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Conflict and Poverty in Afghanistan's Transition

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Abstract:

Despite record economic growth for more than a decade, poverty has remained stubbornly high in Afghanistan, especially in the regions that suffered less from conflict. This paper aims to explain this paradox by combining a model of conflict intensity at the province level over period 2007-14 with a model of consumption at the household level in 2011. Provincial data show that higher levels of conflict were positively correlated with both a larger presence of troops (international and Afghan) and larger aid flows. Household data show that the negative impact of conflict on consumption was more than offset by the positive impact of aid and troops. According to the estimates, Afghan troops contributed more to poverty reduction than international troops, possibly because they spent more locally. The paper uses the estimated models to conduct an out-of-sample validation exercise, focusing on the transition initiated in 2014. The results should be interpreted with caution, as the quantitative models cannot account for strategic shifts in the insurgency and watershed political developments. But they suggest that the reduction in the number of international troops and declining foreign aid flows led to an increase in conflict intensity and a decline in consumption per capita, matching current trends.

Keywords: Afghanistan, Conflict, Foreign Aid, Troops, Poverty and Living Standards

JEL: D74, E21, F35, I32, O17

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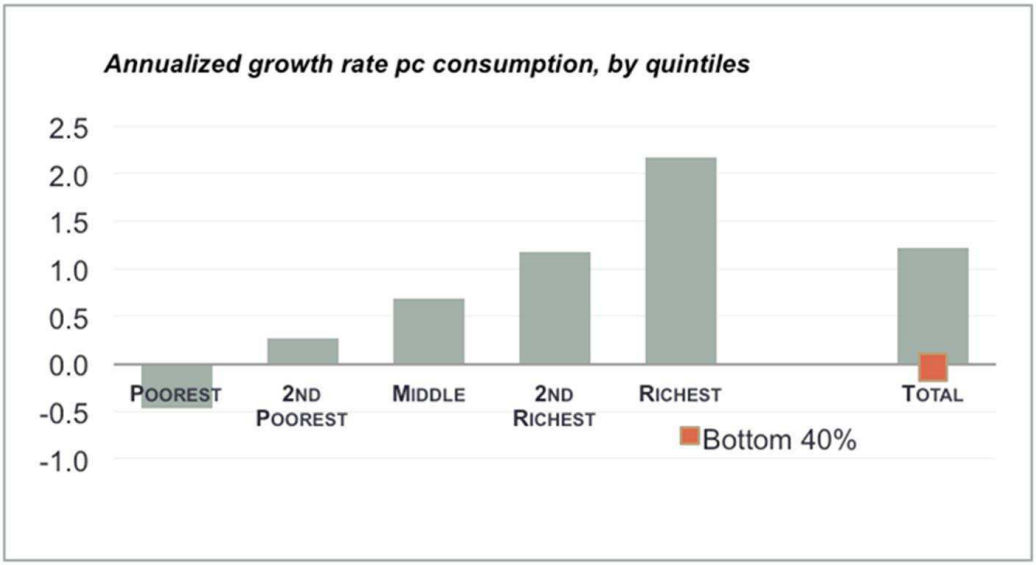
1. Introduction

Until earlier in this decade Afghanistan experienced record economic growth, at an average rate of about 9 percent per year. Massive foreign 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. The poverty incidence nationwide was 35.8 percent in 2011, compared to 36.3 percent in 2007. The decline was not only small in absolute terms: it was also statistically insignificant. Furthermore, 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. Consumption was stagnant among the poorest quintiles

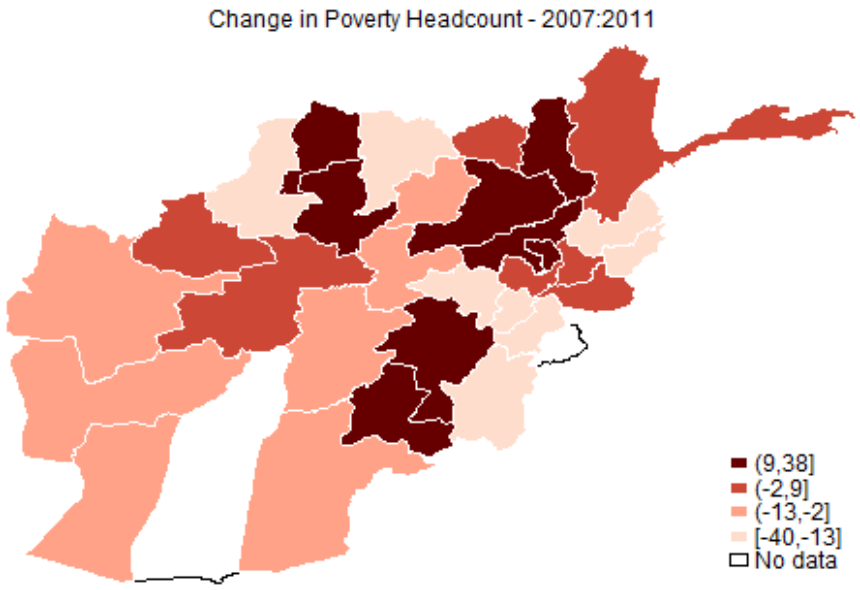


Source: World Bank (2015).

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).

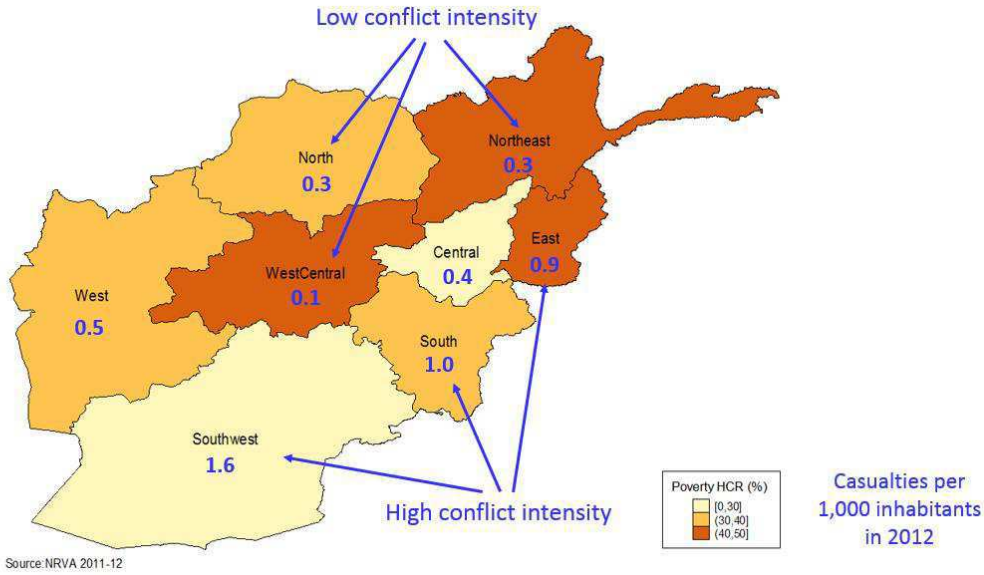
There is a paradox in poverty rates being lower in the South and Southwest, because those are the regions where conflict has been more prevalent (figure 3). There is ample consensus that conflict is especially damaging for the poor (Blattman and Miguel 2010, World Bank 2011, Justino 2012), but Afghanistan seems to defy it.

Figure 2. Poverty rates increased in the North and decreased in the South



Source: World Bank (2015).

Figure 3. Poverty incidence is inversely correlated to conflict intensity



Sources: World Bank (2015); United Nations Assistance Mission to Afghanistan (2015).

There is also a concern going forward. The year 2014 marked the beginning of a major transition for Afghanistan, expected to entail a dramatic reduction in the number of international troops and their replacement by better trained Afghan troops. The number of international troops had started

to decline after 2011, and more recently a slowdown of the withdrawal process was agreed, with approximately 15,900 US troops remaining on the ground in 2015 and 2016. But this is a far cry from the more than 130,000 international troops present in Afghanistan at the height of the "surge", in 2011. The other key component of the transition is the expected decline in foreign aid, especially from USAID.

Until recently, there was optimism that this transition would not have major impacts on economic growth and Afghanistan would remain on an upward trajectory. Kapstein and Kathuria (2012) had concluded that foreign aid had set the country on a more inclusive growth trajectory, despite the political and social tensions. The landmark 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. Other, more recent economic reports maintained this upbeat assessment, forecasting growth rates in the vicinity of 8 percent over an extended period of time (IMF, 2011; World Bank, 2014).

Analyses of this sort were generally muted on conflict, and how it would evolve as a result of the withdrawal of international troops. Yet the security situation was already deteriorating in 2012, and conflict intensity has markedly increased since then (United Nations Assistance Mission to Afghanistan, 2015). In parallel, the revenue allocated to the security sector has been on an upward trend, accounting by now for more than a third of the country's GDP. With fewer international troops on the ground, the country's ability to counter a deteriorating security situation is challenged by its weak fiscal position (World Bank, 2016).

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

The analysis relies on provincial level data on conflict over period 2007-14, and on cross-sectional household data in 2011. The former is used to estimate a dynamic model of conflict intensity at the provincial level, depending on current and lagged presence of troops. The latter allows to identify the determinants of consumption per capita, and in particular to assess the role played by conflict, aid and the presence of troops. These two models are combined to predict consumption per capita from 2012 onwards, and conflict intensity at the provincial level from 2015 onwards. Comparing these out-of-sample simulations with actual figures on economic activity available until 2015 allows validating the proposed empirical approach.

Admittedly the quantitative model used to forecast the dynamics of conflict cannot incorporate strategic shifts in the insurgency and watershed political developments, such as a potential agreement between the government of Afghanistan and the Taliban, or possible tension between rival groups within the Taliban, or between the Taliban and the Islamic State. Therefore, the forecasts of conflict intensity should be interpreted with extreme caution. However, by suggesting

that conflict intensity could increase substantially the paper invites a recognition of the fragility risks Afghanistan faces going forward.

2. 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 statistical tools. Until not long ago, the lack of reliable data tended to dissuade this kind of approach. Conducting censuses and surveys is challenging in conflict affected areas, while administrative records tend to be incomplete in highly informal environments. But these obstacles are gradually being overcome thanks to the availability of non-traditional sources of data, from military statistics to satellite imagery to mobile phone traffic.

Several studies in this emerging literature explore the dynamics of conflict. Biddle, Friedman, and Shapiro (2012) and Hultman, Kathman, and Shannon (2013) use panel data to assess the relationship between troop deployment and violence-related casualties at the subnational or regional level. Data are from Iraq and across countries respectively. Both studies find that large deployments are effective at reducing violence, even in the most challenging environments. The impact of large deployments, however, depends on the number of troops and their equipment, as well as on having a clear mandate to use force to prevent conflict.

The key role played by international troops is confirmed by other studies. Also using data across countries, Hegre, Hultman, and Nygard (2010) conclude that the size of peacekeeping operations—as measured by troop strength or budget—is the main determinant of the ability to effectively curb a conflict. In the cases of Iraq and the Philippines, Berman et al. (2011), Crost et al. (2014a), Berman et al. (2013), and Sexton (2015) find that violence, as perceived by households, declines with the presence of international troops.

The impact of international troops on conflict intensity typically varies spatially. The above-mentioned study by Hegre, Hultman, and 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 and Ruttig (2013) provide further evidence that the ability of troop deployments to contain conflict is not even.

Dynamics can be complex as well. Condra et al. (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 and Weese (2015) show that the insurgency is capable of acting strategically across districts and provinces.

Another relevant strand of this literature focuses on the relationship between conflict and household wellbeing. Brück et al. (2016) review the World Bank's Living Standard Measurement Surveys to suggest concrete ways to capture in these surveys the causes, functioning, and

consequences of violent conflict at the local level. Dercon (2006) and Verwimp (2005) analyze the effects of local violence on household wellbeing in Ethiopia and Rwanda. Again, important spatial differences emerge. For instance, Yanagizawa-Drott (2012) finds evidence that in Rwanda radio stations encouraged people to participate in the genocide. But the reach of these stations varied depending on the terrain, resulting in considerable dispersion in violence across geographic areas.

Some of the studies in this strand of the literature refer specifically to Afghanistan. Using household data from 2007, D'Souza and Jolliffe (2013) find robust evidence that conflict and food security are negatively correlated. They attribute this relationship to disruptions of local markets leading to spikes in food prices. Callen et al. (2014) show the persistence and intensity of the conflict affect household expectations, with the poorest sections of the population having a more negative perception of their future wellbeing. Consistent with this perception, Ciarli et al. (2015) find that conflict reduces employment opportunities by making business investment less attractive, while boosting self-employment in activities that have low returns.

There are also empirical studies focusing on how foreign aid affects economic growth and household wellbeing in conflict-affected countries. During a conflict, aid can enhance state legitimacy and service delivery. After a conflict it could help implement peace agreements and support reconstruction and development. However, aid may also fuel violence because it might exacerbate tensions among local communities. Although the literature has yet to come to a consensus, findings so far suggest a positive impact. Girod (2012) finds that aid improves development outcomes after a civil war. Chandy (2011) reaches a similar conclusion for fragile countries, while pointing out that targeting, design and delivery are critically important.

The allocation of aid is also driven by political and security considerations. Douglas (2012) shows that in Afghanistan, foreign aid is positively correlated with conflict at the provincial level. This is so not only in the case of security assistance but also—albeit to a lower extent—in the case of development aid. According to Johnson, Ramachandran, and Walz (2012), in Afghanistan development aid has been fully anchored into the counterinsurgency strategy. Economic development in conflict areas is seen as essential to reduce local support for insurgents, in line with the "hearts and minds" doctrine (Chou, 2012; Douglas, 2012; Sexton, 2015).

Whether development aid has actually defused conflict in Afghanistan is less clear. There have been unambiguous successes in small-scale and community-driven development projects. Beath, Enikolopov, and Fotini (2014) conduct 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 (2015) claims that successes have been confined to areas already controlled by pro-governmental forces. In disputed areas, aid—and in particular, large development projects—is said to fuel violence or be ineffective (Beath, Fotini, and Enikolopov, 2014; Chou, 2012). Findings have been similar in other fragile settings such as Iraq (Berman, Shapiro, and Felter, 2011) and the Philippines (Crost, Felter, and Johnson, 2014a).

Finally, several studies deal with the direct impact of the presence of troops on economic growth and household wellbeing. Using cross-country data, Jones and Kane (2011) conclude that the deployment of US troops has a positive impact on the economic growth of host countries. They claim that on average one extra year of presence by 100 U.S. soldiers adds 0.02 percentage points to the GDP annual growth rate. Such effects can last several decades; the relationship appears to be strongest in the poorest countries.

In Afghanistan's case, Bove and Gavrilova (2014) show that the presence of troops has a positive impact on wages at the provincial level. Using non-experimental methods over the period from 2003 to 2009, they argue that this positive impact on wages more than offsets the negative impact of conflict. According to the estimates, the presence of troops increases 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 of households.

A few working hypotheses emerge from this literature review. First, the presence of international troops appears to be effective at reducing conflict intensity, albeit with a possible time lag and with varying effectiveness depending on the characteristics of the deployment and those of the communities affected. Second, conflict negatively affects household wellbeing by undermining food security 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 deployment also benefits households indirectly, presumably because the demand for goods and services to support the troops boosts local labor earnings.

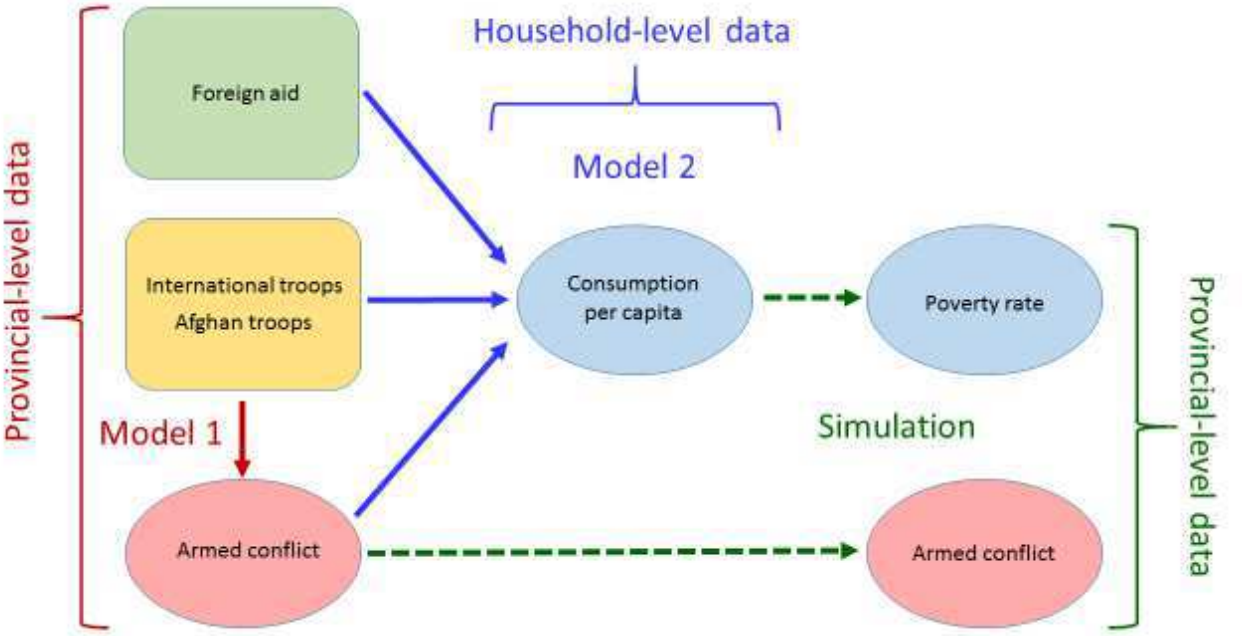
3. Approach and data

Expanding on previous research, this paper adopts an integrated approach that brings together conflict dynamics and household expenditures. The approach is designed so as 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).

Model 1 traces the evolution of conflict intensity over time as measured by the number 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. Model 2 estimates expenditures per capita across households at a point in time. Expenditures per capita depend on household characteristics such as demographics and education, but they are also affected by conflict, 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 conflict intensity and household expenditures moving forward.

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



Since there is no readily available information to estimate Model 1, a database capturing the various dimensions of fragility at the province or regional level had to be constructed for this paper. This database includes variables related to the presence of troops, and the 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 the period from 2007 to 2014. Information was available for 32 provinces.

Data on international troops come from the NATO International Security Assistance Force (ISAF) placemat for each Regional Military Command, by province. Data on Afghan troops are from the NATO ISAF Public Affairs Office. The main source of information on conflict-related casualties is the United Nations Assistance Mission in Afghanistan (UNAMA 2015). 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 that are reported by USAID and the Afghan Ministry of Economy, and on off-budget aid commitments that are reported by line ministries. Technical details on the construction of the database are provided in the data annex to the paper.

Model 2 is estimated using the National Risk and Vulnerability Assessments (NRVA) household surveys fielded in 2007 and 2011. A successor to the NRVA, the Afghanistan Living Condition Survey (ALCS), was fielded in 2013. However, the food consumption module is not available and the total consumption measure has been estimated using survey-to-survey imputations. This makes it challenging to use these data for the purpose of this paper.

The NRVA surveys are nationally representative, 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 range of other socioeconomic indicators. The NRVA surveys also contain information on variables related to fragility, including perceptions on security, revenues from opium, and shocks from violence. In addition, they indicate the household location and report information on the occurrence of local shocks such as severe weather.

The credibility of the proposed approach hinges on the consistency of the data used in the 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 the local intensity of conflict. 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 conflict intensity, 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. This data can be aggregated at the province level using survey weights. To ensure that correlations are meaningful, all seven indicators are scaled by population. Separately, the Asia Foundation Survey of the Afghan people (2015) includes questions regarding the household's fear for safety and the household concern about bad security conditions. These survey data can also be aggregated at the province level using survey weights.

Some of the correlation coefficients between the various indicators of conflict are quite high (table 1). Not surprisingly, households that report having suffered from theft or violence also have higher perceptions of insecurity. Similarly, conflict intensity is 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 conflict intensity 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 the Survey of the Afghan People.

4. Modeling conflict intensity

The econometric specification of Model 1 builds on the analyses by Biddle, Friedman, and Shapiro (2012) and Hultman, Kathman, and Shanon (2013). The model focuses on changes in conflict intensity at the local level and how they are affected by changes in the presence of troops on the ground. Conflict intensity is measured by the number of casualties. 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 deflated by provincial population.

Table 1. The correlation between conflict-related indicators from diverse sources is substantial

	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: The first three indicators are from the provincial database; the subsequent two indicators are from the NRVA survey; and the two last indicators are from the Asia Foundation Survey of the Afghan People. Correlation coefficients are computed for 2011.

The equation to be estimated is:

$$\Delta(Casualties)_{j,t} = \alpha + \beta_1.\Delta\binom{International}{troops}_{j,t} + \beta_2.\Delta\binom{International}{troops}_{j,t-1} +$$

$$+\gamma_1.\Delta\binom{Afghan}{troops}_{j,t} + \gamma_2.\Delta\binom{Afghan}{troops}_{j,t-1} + \mu.\Delta(Casualties)_{j,t-1} + \varepsilon_{j,t}$$

where j stands for province, t for year, Δ indicates change with respect to the previous year, and ε is an independently distributed error term. Coefficients β_1 and β_2 capture the impact of changes in the number of international troops on conflict intensity within the same year and the year after respectively. The interpretation is similar for coefficients γ_1 and γ_2, in relation to Afghan troops. Coefficient μ captures the persistence of conflict; a negative coefficient indicates that shocks in the number of casualties tend to be attenuated over time.

To ensure the robustness of the results, this equation was estimated using a range of approaches. In addition to the right-hand side variables considered above a time dimension was introduced, either under the form of a linear trend or of year dummies. Conversely, in some of the estimations the lagged change in the number of casualties was removed. Different econometric techniques were used for the estimations, including ordinary least squares (OLS), panel fixed effects, and the Arellano and 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.

Reassuringly, the signs and magnitudes of the coefficients are consistent across estimations (table 2). For example in all the simulations, an increase in the number of international troops is associated with an increase in conflict intensity within the same year, but with a reduction the year after. The negative second-year effect is large, in absolute terms, across all estimations. The pattern is similar for an increase in the presence of Afghan troops: the relationship with the change in conflict intensity is positive in the same year but negative the year after.

In all estimations, the sum of the coefficients measuring the impact of increased troops on conflict 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 conflict intensity in the short term, but lower conflict intensity 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. But in our model, most of the effectiveness comes from international troops. The key coefficient in Model 1 is indeed the sizeable and highly significant coefficient β_2, which captures the impact of international troops after one year. In contrast, the coefficients associated with changes in the number of Afghan troops (γ_1 and γ_2) are statistically insignificant in all estimations (Figure 5).

Table 2. Estimation results for Model 1 (conflict dynamics)

VARIABLES	(1) OLS	(2) FE	(3) OLS	(4) FE	(5) AB	(6) OLS	(7) FE	(8) OLS	(9) FE	(10) AB	(11) OLS	(12) FE	(13) OLS	(14) FE	(15) AB
International Troops (per 1, 000 inhabitant) t - t-1	0.0304**	0.0400**	0.0283*	0.0369**	0.0190	0.0252	0.0326*	0.0227	0.0290*	0.0226	0.0375**	0.0450***	0.0349**	0.0415**	0.0228
	(0.0147)	(0.0162)	(0.0146)	(0.0161)	(0.0640)	(0.0164)	(0.0177)	(0.0162)	(0.0174)	(0.0807)	(0.0155)	(0.0168)	(0.0154)	(0.0167)	(0.0612)
International Troops (per 1, 000 inhabitant) t-1 - t-2	-0.135***	-0.152***	-0.130***	-0.146***	-0.150***	-0.0966***	-0.115***	-0.0927***	-0.109***	-0.109***	-0.131***	-0.149***	-0.127***	-0.143***	-0.144***
	(0.0185)	(0.0206)	(0.0185)	(0.0205)	(0.0178)	(0.0204)	(0.0233)	(0.0202)	(0.0230)	(0.0175)	(0.0187)	(0.0207)	(0.0186)	(0.0206)	(0.0182)
Afghan Troops (per 1, 000 inhabitant) t - t-1	0.0232	0.0154	0.0122	0.00481	0.0610*	0.0105	0.00472	0.00189	-0.00435	0.0389	0.0414	0.0315	0.0292	0.0196	0.0997***
	(0.0367)	(0.0386)	(0.0366)	(0.0384)	(0.0349)	(0.0394)	(0.0417)	(0.0390)	(0.0410)	(0.0437)	(0.0387)	(0.0411)	(0.0387)	(0.0410)	(0.0258)
Afghan Troops (per 1, 000 inhabitant) t-1 - t-2	-0.00392	-0.0327	0.00503	-0.0200	0.000606	0.00594	-0.0187	0.0118	-0.0106	-0.00490	-0.0146	-0.0358	-0.00501	-0.0231	-0.00332
	(0.0373)	(0.0518)	(0.0371)	(0.0515)	(0.0215)	(0.0388)	(0.0549)	(0.0383)	(0.0540)	(0.0386)	(0.0379)	(0.0519)	(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											0.0438	0.0361	0.0400	0.0328	0.0630**
											(0.0304)	(0.0320)	(0.0302)	(0.0316)	(0.0293)
Constant	0.148***	0.186***	0.154***	0.188***	0.135***	-9.30e-05	0.0651	0.0312	0.121	0.0846	0.0342	0.0867	0.0500	0.0983	-0.0362
	(0.0498)	(0.0606)	(0.0494)	(0.0598)	(0.0435)	(0.110)	(0.141)	(0.109)	(0.140)	(0.130)	(0.0931)	(0.106)	(0.0924)	(0.105)	(0.0865)
Year Dummies	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No
Observations	192	192	192	192	160	192	192	192	192	160	192	192	192	192	160
Adjusted R-squared	0.209	0.110	0.227	0.133		0.270	0.164	0.292	0.196		0.214	0.112	0.230	0.133	
Number of province	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32

Note: Standard errors are reported below the estimated coefficients. Statistically significant coefficients at the 10, 5, and 1 percent level are indicated by one, two and three asterisks respectively. The preferred estimation is highlighted in yellow. AB = Arellano and Bond; FE = fixed effects; OLS = ordinary least squares.

Figure 5. Robustness of the estimated impact of troops on casualties

Note: The preferred estimation is highlighted in yellow.

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 intensity of conflict is 0.71, and the share of the variance in conflict intensity explained by the model is 0.85.

For half of the provinces, the share of the variance explained by the model exceeds 0.5. And the correlation coefficient between predicted and actual intensity of conflict exceeds 0.8 for more than a third of them. On the other hand, Model 1 does not predict conflict intensity well in nine provinces, where the correlation coefficient between predicted and actual intensity of conflict is below 0.3. Khost, Nooristan, and Helmand are among these nine provinces; they are also among the most violent ones.

A potentially important caveat to these results concerns the possible changes in the military capabilities of Afghan troops in recent years. 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 the coefficients are constant over the entire period 2007–14, it may fail to capture these two effects.

To address this concern, the preferred estimation is re-run 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 and Mohamad Ali, 2016).

The second variation of the preferred estimation 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 a much higher conflict intensity within the same year. But the difference between the two sub-periods in conflict intensity 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 the conflict intensity 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.

5. Modeling household expenditures

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

This model has similarities to the work of Bove and Gavrilova (2014). But instead of looking at the impact of conflict on wages and prices at the provincial level, the model focuses on its impact on expenditures per capita at the household level. The latter indicator provides 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:

$$\binom{Consumption}{per\ capita}_{i,t} = \theta_0 + \theta_1.\binom{Household}{demographics}_{i,t} + \theta_2.\binom{Household}{education}_{i,t} + \theta_3.\binom{Location}{characteristics}_{j,t} +$$

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

where i stands for household and ϑ is an independently distributed error term. The θ 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 expenditure 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).

Although poverty analyses devote considerable attention to interpreting the θ 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 φ coefficients, as they directly reflect the impact of foreign aid and conflict intensity on household expenditures.

Again, a variety of empirical approaches are used to ensure the robustness of the results. The basic estimations rely on household-weighted OLS. Standard errors are clustered at the province level in all specifications, to ensure consistency with conflict indicators measured at the province level. Season dummies are included in all cases, because households were surveyed at different points of the year. Some of the estimations also control for the average share of opium-related income in the district where the household lives, as well as for the poverty rate of the district in 2007.

While information of troops and casualties is reliable, information on the volume of foreign aid spent locally is not. The indicator, provided by the Ministry of Economy, is considered to be only

a crude approximation of the actual figure. An instrumental variables two-stage least squares approach (IV 2SLS) is used to address possible measurement error. The foreign aid variable is therefore instrumented based on more reliable information about USAID aid flows at the local level. The first-stage regression also includes provincial fixed effects.

The preferred estimation includes the maximum number of control variables and corrects for measurement error (table 3a). As an additional robustness check, the indicator on conflict intensity is replaced by with the proportion of people at the provincial level who raised concerns about bad security conditions in their village (table 3b). 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. However, the 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.

In line with previous research, expenditures per capita increase with foreign aid and with the presence of troops, and decrease with conflict intensity (figure 6). 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 conflict intensity 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.

6. 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 conflict intensity has 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 conflict intensity and the presence of troops. Previous research by Chou (2012), Douglas (2012), and Johnson, Ramachandran, and Walz (2012), also points out to a strong correlation between conflict intensity and the level of foreign aid. Because of these correlations, assessing the impact of conflict on household expenditures requires considering all conflict-related variables together, and not in isolation.

The provincial database constructed for this paper sheds additional light on the correlation patterns linking conflict-related variables (figure 7). Contemporary correlations at the province level between conflict intensity, foreign aid and the presence of troops, range from 0.2 to 0.4. But based on the time structure of the correlation coefficients, conflict intensity precedes aid, which is in turn followed by an increase in the number of troops, both international and Afghan. This dynamic suggests that mobilizing more financial resources is easier than handling the logistics of a larger military presence on the ground.

Table 3a. Estimation results for Model 2 (household expenditures) with casualties as conflict indicator

	Casualties							
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	(5) HH Weighted - OLS Log per capita Consumption	(6) HH Weighted - OLS Log per capita Consumption	(7) HH Weighted - IV 2sls Log per capita Consumption	(8) HH Weighted - IV 2sls Log per capita Consumption
Demographics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Education	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Location	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Opium Income District	No	Yes	No	Yes	No	Yes	No	Yes
Poverty Headcount District (2007)	No	No	No	No	Yes	Yes	Yes	Yes
Season Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Foreign Aid (USD per 1,000 inhabitant)	0.0143	0.0103	0.0120	0.00799	0.0493	0.0453	0.0466	0.0426
	(0.0359)	(0.0355)	(0.0346)	(0.0342)	(0.0477)	(0.0491)	(0.0461)	(0.0475)
Casualties (per 1,000 inhabitant)	-0.0193	-0.0225	-0.0197	-0.0229	0.00172	-0.00116	0.00112	-0.00180
	(0.0467)	(0.0463)	(0.0457)	(0.0453)	(0.0450)	(0.0439)	(0.0437)	(0.0426)
International Troops (per 1,000 inhabitant)	0.00301	0.00311	0.00303	0.00313	0.00167	0.00179	0.00169	0.00181
	(0.00587)	(0.00585)	(0.00575)	(0.00574)	(0.00543)	(0.00542)	(0.00532)	(0.00530)
Afghan Troops (per 1,000 inhabitant)	0.00527***	0.00540***	0.00525***	0.00539***	0.00648***	0.00650***	0.00645***	0.00647***
	(0.00185)	(0.00182)	(0.00180)	(0.00178)	(0.00212)	(0.00210)	(0.00207)	(0.00205)
Observations	18,221	18,221	18,221	18,221	18,211	18,211	18,211	18,211
Adjusted R-squared	0.364	0.367	0.364	0.367	0.378	0.378	0.378	0.378
Joint Significance (Prob > Test)	**0.109**	**0.0862**	**0.0695**	**0.0505**	**0.0358**	**0.0357**	**0.0148**	**0.0147**
Joint Significance (%)	**89.1%**	**91.4%**	**93.1%**	**95.0%**	**96.4%**	**96.4%**	**98.5%**	**98.5%**

Robust standard errors (Province) in parentheses

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

Note: Standard errors are clustered at the province level are reported below the estimated coefficients. Statistically significant coefficients at the 10, 5, and 1 percent 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 3b. Estimation results for Model 2 (household expenditures) with perceptions as conflict indicator

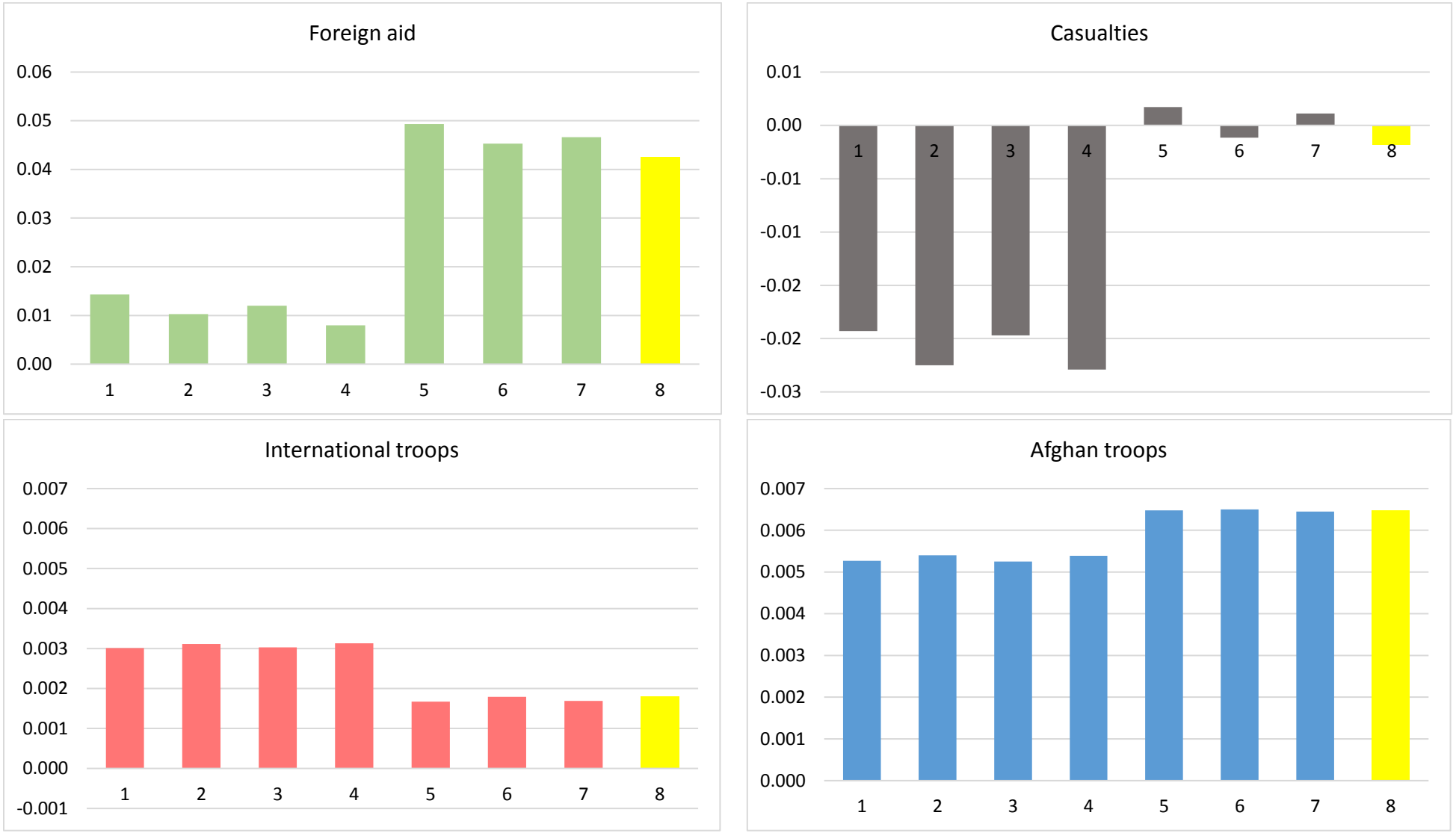
	Bad Security Conditions in Village/Neighborhood							
VARIABLES	(1) HH Weighted - OLS Log per capita Consumption	(2) HH Weighted - OLS Log per capita Consumption	(3) HH Weighted - IV 2sls Log per capita Consumption	(4) HH Weighted - IV 2sls Log per capita Consumption	(5) HH Weighted - OLS Log per capita Consumption	(6) HH Weighted - OLS Log per capita Consumption	(7) HH Weighted - IV 2sls Log per capita Consumption	(8) HH Weighted - IV 2sls Log per capita Consumption
Demographics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Education	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Location	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Opium Income District	No	Yes	No	Yes	No	Yes	No	Yes
Poverty Headcount District (2007)	No	No	No	No	Yes	Yes	Yes	Yes
Season Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Foreign Aid (USD per 1,000 inhabitant)	-0.00439	-0.00870	-0.00276	-0.00707	0.0331	0.0285	0.0344	0.0298
	(0.0375)	(0.0368)	(0.0388)	(0.0381)	(0.0459)	(0.0468)	(0.0467)	(0.0476)
Casualties (per 1,000 inhabitant)	-0.165	-0.170	-0.162	-0.167	-0.114	-0.120	-0.112	-0.118
	(0.177)	(0.178)	(0.176)	(0.176)	(0.158)	(0.157)	(0.157)	(0.156)
International Troops (per 1,000 inhabitant)	0.00291	0.00277	0.00290	0.00276	0.00293	0.00284	0.00292	0.00283
	(0.00473)	(0.00470)	(0.00464)	(0.00461)	(0.00438)	(0.00438)	(0.00430)	(0.00430)
Afghan Troops (per 1,000 inhabitant)	0.00533***	0.00543***	0.00534***	0.00544***	0.00667***	0.00666***	0.00668***	0.00668***
	(0.00178)	(0.00175)	(0.00175)	(0.00173)	(0.00187)	(0.00186)	(0.00185)	(0.00183)
Observations	18,221	18,221	18,221	18,221	18,211	18,211	18,211	18,211
Adjusted R-squared	0.366	0.369	0.366	0.369	0.379	0.380	0.379	0.380
Joint Significance (Prob > Test)	**0.0158**	**0.0113**	**0.00454**	**0.00270**	**0.0229**	**0.0207**	**0.00790**	**0.00676**
Joint Significance (%)	**98.4%**	**98.9%**	**99.5%**	**99.7%**	**97.7%**	**97.9%**	**99.2%**	**99.3%**

Robust standard errors (Province) in parentheses

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

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 percent 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.

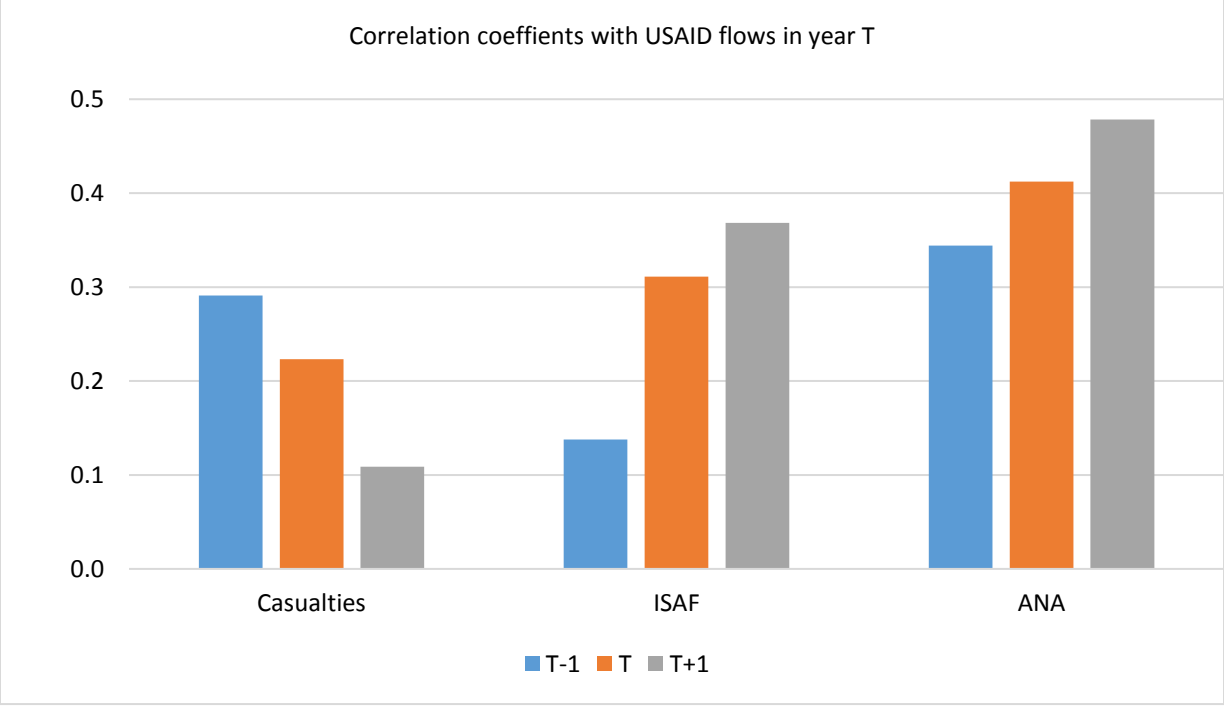
Figure 6. Robustness of the estimated impact of conflict-related variables on household expenditures, with casualties as conflict indicator



Note: The preferred estimation is highlighted in yellow.

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 intensity of conflict. 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 φ 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 the results at the level of the province, the region, or the country.

Figure 7. Conflict precedes aid and the build-up of troops

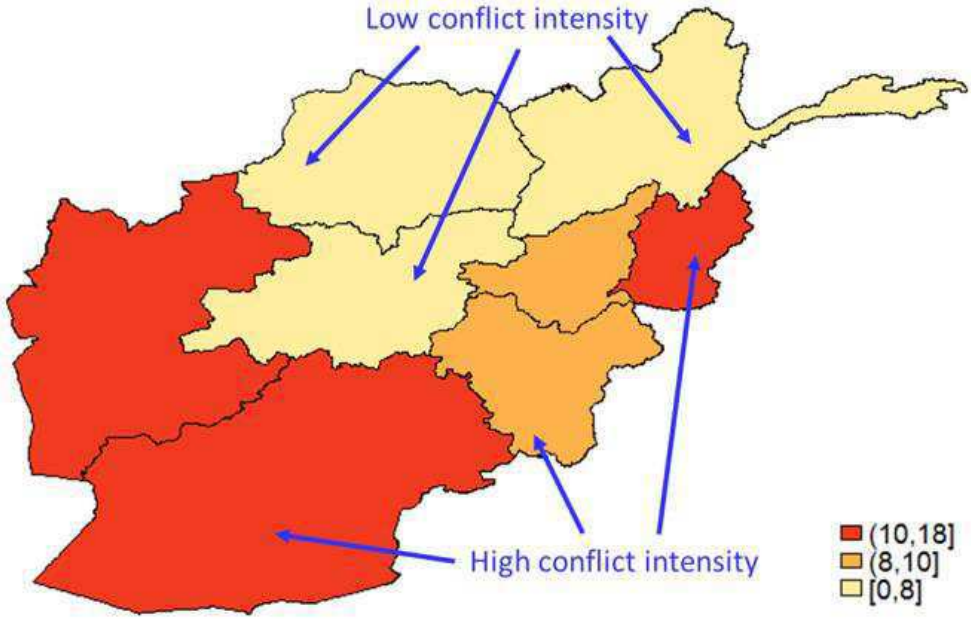


Note: ISAF stands for international troops (ISAF) and ANA for Afghan troops. Observations are at the provincial level between 2009 and 2014.

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 8). The impact is particularly strong among the provinces in the East, South, and the Southwest. 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 paradox of limited poverty reduction in the Afghan provinces and regions less affected by conflict.

Figure 8. A higher intensity of conflict is associated with larger household expenditures

Marginal contribution of conflict-related indicators (%)



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

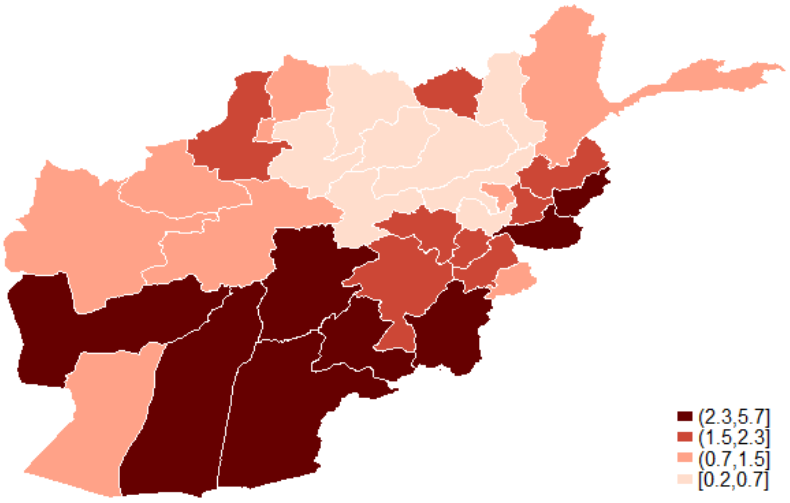
7. The consequences of the transition

The estimated models can also be used to simulate the consequences of the decline of foreign aid and the withdrawal of international troops on poverty, 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 and casualties are available. This choice requires updating the data on household expenditures per capita, as the most recent 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.

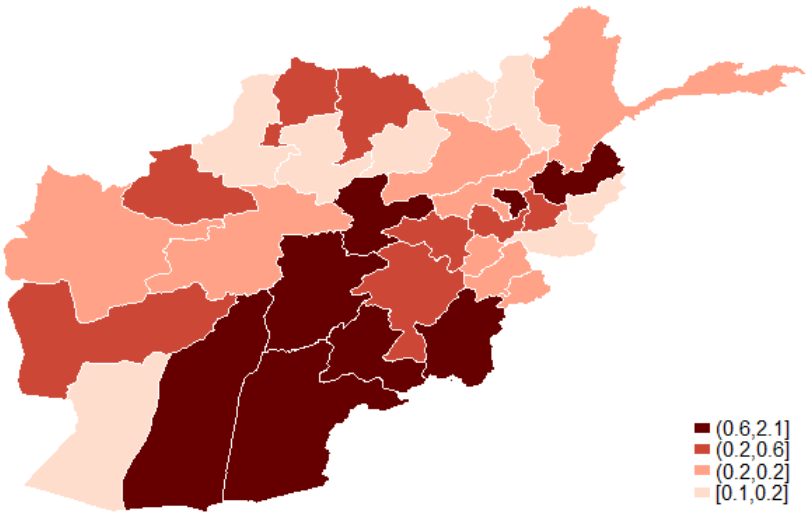
Forecasting conflict intensity and the level of household expenditures beyond 2014 requires additional assumptions. Foreign aid flows at the province level are supposed to be 5 percent lower in 2015 than in 2011, and to decline by 5 percent every year subsequently, consistent with information provided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

Figure 9. Conflict intensity increases more in provinces where it was already high

Casualties in 2014 (per 1,000 inhabitants)



Increase in casualties between 2014 and 2016 (per 1,000 inhabitants)



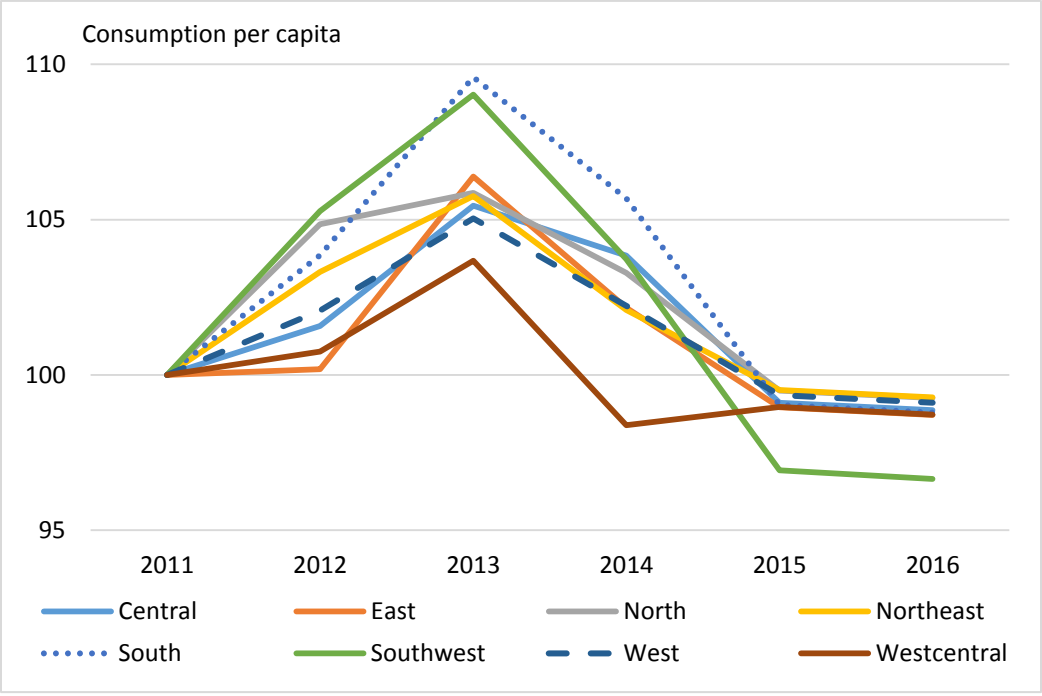
The prediction of conflict intensity at the provincial level beyond 2014 is based on Model 1. For every province, conflict intensity in 2015 is computed as the level of conflict intensity in 2014 plus the predicted change in conflict intensity between 2014 and 2015. The same procedure is used recurrently to simulate the level of conflict intensity in subsequent years.

The simulation yields an increase in conflict intensity across Afghanistan. The sharpest increase is in the Southwest region, but even the relatively peaceful North and Northeast regions see a deterioration of their security situation. Conflict intensity increases sharply in 2015, but the upward

trend continues in 2016. The ranking across provinces remains unchanged, with the larger increase in conflict intensity taking place in the regions where conflict levels were already high in 2014 (Figure 9).

The same assumptions on foreign aid and the presence of troops are used to forecast household expenditures beyond 2014, with inputs on conflict intensity 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. Although international troops may procure most of their supplies abroad, their construction and civil works most likely involve local labor. Furthermore, international troops' withdrawal has a negative effect on household welfare through the increased conflict intensity it may generate.

Figure 10. Household expenditure per capita declines relative to its 2013 peak



As a result of this triple shock, household expenditure per capita is expected 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 will be impacted most severely by the transition, followed by the South (Figure 10). In the South and Southwest regions, declines in household expenditure per capita relative to their 2013 peak will reach 10.8 and 12.4 percent, respectively.

Although the simulation results reported so far refer to average household expenditures at the regional level, the chosen approach also make 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, this procedure yields the estimated poverty rates over the simulation period (Figure 11).

Using this approach, poverty incidence in Afghanistan can be expected to increase 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 increase will be more marked in the East, South, and Southwest regions.

8. Out-of-sample validation

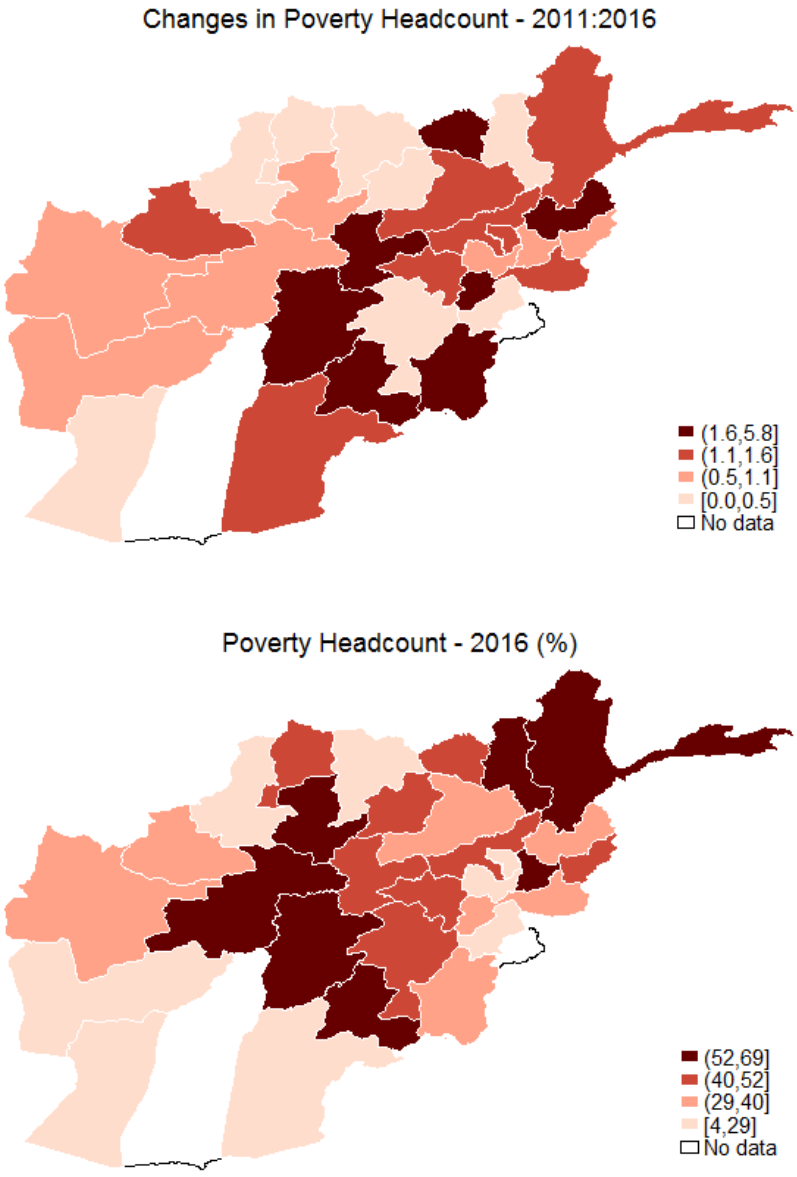
The results in this paper help understand the paradox of lower poverty in regions more severely affected by conflict, but the relevance of the forecasts on the dynamics triggered by the transition could be questioned. The estimated models ensure a good fit with the data during the estimation period, but they could be less relevant beyond it, when political processes and exogenous shocks may put the country, and conflict intensity, on a different trajectory relative to the forecasts. This is a valid concern. One way to address it is to assess how well the forecasts in this paper predict actuals for the year 2015.

Data recently made available on conflict intensity in recent months reveals a strong similarity between the actual intensity of conflict in 2015 and the forecasts from Model 1. The predicted number fell short of the actual by only 0.2 percent, suggesting that the proposed approach is quite accurate at the national level. 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, with the model not fully anticipating the increase in conflict intensity in the Northeast, and overestimating conflict intensity in the Central region, and even more so in the Westcentral region (figure 12).

An out-of-sample validation can also be conducted in relation to expenditures per capita, Because Model 2 was estimated using data from 2011, forecasts and actuals can be compared for all the years since 2012. The exercise also allows to assess the performance of the empirical approach used in this paper relative to other forecasts produced building on the 2011 NRVA survey and other data sources issued at about the same time. Such analyses include the already mentioned landmark

report *Afghanistan in Transition*, as well as a more updated version, *Pathways to Inclusive Growth* (World Bank, 2014). The studies also include the 2011 edition of the Afghanistan Article IV Consultation (IMF, 2011).

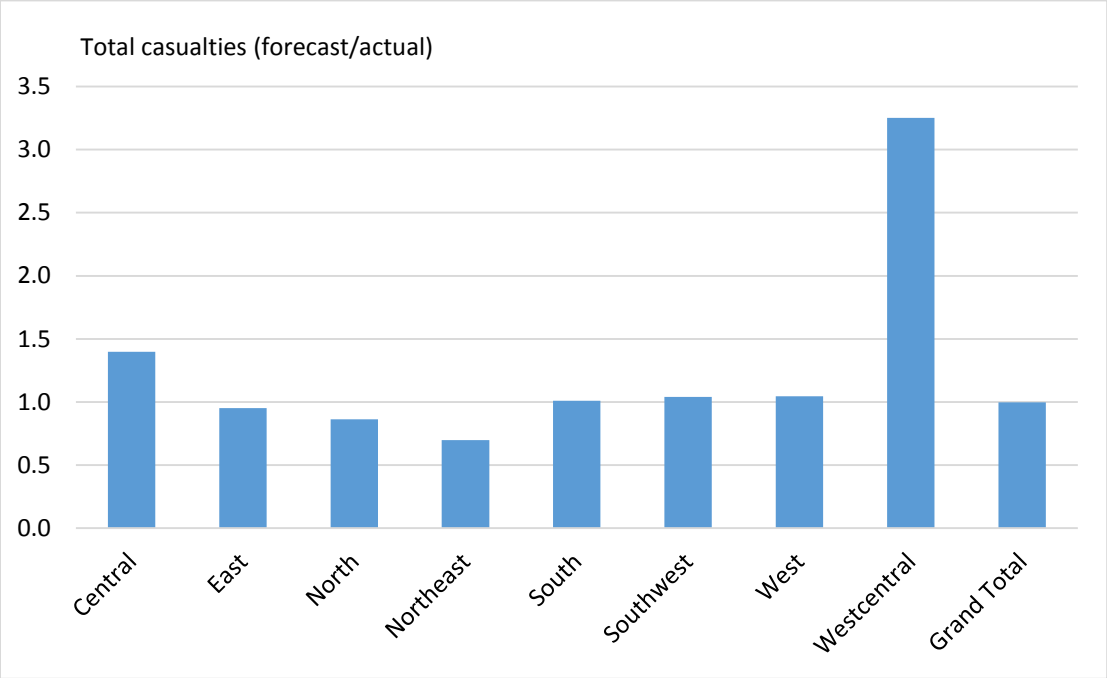
Figure 11. Poverty rates increase during the transition



These studies and reports anticipated a steady upward trend in GDP per capita over time. Official statistics confirmed a very strong growth performance in 2012 — most probably the result of the surge in international troops. However, growth decelerated sharply in 2012 and has been sluggish

since then. Given rapid population growth in Afghanistan, the official statistics imply that GDP per capita has been on a declining trend in recent years.

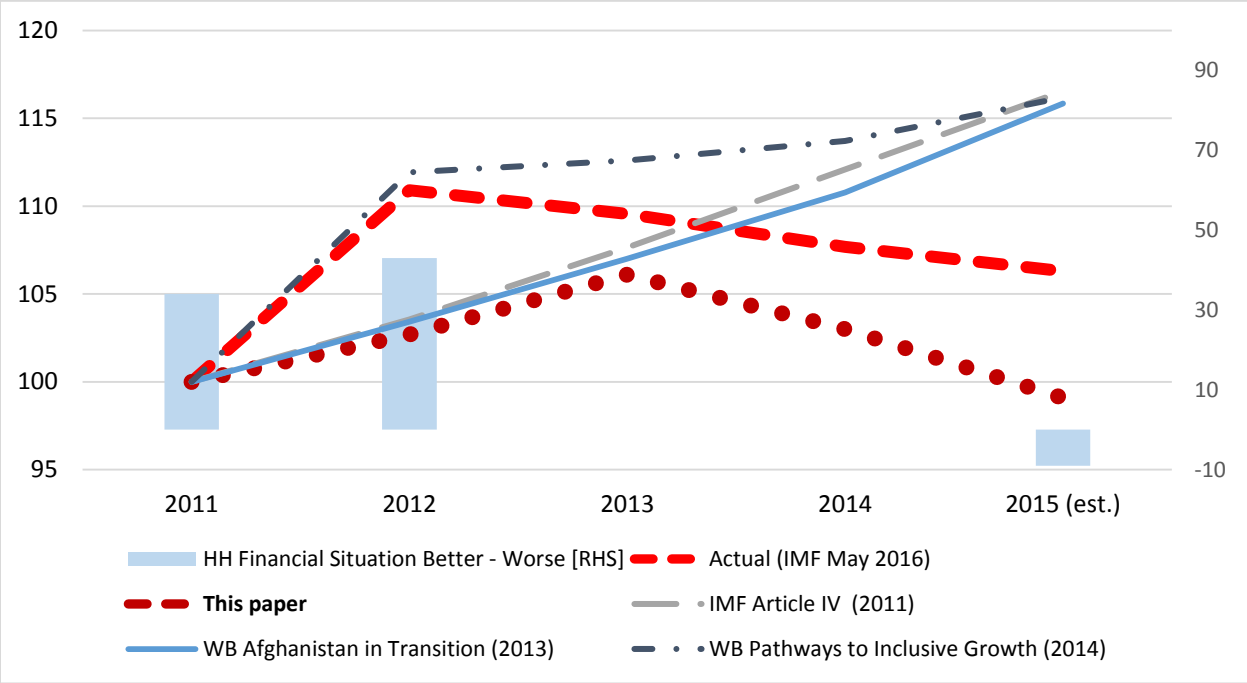
Figure 12. Out-of-sample forecasts of conflict intensity are accurate at the aggregate level



The analysis in this paper refers to expenditures per capita, rather than to GDP per capita. But with savings rates being generally stable it is reasonable to assume that the two series are highly correlated. With this caveat in mind, the out-of-sample forecast predicts well the increase in GDP per capita associated with the surge in international troops, although it sees it happening in 2013 rather than in 2012. The forecasts also predict a decline in GDP per capita in subsequent years, in contrast with the relative stability implied by official statistics and the steady increase anticipated by other, contemporary analyses (figure 13).

There are additional indications that the approach used in this paper yields reliable results. In the already mentioned Survey of the Afghan People (2015), one of the questions asks households about the change in their financial situation, relative to the previous year. The difference between the percentage of households reporting that their situation had improved and those answering that it had worsened can be seen as an indicator of the change in living standards. The variation of this indicator matches well the change in expenditures per capita generated by the out-of-sample simulation.

Figure 13. Out-of-sample forecasts of consumption anticipated actual trends well



A final validation of the out-of-sample forecasts in this paper comes from the preliminary results of the latest poverty assessment for Afghanistan according to which the share of the population living below the poverty line increased from 35.8 percent in 2011 to 39.1 percent in 2013 (Afghanistan Central Statistical Office, CSO-ALCS, 2015). This particular poverty assessment used survey-to-survey imputations, as opposed to actual expenditure data, so that the poverty headcount it provides, could be less precise than its predecessors. However, if the figures are taken at face value they imply an even more dramatic deterioration of the economic situation than anticipated by the out-of-sample forecasts in this paper.

9. 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 Afghanistan's ongoing transition. The approach combines a dynamic model of conflict intensity at the province level with a cross-sectional model disentangling the impact of conflict-related indicators on consumption expenditures at the household level. One of the contributions of the paper is to assemble the database on conflict at the province level. Although much of the data used to this effect is in the public domain, the added value is to bring the data together on a spatial platform and to check its consistency with the conflict-related indicators estimated based on household survey data and opinion polls.

Several important insights emerge from the analyses in the paper. First and foremost, the paradox of higher poverty in safer provinces and regions can be explained. The estimates make it clear that higher conflict intensity is associated with lower household expenditure per capita. But Afghanistan is an unusual case in which foreign aid and the presence of troops on the ground are correlated with conflict, and the positive impact of these two added variables on household expenditures more than offsets the negative impact of casualties across all provinces. Related to this point, the estimates show that the impact of Afghan troops on expenditures is two to three times larger than that of international troops, most probably because local spending and procurement by Afghan troops is larger. All in all, the simulation exercise performed in this paper suggests, in line with the latest available evidence, that the transition in Afghanistan involved a severe deterioration in living standards.

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Data Annex

The provincial-level database on conflict used to estimate our 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 1230 reports. The assumption is that the provincial distribution of ANA troops over the period 2007–2011 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.

The list of variables that we used in the estimation, as well as the corresponding summary statistics, are presented in the tables below.

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 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

Summary statistics

Model 1

Variable	Mean	Std. Dev. Overall	Between	Within	Min	Max	Observations
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

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