. However, the poverty rates reported for 2011 and 2013 may not be strictly comparable, as actual household expenditure data was used in the first year, and survey-to-survey imputations in the second.

A more qualitative validation is provided by the already mentioned *Survey of the Afghan People* (Asia Foundation, several years). One of the questions asks households whether they think that Afghanistan is going in the right or the wrong direction. The share of them answering positively provides an implicit measure of household wellbeing. Over the period 2011-16, the correlation between the change in this measure and the change in the poverty rate simulated in this paper is -0.47. This high correlation across 32 provinces can be seen as an indication that out-of-sample simulations from the models in this paper bear resemblance with reality.

## Conclusion

This paper proposes an empirical approach to understand the relationship between conflict and household wellbeing in Afghanistan and uses the results to predict the consequences of the country's ongoing transition. The approach combines a dynamic model of casualties at the province level with a cross-sectional model disentangling the impact of conflict-related indicators on consumption expenditures at the household level.

The proposed exercise is in the spirit of a growing literature on conflict that builds on empirical tools. The analysis is conducted over the period 2007-14, for which data on casualties, troops and foreign aid at the province level can be credibly assembled. Although much of the data used to this effect is in the public domain, one contribution of this paper is to bring it together on a spatial platform and to check its consistency with conflict-related indicators estimated based on household survey data and opinion polls.

Over the sample period, the two models fit the data well. The estimated coefficients are significant, and their signs are consistent with previous findings in the literature. In addition, out-of-sample simulations match well the more scattered evidence on conflict and living standards available for Afghanistan in more recent years.

Two important insights emerge from the analyses in the paper. First, the puzzle of higher poverty in safer provinces and regions can be explained. The estimates make it clear that higher casualties are associated with lower household expenditure per capita. However, in Afghanistan foreign aid and the presence of troops on the ground are correlated with conflict. The positive impact of these two other variables on household expenditures more than offsets the negative impact of casualties across all provinces. And second, the simulations suggest that the transition in Afghanistan involved a rise in conflict and a deterioration in living standards.

**References**


Asia Foundation (several issues). *Survey of the Afghan People*. http://asiafoundation.org/where-we-work/afghanistan/survey/.

Asongu, S., & Nwachuku, J. (2017). The impact of terrorism on governance in African countries. *World Development* 99: 253–270.

Beath, A., Enikolopov, R., & Christi, F. (2014). *Winning hearts and minds through development aid: Evidence from a field experiment in Afghanistan* (Policy Research Working Paper 6129). Washington, DC: The World Bank.

Berman, E., Shapiro, J., & Felter, J. (2011). Can hearts and minds be bought? The economics of counterinsurgency in Iraq. *Journal of Political Economy* 119: 766–819.

Berman, E., Felter, J., Shapiro, J., & Troland, E. (2013). Modest, secure and informed: Successful development in conflict zones. *American Economic Review* 103: 512–17.

Berman, E., & Mattanock, A. (2015). *The empiricists' insurgency* (NBER Working Paper 21061). Cambridge, MA: National Bureau of Economic Research (NBER).

Biddle, S., Friedman, J., & Shapiro, J. (2012). Testing the surge. Why did violence decline in Iraq in 2007? *International Security* 37(1): 7–40.

Blattman, C., & Miguel, E. (2010). Civil war. *Journal of Economic Literature* 48: 3–57.

Bove, V., & Gavrilova, E. (2014). Income and livelihoods in the war in Afghanistan. *World Development* 60: 113–131.

Brookings Institution (2016). *Afghanistan Index*. Washington, DC (http://www.brookings.edu/about/programs/foreign-policy/afghanistan-index).

Brück, T., Justino, P., Verwimp, P., Avdeenko, A., & Tedesco, A. (2013). *Measuring violent conflict in micro-level surveys: Current practices and methodological challenges* (Policy Research Working Paper 7585). Washington, DC: The World Bank.

Callen, M., Isaqzadeh, M., Long, J., & Sprenger, C. (2014). Violence and risk preference: Experimental evidence from Afghanistan. *American Economic Review* 104: 123–48.

Chou, T. (2012). Does development assistance reduce violence? Evidence from Afghanistan. *The Economics of Peace and Security Journal* 7(2): 5–13.

Ciarli, T., Kofol, C., & Menon, C. (2015). *Business as unusual. An explanation of the increase of private economic activity in high-conflict areas in Afghanistan* (LSE Research Online

Documents on Economics 65015). London: London School of Economics and Political Science.

Condra, L., Felter, J., Iyengar, R., & Shapiro, J. (2010). *The effect of civilian casualties in Afghanistan and Iraq* (NBER Working Paper 16152). Cambridge, MA: National Bureau of Economic Research (NBER).

Crost, B., Felter, J., & Johnston, P. (2014). Aid under fire: Development projects and civil conflict. *American Economic Review* 104: 1833–56.

Dercon, S. (2006). *Vulnerability: A micro perspective* (QEH Working Paper Series 149). Oxford, UK: Queen Elizabeth House, University of Oxford.

Derksen, D., & Ruttig, T. (2013). *Reluctant interventionists: ISAF's influence on local power structures in Kunduz and Badakhshan* (Afghanistan Analysts Network Thematic Report 03/2013). Retrieved from: https://www.afghanistan-analysts.org/reluctant-interventionists-isafs-influence-on-local-power-structures-in-kunduz-and-badakhshan/.

Douglas, J. (2012) Military strategy or poverty reduction? Investigating the provincial allocation of aid to Afghanistan. Blogpost at AidData website, November 27, 2012. Retrieved from: http://aiddata.org/blog/military-strategy-or-poverty-reduction-investigating-the-provincial-allocation-of-aid-to-afghanistan.

D'Souza, A., & Jolliffe, D. (2013). Conflict, food price shocks, and food insecurity: The experience of Afghan households. *Food Policy* 42: 32–47.

Giustozzi, A., & Mohamad Ali, A. (2016). *The Afghan national army after ISAF* (Afghanistan Research and Evaluation Unit (AREU) Briefing Paper Series, March 2016). Kabul: AREU. Retrieved from: http://areu.org.af/wp-content/uploads/2016/10/1603E-The-Afghan-National-Army-after-ISAF.pdf.

Hegre, H., Hultman, L., & Nygard, H. (2010). *Evaluating the conflict-reduction effects of UN peacekeeping operations.* Paper presented to the National Conference on Peace and Conflict Research, Uppsala, September 9–11, 2010.

Hultman, L., Kathman, J., & Shannon, M. (2013). *Beyond keeping peace: United Nations effectiveness in the midst of fighting.* Paper prepared for presentation at the American Political Science Association Annual Meeting, Chicago, IL, 2013.

Johnson, G., Ramachandran, V., & Walz, J. (2012). CERP in Afghanistan: Refining military capabilities in development activities. *Prism* 3(2): 81–98.

Jones, G., & Kane, T. (2011). U.S. troops and foreign economic growth. *Defense and Peace Economics* 23: 235–249.

Kapstein, E., & Kathuria, K. (2012). *Economic assistance in conflict zones* (CGD Policy Paper 013). Washington, DC: Center for Global Development (CGD).

North Atlantic Treaty Organization (NATO) (2015) ISAF's mission in Afghanistan (2001–2014) (Archived). Last updated September 1, 2015. Retrieved from: http://www.nato.int/cps/en/natohq/topics_69366.htm.

Parlow, A. (2016). *Child mortality and the war on terror: Afghanistan from 2007 to 2010* (HiCN Working Paper 220). Brighton, UK: Households in Conflict Network (HiCN).

Ravallion, M., & Wodon, Q. (1999). Poor areas, or only poor people? *Journal of Regional Science* 39: 689–711.

Sexton, R. (2016). Aid as a tool against insurgency: Evidence from contested and controlled territory in Afghanistan. *American Political Science Review* 110: 731–749.

Trebbi, F., & Weese, E. (2015). *Insurgency and small wars: Estimation of unobserved coalition structures* (NBER Working Paper 21202). Cambridge, MA: National Bureau of Economic Research (NBER).

United Nations Assistance Mission in Afghanistan (UNAMA) (2015) *Afghanistan Annual Report 2014: Protection of Civilians in Armed Conflicts.* Retrieved from: https://unama.unmissions.org/sites/default/ files/2014-annual-report-on-protection-of-civilians-final.pdf.

United Nations Assistance Mission in Afghanistan (UNAMA) (2016) *Afghanistan Annual Report 2015: Protection of Civilians in Armed Conflicts.* Retrieved from: https://unama.unmissions.org/sites/default/files/poc_annual_report_2015_final_14_feb_2016.pdf.

United Nations Assistance Mission in Afghanistan (UNAMA) (2017) *Afghanistan Report March 2017.*

United Nations Office of Drugs and Crime (UNODC) (2008). *Discussion paper: Is poverty driving the Afghan opium boom?* Vienna: UNODC.

Verwimp, P. (2005). An economic profile of peasant perpetrators of genocide micro-level evidence from Rwanda. *Journal of Development Economics* 77: 297–323.

Wodon, Q., Castro-Fernández, R., Lee, K., López-Acevedo, G., Siaens, C., Sobrado, C. & Tre, J-P. (2001). Poverty in Latin America: Trends (1986–1998) and determinants. *Cuadernos de Economia* 114: 127–53.

World Bank (2011). *World Development Report 2011: Conflict, Security, and Development.* Washington, DC: The World Bank.

World Bank (2013). *Afghanistan in Transition*. Washington, DC: The World Bank.

World Bank (2014). *Afghanistan: Pathways to Inclusive Growth*. Washington, DC: The World Bank.

World Bank (2015). *Afghanistan Poverty Status Update*. Washington, DC: The World Bank.

World Bank (2016). *Afghanistan Development Update*. Washington, DC: The World Bank.

World Bank (2017). *Afghanistan Poverty Status Update*. Washington, DC: The World Bank.

Yanagizawa-Drott, D. (2012). *Propaganda and conflict: Theory and evidence from the Rwandan genocide* (CID Working Paper 257). Cambridge, MA: Center for International Development (CID) at Harvard University.

# Appendix A.

## Table A-1: Summary Statistics Model 1

| Variable | Mean | Std. Dev. | | | Min | Max | Observations |
|---|---|---|---|---|---|---|---|
| | | Overall | Between | Within | | | |
| *Dependent variable* | | | | | | | |
| Casualties (per 1,000 inhabitants) t - t-1 | 0.10 | 0.66 | 0.10 | 0.65 | -3.92 | 3.40 | 224 |
| *Independent variables* | | | | | | | |
| Casualties (per 1,000 inhabitants) t-1 - t-2 | 0.06 | 0.69 | 0.09 | 0.68 | -3.92 | 3.40 | 192 |
| International Troops (per 1, 000 inhabitants) t - t-1 | 0.01 | 3.11 | 0.22 | 3.10 | -16.44 | 14.10 | 224 |
| International Troops (per 1, 000 inhabitants) t -1 - t-2 | 0.51 | 2.57 | 0.86 | 2.42 | -10.10 | 14.10 | 192 |
| Afghan Troops (per 1, 000 inhabitants) t - t-1 | 0.63 | 1.67 | 1.05 | 1.30 | -3.43 | 13.39 | 224 |
| Afghan Troops (per 1, 000 inhabitants) t -1 - t-2 | 0.81 | 1.71 | 1.35 | 1.07 | -1.42 | 13.39 | 192 |

**Table A-2: Summary Statistics Model 2**

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| *Dependent variable* | | | | | |
| Log monthly per capita expenditures | 18,399 | 7.7 | 0.6 | 5.0 | 10.6 |
| *Independent variable* | | | | | |
| Babies | 18,399 | 1.5 | 1.3 | 0.0 | 14.0 |
| Babies squared | 18,399 | 4.2 | 7.0 | 0.0 | 196.0 |
| Children | 18,399 | 2.0 | 1.7 | 0.0 | 16.0 |
| Children squared | 18,399 | 6.9 | 9.9 | 0.0 | 256.0 |
| Adults | 18,399 | 3.8 | 2.1 | 1.0 | 23.0 |
| Adults squared | 18,399 | 18.9 | 22.6 | 1.0 | 529.0 |
| Female Head | 18,399 | 0.0 | 0.1 | 0.0 | 1.0 |
| HHH age | 18,399 | 41.9 | 14.0 | 10.0 | 99.0 |
| HHH age squared | 18,399 | 1954.5 | 1330.1 | 100.0 | 9801.0 |
| HHH not maried | 18,399 | 0.0 | 0.2 | 0.0 | 1.0 |
| HHH primary education | 18,399 | 0.1 | 0.3 | 0.0 | 1.0 |
| HHH lower secondary education | 18,399 | 0.1 | 0.2 | 0.0 | 1.0 |
| HHH upper secondary education | 18,399 | 0.1 | 0.3 | 0.0 | 1.0 |
| HHH university | 18,399 | 0.0 | 0.2 | 0.0 | 1.0 |
| HHH postgraduate | 18,399 | 0.0 | 0.1 | 0.0 | 1.0 |
| Urban | 18,399 | 0.2 | 0.4 | 0.0 | 1.0 |
| Distance from road | 18,244 | 2.4 | 6.7 | 0.0 | 80.0 |
| Frost | 18,380 | 0.2 | 0.4 | 0.0 | 1.0 |
| Flooding | 18,383 | 0.2 | 0.4 | 0.0 | 1.0 |
| Opium Revenues in District | 18,399 | 1.1 | 5.0 | 0.0 | 65.0 |
| Poverty Headcount District (2007) | 18,389 | 37.2 | 19.7 | 0.0 | 100.0 |
| Season | 18,389 | 2.5 | 1.1 | 1.0 | 4.0 |
| Log Ministry of Economy Aid (in USD per 1,000 inhabitants) | 18,399 | 10.1 | 0.7 | 8.8 | 12.4 |
| Log USAID Aid (in USD per 1,000 inhabitants) | 18,399 | 10.5 | 0.7 | 9.4 | 11.9 |
| Total Casualties (per 1,000 inhabitants) | 18,399 | 0.8 | 0.8 | 0.0 | 5.8 |
| Total ISAF international troops (per 1,000 inhabitants) | 18,399 | 3.9 | 5.3 | 0.0 | 32.4 |
| Total ANA Afghan troops (per 1,000 inhabitants) | 18,399 | 5.8 | 8.5 | 0.0 | 49.4 |

## Table A-3: Variables and sources

| | Variable | Definition(s) | Source |
|---|---|---|---|
| | *Conflict dynamics* | | |
| | Casualties | Total Casualties (injuries + deaths) at the provincial level (per 1,000 inhabitants) | UNAMA |
| | Aid | Log Aid flows at the Provincial level (USD per 1,000 inhabitants) | Afghan Ministry of Economy<br>USAID |
| | International Troops | Total International Security Assistance Force troops at the provincial level (per 1,000 inhabitants) | NATO public affairs |
| | Afghan Troops | Total Afghan National Army troops at the provincial level (per 1,000 inhabitants) | NATO public affairs |
| | Violent incidents | Violence incidents reported at the provincial level (per 1,000 inhabitants) | UNAMA |
| | Terrorism casualties | Total injuries + deaths from terrorist attacks at the provincial level (per 1,000 inhabitants) | Global Terrorism Database |
| | *Household wellbeing* | | |
| | Log monthly per capita expenditures | Total monthly per capita real expenditures at the household level | NRVA 2011 |
| Demographics | Babies | Number of babies for the household | NRVA 2011 |
| | Babies squared | Squared Number of babies for the household | NRVA 2011 |
| | Children | Number of children for the household | NRVA 2011 |
| | Children squared | Squared Number of children for the household | NRVA 2011 |
| | Adults | Number of adults for the household | NRVA 2011 |
| | Adults squared | Squared Number of adults for the household | NRVA 2011 |
| | Female Head | Household head is a female | NRVA 2011 |
| | HHH age | Age Household head | NRVA 2011 |
| | HHH age squared | Squared Age Household head | NRVA 2011 |
| | HHH not maried | Household head is not married | NRVA 2011 |
| Education | HHH primary education | Household head has attended primary education | NRVA 2011 |
| | HHH lower secondary education | Household head has attended lower secondary education | NRVA 2011 |
| | HHH upper secondary education | Household head has attended upper secondary education | NRVA 2011 |
| | HHH university | Household head has attended university | NRVA 2011 |
| | HHH postgraduate | Household head has attended postgraduate education | NRVA 2011 |
| Location | Urban | Household living an urban area | NRVA 2011 |
| | Distance from road | Distance from the closest road in km | NRVA 2011 |
| | Frost | Household self reported frost shock | NRVA 2011 |
| | Flooding | Household self reported flooding shock | NRVA 2011 |
| | Opium Revenues in District | Share of households within each district reporting revenues from opium (in %) | NRVA 2011 |
| Other | Seasonal dummies | Dummy corresponding to the season when the data for household I have been collected (default value is spring) | NRVA 2011 |
| | Poverty Headcount District (2007) | Share of poor within each district in 2007 (in %) | NRVA 2011 |
| | Insecurity/Violence | Share of households reporting a security shock within each province (in %) | NRVA 2011 |
| | Theft/Violence | Share of households reporting a violence shock within each province (in %) | NRVA 2011 |
| | Fear for Safety | Share of households reporting to fear for their Safety within each province (in %) | Asia Foundation Survey of the Afghan People 2011 |
| | Bad Security Condition | Share of households reporting to bad security condition in their village within each province (in %) | Asia Foundation Survey of the Afghan People 2011 |
| | Household Financial Situation Better | Share of households reporting that their household financial situation improved over the last two years nationwide (in %) | Asia Foundation Survey of the Afghan People 2011 |
| | Household Financial Situation Worse | Share of households reporting that their household financial situation worsened over the last two years nationwide (in %) | Asia Foundation Survey of the Afghan People 2011 |

**Appendix B. Technical note on the provincial database constructed**

The provincial-level database on conflict used to estimate the model builds on information that is mostly available in the public domain. Casualties include the dead and injured among civilians, insurgents, and military forces. The unit of observation is the province, and the data spans the period from 2007 to 2014. Information could be gathered for 32 provinces. The main source of information on conflict-related casualties is the United Nations Assistance Mission in Afghanistan (UNAMA). An alternative data source for casualties is the Global Terrorism Database (GTD) of the University of Maryland. Foreign aid at the local level is estimated based on commitments at the provincial level as reported by USAID and the Afghan Ministry of Economy (off-budget aid commitments as reported by line ministries).

An important exception is the location of international and Afghan troops on the ground, which is not publicly available for the entire period from 2007 to 2014.

For international troops, location is inferred from the International Security Assistance Force (ISAF) placemats released by NATO several times a year. Placemats provide information on the number of ISAF troops by contributing nations and the localization of Provincial Reconstruction Teams (PRTs). Some placemat issues also include information on the number of Afghan National Army (ANA) troops and on ISAF and ANA major units. Although information on PRTs is systematically reported, information on ISAF major units at the provincial level is only available from 2011 onwards. Before that year, provincial numbers are reported sporadically. Similarly, reliable information on the location of ANA troops is only available starting in 2012.

In this paper, the location of ISAF troops before 2011 is computed assuming the stability of their distribution across provinces under each regional military command. This is equivalent to assuming that provincial troops varied in size proportionally to the regional security forces and that no major reallocation of troops across provinces within regions occurred. Based on this procedure, the number of ISAF troops in a province with one PRT was 400 in 2007 and 1,100 in 2011. The corresponding figures for a province with a major ISAF unit were 700 in 2007 and 2,100 in 2011. Values were set to zero in provinces for which neither a PRT nor an ISAF unit is reported. These numbers, while crude, match discontinuous location information provided by NATO placemats.

As for ANA troops, their location before 2012 relies on the Brookings Institution's Afghanistan Index, which in turn builds on disclosures by U.S. Department of Defense Section 1230 reports. The assumption is that the provincial distribution of ANA troops over the period 2007–11 was the same as in 2012. For this year, placemats specify how many brigades (3,000–4,000 soldiers), divisions (10,000 soldiers), and corps (15,000–20,000 soldiers) were hosted by each province and display the number of soldiers under each command seat. The assumption of a stable distribution across provinces prior to 2012 is justified by the fact that ANA commands were already established in 2007.

## Notes

[1] The National Risk and Vulnerability Assessment (NRVA) provides a complete and comprehensive household survey for Afghanistan. Its poverty line is estimated following the Cost of Basic Needs approach. To ensure the reliability of province-level trends in a context of deteriorating security, and concomitant field data-collection challenges, Afghanistan's Central Statistical Organization collaborated with the World Bank to conduct tests and sensitivity analysis to validate NRVA data quality (World Bank, 2015).

[2] A successor to the NRVA, the Afghanistan Living Condition Survey (ALCS), was fielded in 2013 and 2016. However, the ALCS 2013 does not include the food consumption module and the ALCS 2016 is not available yet.

[3] Unfortunately, NATO stopped disclosing information on the presence of troops presence at the province level after the end of 2014.

[4] With respect to opium cultivation, an alternative measure used was the maximum share of land area under opium cultivation at the district level for the period 2007-2014 (Data from UNODC). The results available upon request to the authors show similar patterns both for opium and for the coefficients of the conflict-related variables.

[5] In these estimations, the independent variable corresponds to the share of households reporting bad security condition in their village within each province (in percent) as measured by the 2011 edition of the *Survey of the Afghan People* (Asia Foundation, several issues).

[6] The root-mean-square error (RMSE) of the actual values and the forecasts is small (783 or 0.0185 if normalized), confirming the accuracy of the forecast.