FONDATION POUR LES ÉTUDES ET RECHERCHES SUR LE DÉVELOPPEMENT INTERNATIONAL

Working Paper 366 February 2026 Development Policies

On the Asymmetry between Conflict and Development: Evidence from Sustainable Development Goals

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Abstract

This paper investigates the relationship between (internal) armed conflict and sustainable development. Using annual panel data on 192 countries from 2000 to 2024, we employ a variety of econometric techniques to trace the impulse responses between conflict fatalities and Sustainable Development Goal (SDG) performance in both directions. Results reveal a striking asymmetry: conflict shocks produce long-lasting adverse effects on SDG performance, while SDG performance shocks exert only transient effects on conflict intensity. This asymmetry persists across external and major conflict episodes, and is robust to alternative identification strategies. Our findings indicate that sustainable development is fundamentally contingent on prior achievement of peace.

Keywords: Conflict, Development, Sustainability, Asymmetry, Persistence.

JEL Codes: O10, O43, D74, C33.

1. Introduction

The relationship between armed conflict and economic development represents one of the most fundamental and enduring questions in development economics and political science. peace and economic development. This bidirectional framework has guided trillions of dollars in international aid and policy interventions, often with the implicit assumption that investments in development can reduce conflict, and that conflict resolution can spur development (Collier *et al.*, 2003; World Bank, 2011). However, the empirical evidence on the direction and persistence of this relationship remains contested and surprisingly sparse in its temporal dimension. In the present paper, we explore the asymmetrical nature of the relationship between (internal) armed conflict and sustainable development.

The nexus between peace and development has its origins in the aftermath of the Second World War. In his 1949 inaugural address, US President Harry Truman introduced a linear concept of development and recognized that poverty was a "threat" to both less and more prosperous areas. That model of international development has endured till today. Notably, the conventional wisdom, encapsulated in the United Nations' Sustainable Development Goals (SDGs), posits a bidirectional relationship: conflict undermines development, while development failures can fuel conflict (United Nations, 2015). In this paper, we use data on performance toward achieving SDGs as proxy for economic development going beyond gross domestic product (GDP).

The literature on the link between conflict and development is abundant mostly focusing on a particular dimension of the causality. Numerous studies document contemporaneous relationship between conflict and poor development outcomes (Blattman & Miguel, 2010; Fearon & Laitin, 2003). Some examine short-term effects (Guidolin & La Ferrara, 2007). Few quantify how long these effects last, or whether they are symmetric in both directions. Understanding persistence—the rate at which the effects of shocks decay over time—is crucial both academically and for designing effective policy interventions. This paper addresses this gap by providing a comprehensive empirical analysis of the asymmetric persistence in the relationship between internal conflict and sustainable development.

To do so, we trace the dynamic impulse responses between conflict intensity and performance across all 17 SDGs over a 24-year period. Our primary methodological innovation is the application of half-life estimation—borrowed from macroeconomics and finance (Cochrane, 1988; Campbell & Mankiw, 1987)—to quantify the durability of shocks in both directions. This approach allows us to answer a central but overlooked question: When conflict strikes, how

long does its shadow linger over development? Conversely, when development improves, how durable is its pacifying effect?

Our analysis yields robust results. The relationship is profoundly asymmetric in its persistence. Shocks to conflict inflict long-lasting damage on SDG performance, with effects that decay slowly over many years—often exceeding a decade for critical dimensions like poverty reduction, health, and infrastructure. In stark contrast, shocks to SDG performance, whether positive or negative, exert only fleeting influence on conflict dynamics, with effects dissipating within two years. This asymmetry is evident across all SDG pillars, robust to distinguishing between internal and external conflicts, and persists when examining only major conflict episodes.

These findings contribute to several strands of literature. First, they advance the empirical literature on the economic costs of conflict (Abadie & Gardeazabal, 2003; Cerra & Saxena, 2008) by quantifying not just the magnitude but the duration of these costs across a comprehensive set of development outcomes. Second, they engage with the political economy literature on state fragility and the "conflict trap" (Collier *et al.*, 2003; Besley & Persson, 2011), providing evidence that conflicts create persistent negative feedback loops through developmental channels. Third, they inform the growing policy literature on the SDGs and the "nexus" approach to humanitarian and development assistance (Clemens *et al*., 2007; Di Maro & Minoiu, 2021), suggesting that assumptions about bidirectional causality may be overly optimistic.

The implications for policy are significant. If conflicts cast long shadows over development but development casts only short shadows over peace, then the policy priority should lean heavily toward conflict prevention and early resolution. While development assistance remains vital for humanitarian and ethical reasons, its efficacy as a tool for durable conflict reduction appears limited. Our findings suggest that the "peace-first" and "development-first" debate may be somewhat misplaced; rather, they indicate that sustainable development is fundamentally contingent on prior or simultaneous achievement of peace.

The remainder of this paper is structured as follows. Section 2 reviews the related literature. Section 3 describes our data and empirical framework. Section 4 presents the main results on asymmetric persistence. Section 5 provides robustness checks. Section 6 concludes.

2. Related Literature

Our paper sits at the intersection of three strands of literature: the economic costs of conflict, the determinants of civil war, and the measurement of persistence in macroeconomic and development outcomes.

The Economic Costs of Conflict. A well-established literature documents that armed conflict reduces economic growth, destroys capital, displaces populations, and undermines human capital accumulation (Blattman & Miguel, 2010 provides a comprehensive review). Early cross-country studies found strong negative association between conflict and growth (Alesina *et al.*, 1996; Collier, 1999). More recent work has employed quasi-experimental methods to identify causal effects in specific contexts (Miguel *et al.*, 2004; Dube & Vargas, 2013). However, most studies focus on GDP or narrow economic indicators. Few examine the comprehensive set of development outcomes captured by the SDGs, and even fewer quantify the persistence of these effects beyond the immediate post-conflict period. Our paper extends this literature by measuring the half-life of conflict shocks across 17 development dimensions.

The Determinants of Civil War and the "Conflict Trap." A parallel literature investigates the root causes of conflict, emphasizing factors like poverty, inequality, natural resource dependence, and weak institutions (Fearon & Laitin, 2003; Collier & Hoeffler, 2004). This literature often posits a bidirectional relationship or a "conflict trap" where poverty breeds conflict and conflict reinforces poverty (Collier *et al.*, 2003). However, empirical tests of this reverse causality—from development to conflict—have yielded mixed results (Hegre & Sambanis, 2006). Our contribution is to formally test the symmetry and persistence of this relationship using a unified empirical framework, allowing us to compare the durability of effects in both directions directly.

Persistence and Half-Life Estimation in Economics. The concept of half-life, measuring the time it takes for a shock to decay by half, is widely used in macroeconomics to study the persistence of output gaps, inflation, or real exchange rates (Cochrane, 1988; Rogoff, 1996; Cheung & Lai, 2000). In development economics, the idea of "hysteresis" or persistent effects of temporary shocks has been applied to health (Bleakley, 2010), education (Duflo, 2001), and poverty (Jalan & Ravallion, 2002). We adapt this approach to the peace-development nexus, providing a novel metric to compare the lasting scars of conflict against the transient pacifying effects of development.

The Sustainable Development Goals (SDGs) Literature. Since their adoption in 2015, a growing literature has emerged on measuring SDG progress, identifying trade-offs and synergies

between goals (Pradhan *et al.*, 2017; Costanza *et al.*, 2016), and analyzing their determinants. However, the impact of conflict on the multidimensional SDG framework remains under-explored. Our paper fills this gap by providing a holistic assessment of how conflict disrupts progress across all 17 goals and quantifying how long these disruptions last.

3. Data and Empirical Framework

3.1 Data Sources and Variables

Our analysis employs a balanced annual panel dataset covering 192 countries from 2000 to 2024.

Sustainable Development Goals (SDGs). We use the official SDG Index scores from the Sustainable Development Solutions Network (SDSN) and the Bertelsmann Stiftung (Sachs *et al.*, 2024). The index provides 17 separate scores (0-100) for each SDG, along with an aggregated score. The SDGs cover poverty (SDG 1), hunger (2), health (3), education (4), gender equality (5), water (6), energy (7), growth (8), industry (9), inequality (10), cities (11), consumption (12), climate (13), oceans (14), land (15), institutions (16), and partnerships (17).

Conflict Data. Our primary measure of conflict intensity comes from the UCDP/PRIO Armed Conflict Dataset (Gleditsch *et al.*, 2002; Pettersson *et al.*, 2021). We define Internal Conflict Fatalities as the annual number of battle-related deaths in internal armed conflicts (type 3 and 4 in UCDP) per 10,000 population. We also construct a binary Conflict Onset indicator and distinguish between Internal and Internationalized Internal conflicts. For robustness, we use data from the Major Episodes of Political Violence (MEPV) dataset and the Global Terrorism Database (GTD).

Summary Statistics. Table A1 in Supplementary Appendix A presents summary statistics. The aggregate SDG score is 64.4, with substantial variation across goals and countries. Conflict is a rare but severe event: the mean conflict fatality rate is 0.24 per 10,000, but the standard deviation is 2.12, and the 90th percentile is 2.0, indicating a highly skewed distribution.

3.2 Empirical Framework

To uncover the dynamic, potentially asymmetric relationship between conflict and SDGs, we employ three complementary empirical strategies.

3.2.1 Local Projections

We first estimate impulse response functions (IRFs) using the local projection method (Jordà, 2005). For each horizon $h = 0,1,\ldots,H$, we estimate:

$$y_{i,t+h} = \alpha_i + \mu_t + \beta_h \cdot \text{Shock}_{i,t} + X'_{i,t}\Gamma_h + \epsilon_{i,t+h} \quad (1)$$

where $y_{i,t+h}$ is either the SDG score (for conflict shocks) or conflict fatalities (for SDG shocks) for country i at time $t + h$. $\text{Shock}_{i,t}$ is the initiating shock variable. α_i and μ_t are country and year fixed effects. $X_{i,t}$ is a vector of control variables. The sequence $\{\hat{\beta}_h\}_{h=0}^{H}$ traces the impulse response. We estimate Equation (1) separately for positive and negative shocks to test for asymmetry in the response direction.

3.2.2 Distributed-Lag Models and Half-Life Estimation

To quantify persistence, we estimate an autoregressive distributed-lag (ARDL) model:

$$y_{i,t} = \sum_{j=1}^{p} \rho_j \, y_{i,t-j} + \sum_{k=0}^{q} \delta_k \, \text{Shock}_{i,t-k} + \alpha_i + \mu_t + X'_{i,t}\Gamma + u_{i,t} \quad (2)$$

We select lag lengths p and q using the Akaike Information Criterion (AIC). From the estimated lag polynomial of the shock, we compute the *cumulative impulse response* $CIR(L) = \sum_{k=0}^{L} \frac{\partial y_{i,t+k}}{\partial \text{Shock}_{i,t}}$. The half-life is defined as the smallest $L^{\square}$ such that $CIR(L^{\square}) \leq \frac{1}{2} CIR(0)$. We estimate half-lives via Monte Carlo simulation, drawing from the estimated parameter distribution.

3.2.3 Panel Vector Autoregression (PVAR)

To capture joint dynamics and feedback effects, we estimate a Panel VAR model (Abrigo & Love, 2016):

$$Y_{i,t} = \sum_{j=1}^{p} A_j \, Y_{i,t-j} + \alpha_i + \mu_t + u_{i,t} \quad (3)$$

where $Y_{i,t} =$. We use the Helmert transformation to remove fixed effects before estimation (Arellano & Bover, 1995). We identify shocks using a Cholesky decomposition, ordering conflict first (assuming conflict can affect SDGs contemporaneously, but SDGs affect conflict only with a lag), and check robustness to alternative orderings. Table 1 presents the selection criteria used to determine the lag structure for the PVAR model.

3.2.4 Addressing Endogeneity

The key identification challenge is the potential endogeneity between conflict and development. We employ several strategies:

1. Fixed Effects (FE): Country FE absorb time-invariant confounders; year FE absorb global shocks.
2. Lagged Controls: All control variables are lagged by one period.
3. System GMM: For the PVAR, we use the system GMM estimator (Blundell & Bond, 1998) with lagged levels as instruments for differenced equations.
4. External Instrument (IV) Approach: As a robustness check, we instrument the effect of SDG on conflict using (i) rainfall shocks in agricultural-dependent economies (Miguel *et al.*, 2004) and (ii) international commodity price shocks for resource-dependent countries (Bruckner & Ciccone, 2010).

4. Main Results

4.1 Baseline Impulse Responses

Figure 1 presents the local projection estimates of the response of the aggregate SDG score to an increase in conflict fatalities (left panel), and the reverse response of conflict to an improvement in the aggregate SDG score (right panel).

Conflict to SDG Response: A conflict shock leads to an immediate and statistically significant decline in the SDG score. The effect peaks around 8 years after the shock, with a magnitude of approximately -0.27 points for a one SD increase in conflict (2.12 deaths/10,000). For a major conflict like Yemen in 2021 (13.32 deaths/10,000), this implies a peak decline of about -1.67 points. The response is persistent, remaining negative and significant for over 9 years.

SDG to Conflict Response: An improvement in the SDG score leads to a small, statistically insignificant reduction in conflict fatalities in the very short run (year 1). This effect quickly dissipates and becomes indistinguishable from zero by year 2—albeit the effect becomes briefly significant on year 6.

4.2 Half-Lives

Appendix B presents the half-life estimates from the distributed-lag models.

Conflict Shocks on SDG Pillars. The half-lives are long and economically significant as shown in Tables B1-B2 in Appendix B. The average half-life across all 17 pillars is 7.7 years (see Table B1 in Supplementary Appendix B). Turning to Table B2 in Supplementary Appendix B, results point to shocks to conflict being the most persistent negative effects on SDG 1 (No Poverty), with a half-life of 10.7 years, and SDG 9 (Industry, Innovation), with a half-life of 10.8 years. Other pillars with very persistent effects include SDG 3 (Health): 9.2 years, and SDG 7 (Energy): 7.5 years. This indicates that the developmental damage from conflict is not a transient phenomenon but a long-lasting scar.

SDG Shocks on Conflict. The contrast with the other direction of the causality is stark as shown in Tables B3-B4 in Appendix B. The average half-life across all 17 pillars is 2.4 years (see Table B3 in Supplementary Appendix B). Turning to Table B4 in Supplementary Appendix B, results point to the half-life of conflict's response to a shock in any SDG pillar being remarkably consistent and short, clustering tightly around 1.3 years. The sole outlier is SDG 14 (Life Below Water) at 3.7 years, likely reflecting its limited direct relevance to conflict dynamics for most countries. This indicates that changes in development outcomes, whether positive or negative, have only a fleeting impact on the probability or intensity of armed conflict.

4.3 Disaggregated Dynamics Across SDG Pillars

Figure 2 presents the local projection estimates of the response for disaggregated SDG scores to conflict shocks. The local projections for each individual SDG pillar reveal important nuances within the overall pattern of persistence.

Pillars with very long-lasting effects of conflicts (half-life > 8 years): SDG 1 (Poverty), 3 (Health), 9 (Industry). The impulse responses for these pillars all show significant and persistent drop in response to conflict consistent with the results from the half-lives. These represent core capital stocks—human, physical, and economic—that are hardest to rebuild.

Pillars with moderate persistence (half-life 4-7 years): SDG 4 (Education), 5 (Gender), 6 (Water), 8 (Growth), 11 (Cities), 12 (Consumption). The impulse responses for these pillars show much less significant and less persistent drop in response to conflict consistent with the results from the half-lives. These relate to services and institutions that can be partially restored with focused investment.

Pillars with shorter but still significant effects (Half-life 3-4 years): SDG 2 (Hunger), 13 (Climate), 14 (Oceans), 15 (Land), 16 (Institutions), 17 (Partnerships). The impulse responses

for these pillars show non-significant response to conflict consistent with the results from the half-lives. The shorter half-life for SDG 16 (Peace & Institutions) is particularly noteworthy, suggesting that institutional recovery may be somewhat faster than economic recovery, though still taking years.

The reverse responses to the above (from SDG to Conflict) show no such variation; all effects are transient. Indeed, the local projection estimates of the response of conflict to shocks to disaggregated SDG scores presented in Figure 3 show no significant effect.

4.4 Interpretation

In this sub-section, we explore three complementary mechanisms behind the asymmetrical relationship between development and conflict rooted in established theory.

Conflict destroys the stock of capital—human, physical, social, and institutional (Collier, 1999). Rebuilding these stocks is a slow, costly process. Development policies, however, often affect the flow of income or services. A temporary improvement in a flow (e.g., a cash transfer, a new school) does not durably alter the underlying political economy or grievance structures that fuel conflict (Fearon & Laitin, 2003).

Societies may be trapped in a "conflict equilibrium" characterized by weak institutions, polarization, and a culture of violence (North *et al.*, 2009). A minor development shock is insufficient to push the system into a "peace equilibrium." Once conflict erupts, however, it can trigger a cascade of failures (e.g., state collapse, mass displacement) that create a persistent low-development equilibrium.

Our findings are also consistent with the political science literature emphasizing that durable peace requires credible political settlements and power-sharing arrangements (Walter, 2002; Hartzell & Hoddie, 2003). Economic development alone, without addressing the core political grievances and security dilemmas of warring parties, cannot sustain peace.

5. Robustness and Extensions

5.1 Internal vs. External Conflicts

To decipher whether the asymmetrical effect is also driven by external conflict, we re-estimate our models separating internal (intrastate) from internationalized internal and interstate conflicts. Figure 4 shows that the asymmetry is driven primarily by internal conflicts. This aligns with theory, as internal wars are more likely to destroy social capital and state capacity. The reverse effect (SDG to Conflict) remains transient for both types of conflict.

5.2 Major Conflicts Only

To test whether our results are driven by major conflict, we define this category as those in the top 10% of the fatality distribution. The results presented Figure 5 are, if anything, stronger. The effects of major conflict shocks are longer, and the asymmetry remains pronounced. This confirms that severe conflicts cast the longest shadows.

5.3 Panel VAR and Addressing Endogeneity using Instrumental Variable Techniques

To account for reverse causality between conflict and development, we estimate a panel VAR model. The results presented in Figure 6 confirm the asymmetrical relationship between conflict and development. Indeed, the only direction of the causality that is both significant and persistent is the one running from conflict to SDGs. The other direction is fleeting. That confirms earlier results.

Using rainfall and commodity price shocks as instruments for SDGs in agricultural and resource-dependent economies, we estimate an IV-ARDL model. Table C1 in Supplementary Appendix C presents both the first and second stage of the regression where SDGs are instrumented to explain conflict. The first stage confirm that the instruments used are “strong instruments”. The second stage shows evidence that SDG improvements are associated negatively with conflicts. Yet, when estimated Panel VAR with instruments, the latter result disappears as shown in Figure C1 in Supplementary Appendix C. The effect of conflict on SDG remain persistence and negative. These results confirm the asymmetrical nature of the relationship between conflict and development.

5.4 Alternative SDG Aggregations and Conflict Measures

Our results are robust to using the first principal component of SDGs instead of the average; using conflict incidence (binary) instead of intensity (fatalities); and using terrorism data from

the GTD as an alternative measure of political violence. These results are not presented in the paper but are available from the author upon request.

5.5 Results for regional and income sub-samples groups

Our main results may be driven by low level of development or a specific region. To test for that, we re-estimate our model using each regional and income subsamples group. The regional and income group classifications follow those of the World Bank. Specifically, low-income economies are defined as those with a Gross National Income (GNI) per capita, calculated using the World Bank Atlas method, of $1,135 or less in 2024. Middle-income economies are defined as those with a GNI per capita between $1,136 and $13,935, while high-income economies have a GNI per capita above $13,935. Figure D1 in Supplementary Appendix D presents the results for regional groups. Our main results of the asymmetry between conflict and development are driven by sub-Saharan African countries and the Middle East and North Africa (MENA) countries. Considering the prevalence of conflicts in these regions, it is no surprise that these regions drive our main results. Figure D2 in Supplementary Appendix D presents the results for income groups. Our main results are driven by low-and middle-income countries. Albeit the results appear stronger for low-income countries, middle-income countries are also displaying similar patterns suggesting indeed that the effect of conflict on development is not a pattern of low-income countries.

5.6 Foreign aid and conflict

Foreign aid because of its stated development goal may be a relevant factor in the relationship between conflict and development. An influx of aid may help alleviate conflict. Yet, aid inflow is also likely endogenous to conflict in that aid may flow to conflict affected areas including for humanitarian motives. A natural extension is thus to examine the bi-directional relationship between development aid and conflict and documenting a potential asymmetry.

In Supplementary Appendix E, we present a series of results aimed at deciphering the relationship. To do so, we use data on aid inflows obtained from the OECD's net official development assistance (ODA). This data consists of non-military foreign aid that serves the economic development and welfare of low- and middle-income countries, using the World Bank's definition, or least-developed countries, using the United Nations' definition. This includes grants, concessional loans, and the provision of technical assistance that are channeled either bilaterally between countries (donor to recipient) or through a multinational agency. The data are reported as yearly net disbursements and are adjusted for inflation, expressed in 2023 US dollars. We further normalize this value by the corresponding country's GDP, which is adjusted for PPP and expressed in 2021 US dollars.

Table E1 in Appendix E, we present “naïve” results where we do not account for the reverse causality from conflict to aid inflows. We report estimates of the impact of aid inflows on conflict fatalities using panel regressions with country-year fixed effects. The results show that aid inflows are associated negatively with the intensity of conflicts in the following year but results are not statistically significant. The results become significant after controlling lagged aggregate SDG and conflict, as presented in Table E1 in Appendix E. When internal and external conflicts are used as dependent separately, the estimates for internal and external conflicts are not statistically significant.

When exploring both directions of the causality between foreign aid and conflict, results using local projections in Figure E1 in Appendix E suggest that foreign aid increase following conflict statistically significantly with the peak response occurring around five years after a unit increase. The impulse response also indicates that foreign aid inflows somewhat reduce conflict. Yet, the results are not statistically significant at conventional levels. Exploring both directions of causality using a panel VAR approach, shown in Figure E2 in Appendix, yields qualitatively similar results. Overall, our results are consistent with the main result of our paper that development including through foreign aid has fleeting effects on conflict.

6. Conclusion

This paper has documented a fundamental asymmetry in the persistence of the relationship between armed conflict and sustainable development. Using half-life estimation on global panel data, we find that conflict inflicts deep and long-lasting wounds across the entire spectrum of development goals, with effects that typically take more than half a decade to decay by half. In contrast, improvements in development outcomes offer only a brief respite from conflict, with pacifying effects that vanish within about a year and a half.

The results have important policy implications. The long shadow of conflict underscores the immense value—the "avoided persistence cost"—of preventing wars from breaking out in the first place. Investments in diplomacy, mediation, and preventive security may have higher long-term returns than previously recognized. There are, however, limitations associated with the SDG data. While comprehensive, are imperfect and rely on national reporting. Our analysis is at the country-year level, masking subnational heterogeneity. Future research could use subnational data, employ more granular instruments, and explore the mechanisms behind the asymmetric persistence in more depth.

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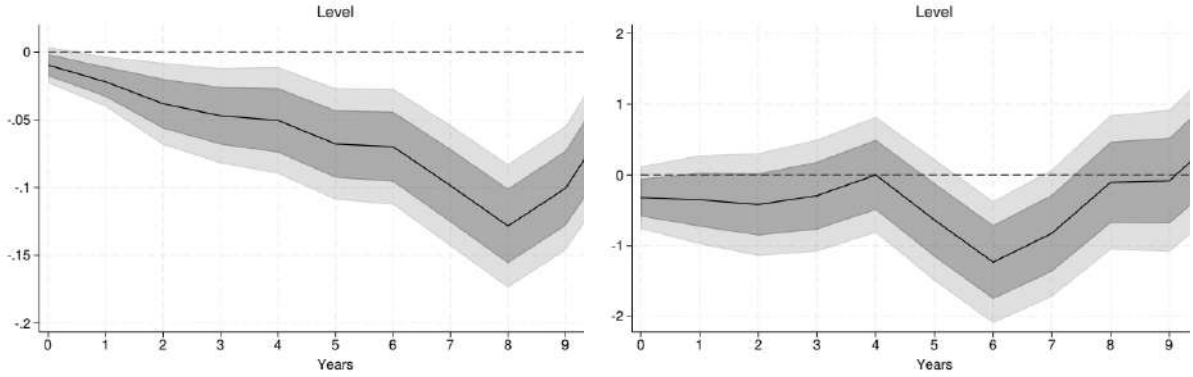
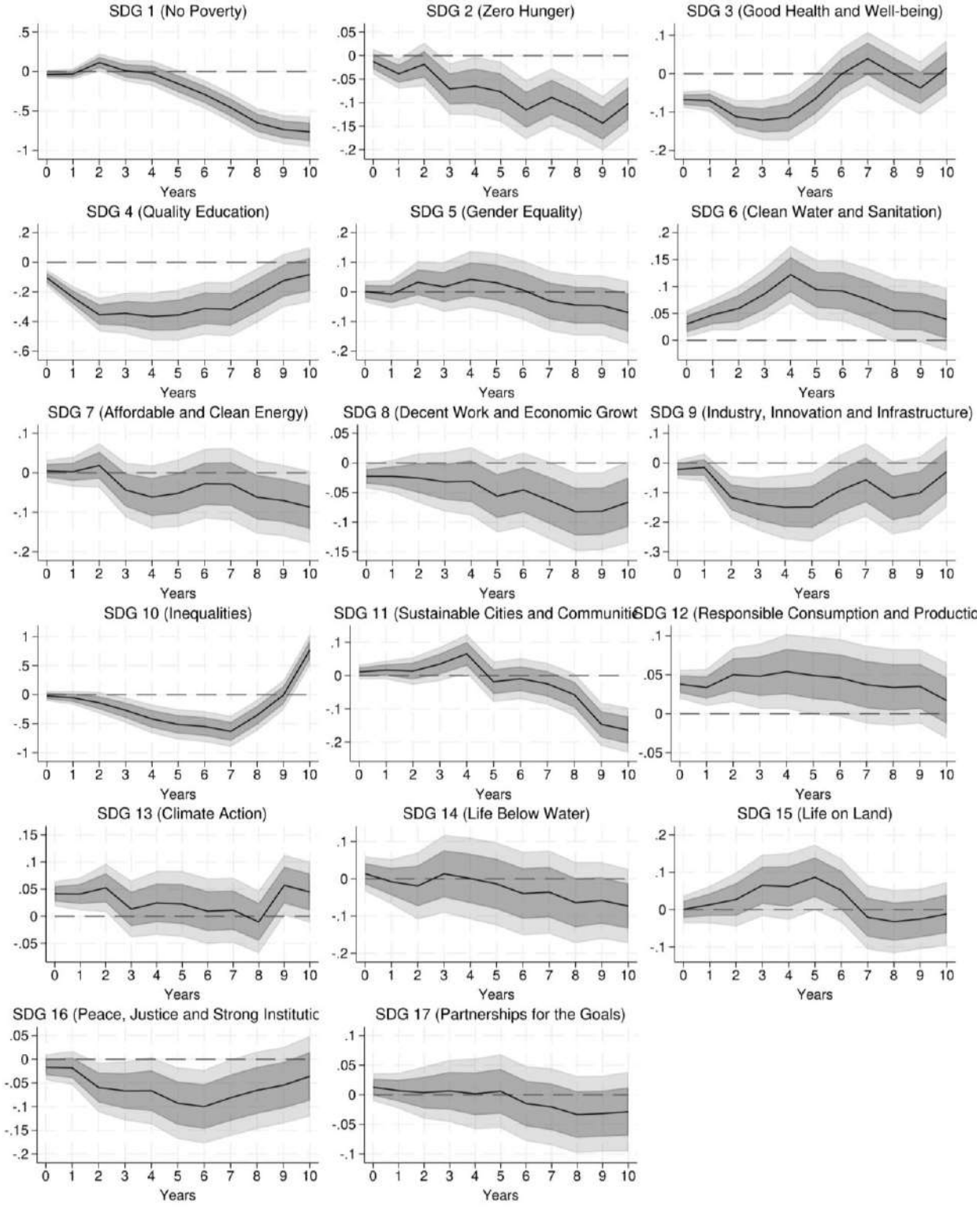
Figure 1: Impulse responses of aggregate SDG & conflict

Response of SDG to conflict shocks *Response of conflict to SDG shocks*



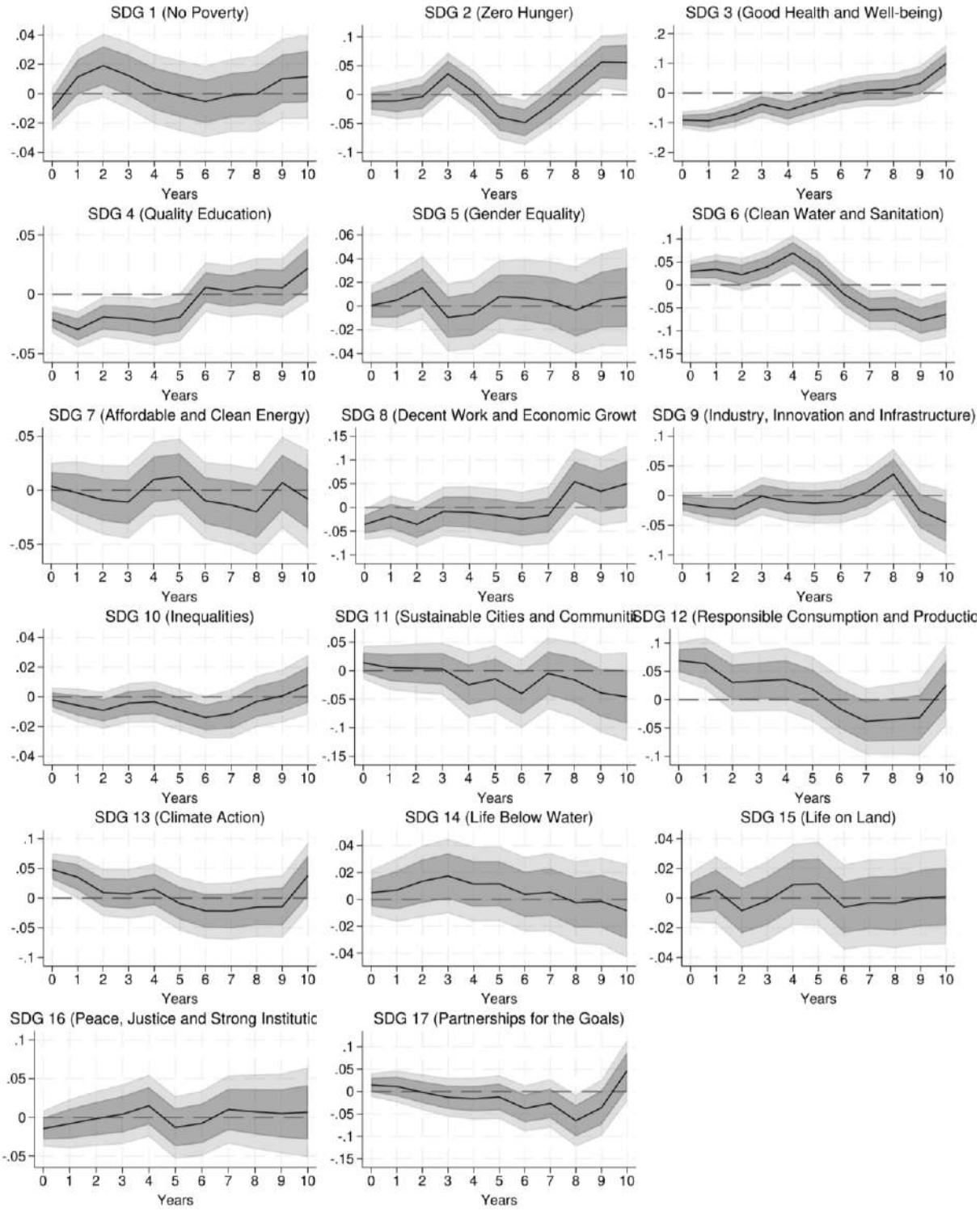
Note. This figure presents the impulse response of change in aggregate SDG performance scores to a unit increase in internal conflict fatalities per 10,000 population (left-hand side panel) and vice versa (right-hand side panel). We include fixed-effects for each country and each time period. The solid lines indicate point estimates. The dark and light gray areas denote 68% and 90% confidence intervals, respectively. Data are for 192 countries between 2000--2024.

Figure 2: Responses of disaggregated SDG scores to conflict



Note. This figure presents the impulse responses of change in SDG performance scores to a unit increase in internal conflict fatalities per 10,000 population. We include fixed-effects for each country and each time period. The solid lines indicate point estimates. The dark and light gray areas denote 68% and 90% confidence intervals, respectively. Data are for 192 countries between 2000--2024.

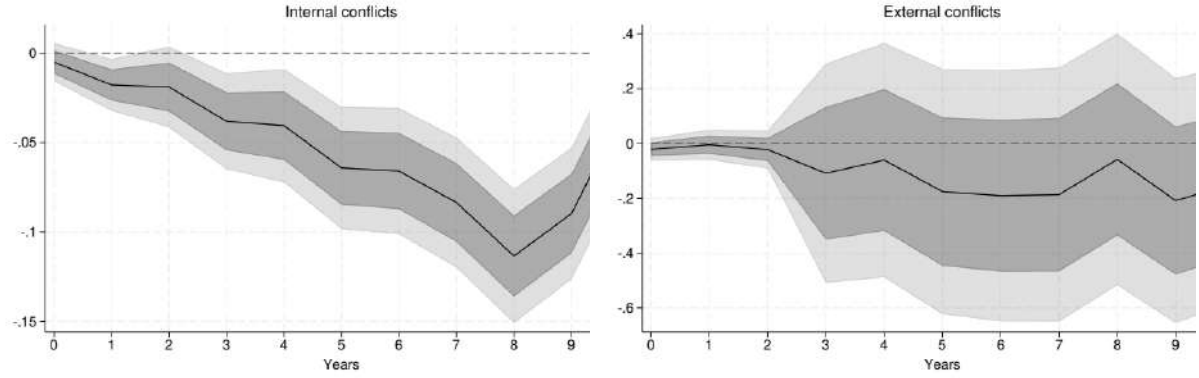
Figure 3: Responses of internal conflict fatalities to changes in SDG scores



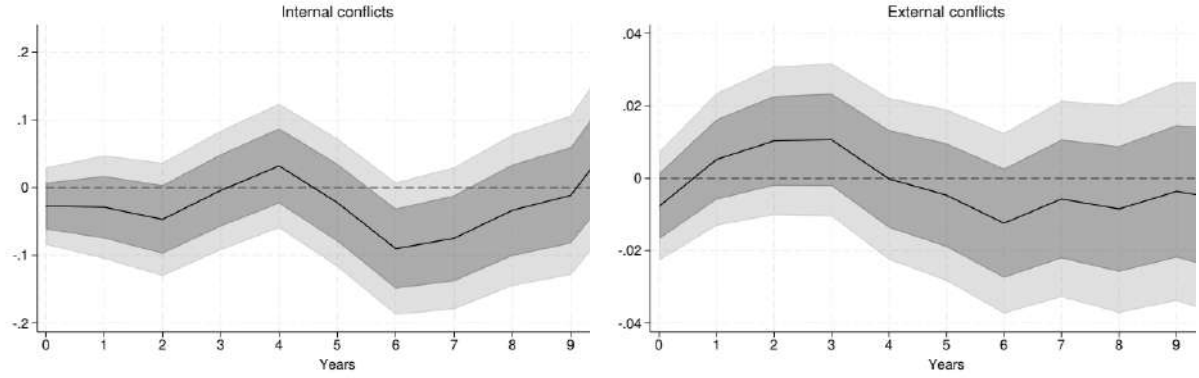
Note. This figure presents the impulse responses of change in internal conflict fatalities per 10,000 population to a unit increase in SDG performance scores. We include fixed-effects for each country and each time period. The solid lines indicate point estimates. The dark and light gray areas denote 68% and 90% confidence intervals, respectively. Data are for 192 countries between 2000–2024.

Figure 4: Impulse response between aggregate SDG and internal/external conflicts

Panel A: Response of aggregate SDG to conflict

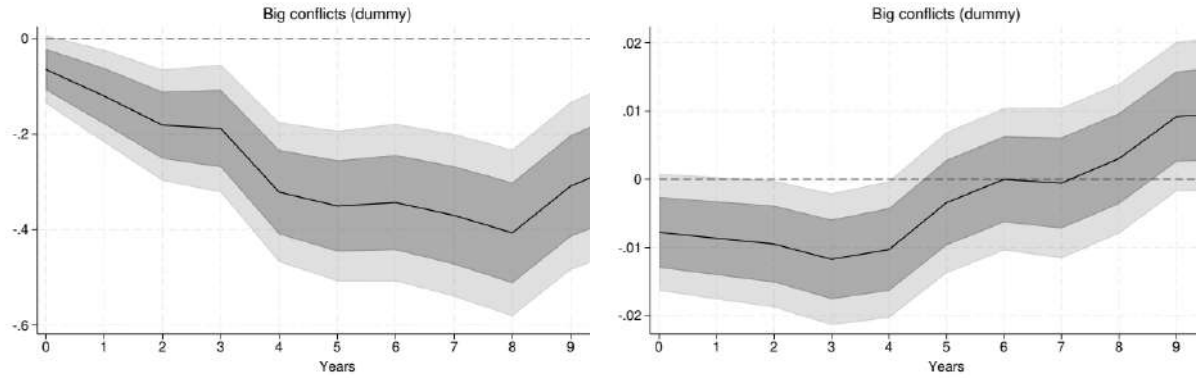


Panel B: Response of conflicts to aggregate SDG



Note. This figure presents the impulse response of aggregate SDG performance scores to a unit increase in internal and external conflict fatalities per 10,000 population. We include fixed-effects for each country and each time period. The solid lines indicate point estimates. The dark and light gray areas denote 68% and 90% confidence intervals, respectively. Data are for 192 countries between 2000-2024.

Figure 5: Response of aggregate SDG score to conflicts



Note. This figure presents the impulse response of aggregate SDG performance scores to a major conflict dummy. Major conflicts are selected by a 90% cutoff in conflict fatalities per 10,000 population. We include fixed-effects for each country and each time period. The solid lines indicate point estimates. The dark and light gray areas denote 68\% and 90\% confidence intervals, respectively. Data are for 192 countries between 2000--2024.

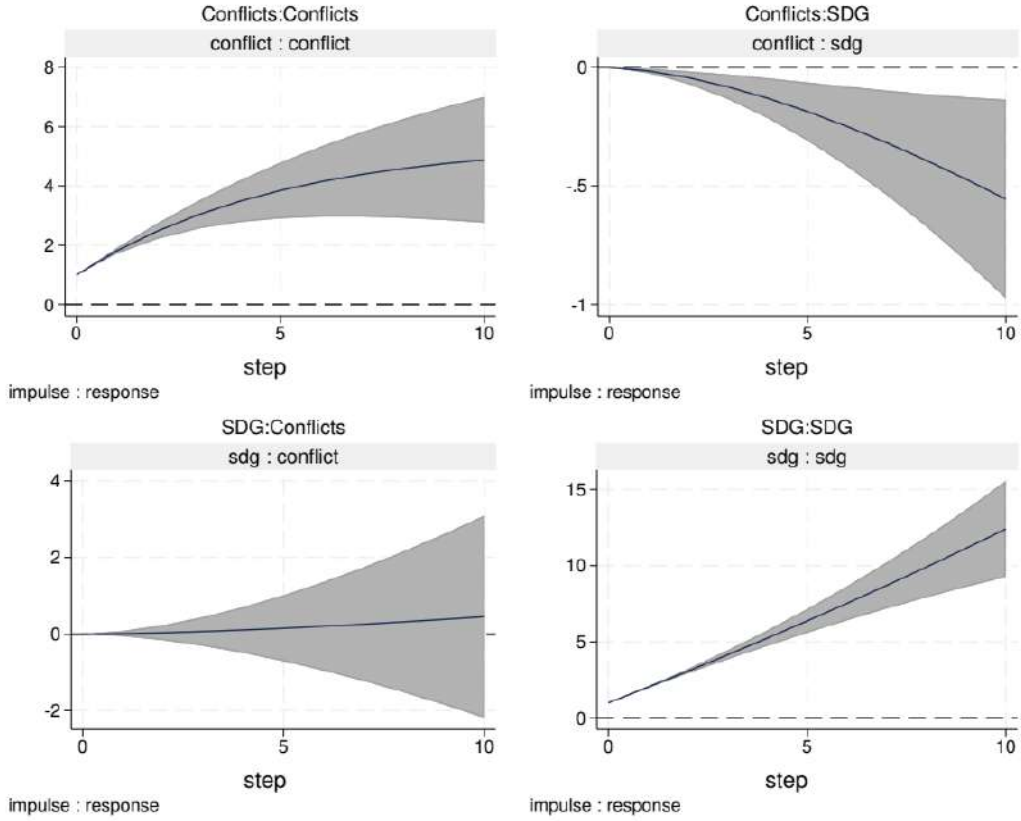
Table 1: Panel VAR lag order selection criteria

Lag	CD	J	p-value	MBIC	MAIC	MQIC
1	0.99882	96.93246	0.00000	-198.52420	24.93246	-54.62777
2	0.99887	51.36971	0.01638	-211.25840	-12.63029	-83.35049
3	0.99884	72.18411	0.00001	-157.61550	16.18411	-45.69607
4	0.99888	53.06591	0.00057	-143.90520	5.06591	-47.97424
5	0.99899	35.46185	0.01778	-128.68070	-4.53815	-48.73828

Sample: 2005–2023 No. of obs = 3,667 No. of panels = 193 Ave. T = 19.0

Note. This table reports the overall coefficient of determination (CD), Hansen's (1982) J statistic and its corresponding p-value, and the moment model selection criteria (MMSC) proposed by Andrews and Lu (2001): the MMSC Bayesian information criterion (MBIC), MMSC Akaike information criterion (MAIC), and MMSC Hannan and Quinn information criterion (MQIC). The panel vector autoregressions (PVAR) include two endogenous variables, the number of conflict fatalities normalized by population and the aggregate SDG score, observed from 2000 to 2024, and are estimated using GMM with ten lagged instruments after applying forward-mean differencing to remove unobserved panel effects.

Figure 6: Impulse response in a panel-VAR



Note. This figure presents the impulse response from a panel VAR(1) between conflict fatalities per 10,000 population, and aggregate SDG scores. The gray areas denote 95% confidence intervals based on 200 Monte Carlo simulations. Data are for 192 countries between 2000--2024.

Supplementary Appendix A: Summary statistics

Table A1: Summary statistics

Variable	Mean	SD
Conflict	0.24	2.12
Aggregate SDG Score	64.38	10.88
SDG 1: No Poverty	68.5	32.94
SDG 2: Zero Hunger	57	13.82
SDG 3: Good Health and Well-being	65.43	21.99
SDG 4: Quality Education	71.47	26.8
SDG 5: Gender Equality	54.63	17.73
SDG 6: Clean Water and Sanitation	66.35	16.68
SDG 7: Affordable and Clean Energy	57.58	22.33
SDG 8: Decent Work and Economic Growth	68.88	8.61
SDG 9: Industry, Innovation and Infrastructure	37.67	25.07
SDG 10: Reduced Inequalities	59.98	27.24
SDG 11: Sustainable Cities and Communities	73.67	19.54
SDG 12: Responsible Consumption and Production	76.36	17.89
SDG 13: Climate Action	84.23	19.54
SDG 14: Life Below Water	62.32	12.03
SDG 15: Life on Land	61.02	15.02
SDG 16: Peace, Justice and Strong Institutions	64.59	15.75
SDG 17: Partnerships for the Goals	64.4	9.43

Supplementary Appendix B: Half-life estimations

Half-life effects of conflict on aggregate SDG

Table B1: Distributed-lag estimates: aggregate SDG

VARIABLES	Coefficient
Lag aggregate SDG	0.914***
	(0.00571)
Lag conflict fatalities	-0.0114***
	(0.00402)
Observations	4,632
R-squared	‘0.998
Country and Year FE	YES
Half-life	7.68652***
	(0.53261)

Note. This table presents the results from distributed-lag regressions estimating the persistence of Sustainable Development Goal (SDG) performance. All specifications include country and year fixed effects. Half-life estimates represent the number of years required for the effect of a one-unit shock to decay by half. Robust standard errors are reported in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1

Table B2: Estimated half-life of SDG performance response to internal conflict Shocks

Outcome variable	N	Half-life estimate	SD	R-squared
Pillar 1: No Poverty	3816	10.66977***	(0.8767)	0.994
Pillar 2: Zero Hunger	4632	3.32843***	(0.1607)	0.99
Pillar 3: Good Health and Well-being	4608	9.18037***	(0.7478)	0.997
Pillar 4: Quality Education	4584	6.42939***	(0.4600)	0.989
Pillar 5: Gender Equality	4632	4.56545***	(0.2676)	0.989
Pillar 6: Clean Water and Sanitation	4632	4.08156***	(0.2123)	0.994
Pillar 7: Affordable and Clean Energy	4632	7.49955***	(0.5162)	0.996
Pillar 8: Decent Work and Economic Growth	4368	5.48126***	(0.3795)	0.986
Pillar 9: Industry, Innovation and Infrastructure	4632	10.84370***	(0.9994)	0.996
Pillar 10: Reduced Inequalities	3936	4.98555***	(0.3423)	0.975
Pillar 11: Sustainable Cities and Communities	4632	5.98458***	(0.3736)	0.997
Pillar 12: Responsible Consumption and Production	4584	4.99905***	(0.3077)	0.997
Pillar 13: Climate Action	4584	4.22869***	(0.2390)	0.996
Pillar 14: Life Below Water	3576	3.76515***	(0.2124)	0.97
Pillar 15: Life on Land	4560	4.17244***	(0.2040)	0.984
Pillar 16: Peace, Justice and Strong Institutions	4536	4.08345***	(0.2543)	0.992
Pillar 17: Partnerships for the Goal	4632	3.60881***	(0.1982)	0.984

Note. This table reports the estimated half-life, in years, of a one-unit shock in internal conflict fatalities per capita on each of the 17 Sustainable Development Goal (SDG) performance indices. All regressions include country and time fixed effects. Robust standard errors are reported in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1

Half-life effects of SDG on conflicts

Table B3: Distributed-lag estimates: aggregate SDG

VARIABLES	Coefficient
Lagged conflict fatalities	0.749***
	(0.0110)
Lagged aggregate SDG	0.00467
	(0.0155)
Observations	4,632
R-squared	‘0.630
Country and Year FE	YES
Half-life	2.39376***
	(0.12095)

Note. This table presents distributed-lag estimates of the persistence of internal conflict fatalities per capita. All specifications include country and year fixed effects. Half-life estimates represent the number of years required for the effect of a one-unit shock to decay by half. Robust standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table B4: Half-life of SDG performance response to internal conflict Shocks

Outcome variable	N	Half-life estimate	SD	R-squared
Pillar 1: No Poverty	3816	1.30343***	(0.05625)	0.461
Pillar 2: Zero Hunger	4632	1.30503***	(0.05111)	0.460
Pillar 3: Good Health and Well-being	4608	1.30553***	(0.05127)	0.460
Pillar 4: Quality Education	4584	1.30771***	(0.05152)	0.460
Pillar 5: Gender Equality	4632	1.30521***	(0.05114)	0.460
Pillar 6: Clean Water and Sanitation	4632	1.30634***	(0.05125)	0.460
Pillar 7: Affordable and Clean Energy	4632	1.30549***	(0.05116)	0.460
Pillar 8: Decent Work and Economic Growth	4368	1.30618***	(0.05271)	0.460
Pillar 9: Industry, Innovation and Infrastructure	4632	1.30303***	(0.05108)	0.460
Pillar 10: Reduced Inequalities	3936	1.29149***	(0.05477)	0.442
Pillar 11: Sustainable Cities and Communities	4632	1.30606***	(0.05117)	0.460
Pillar 12: Responsible Consumption and Production	4584	1.30640***	(0.05148)	0.460
Pillar 13: Climate Action	4584	1.30640***	(0.05147)	0.460
Pillar 14: Life Below Water	3576	3.73324***	(0.23956)	0.763
Pillar 15: Life on Land	4560	1.30623***	(0.05159)	0.460
Pillar 16: Peace, Justice and Strong Institutions	4536	1.30617***	(0.05171)	0.460
Pillar 17: Partnerships for the Goal	4632	1.30488***	(0.05111)	0.460

Note. This table reports the estimated half-life of the response of internal conflict fatalities per capita to a one-unit shock in each of the 17 Sustainable Development Goal (SDG) performance indices. The half-life is expressed in years. All regressions include country and time fixed effects. Robust standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Supplementary Appendix C: Addressing Endogeneity using Instrumental Variable Techniques

Table C1: Instrument variable regression

Panel A: OLS and 2nd-step IV regressions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES	Conflict fatalities						
SDG score	-1,557**	-1,309**	4,024	-1,436***	2,148	257.7	-183.7
	(688.1)	(610.3)	(2,549)	(547.3)	(1,911)	(559.6)	(512.4)
Observations	4,115	4,266	4,266	3,989	3,989	4,266	3,989
R-squared	-0.218	-0.148	-1.550	-0.180	-0.438	-0.009	-0.002
Year FE	YES	YES	YES	YES	YES	YES	YES
Country FE	YES	YES	YES	YES	YES	YES	YES
Number of Countries	180	178	178	174	174	178	174

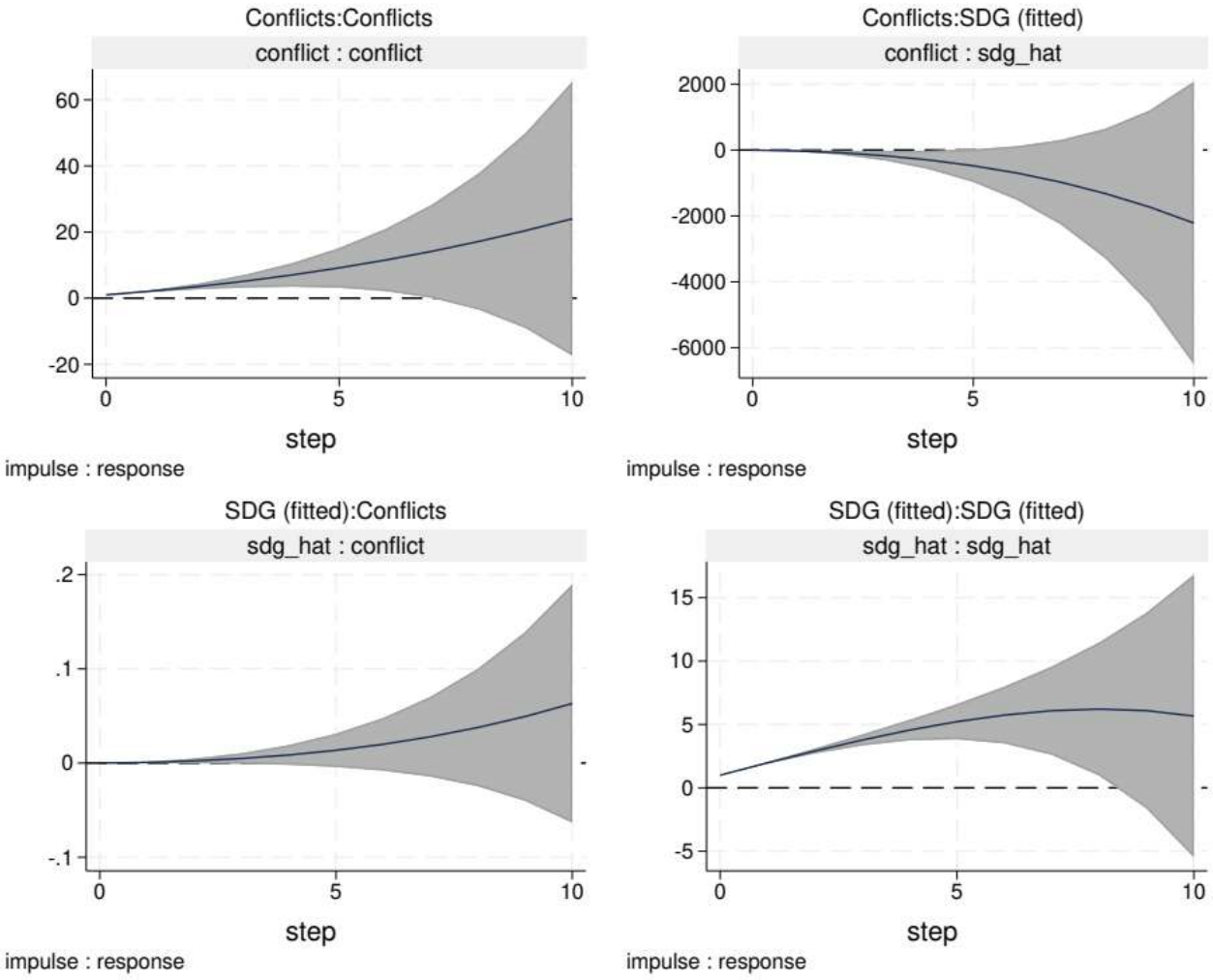
Panel B: 1st-step IV regressions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES	SDG score						
Lag precipitation	0.00306**			0.00309**	0.00298**		0.00304**
	(0.00133)			(0.00132)	(0.00142)		(0.00140)
Lag commodity gross export price index		-0.0195***		-0.0195***		-0.0194***	-0.0195***
		(0.00528)		(0.00529)		(0.00530)	(0.00530)
Lag commodity gross import price index			0.0298***		0.0271**	0.0295***	0.0269**
			(0.0108)		(0.0112)	(0.0107)	(0.0110)
Observations	4,115	4,266	4,266	3,989	3,989	4,266	3,989
F-stat	5.292	13.62	10.81	7.594	5.265	11.10	8.902

Note. This table reports estimates from a distributed-lag model in which the main dependent variable is the number of conflict fatalities per 10,000 population. The explanatory variable, the aggregate SDG score, is instrumented using (1, 4, 5, 7) annual precipitation measured in millimeters per year, (2, 4, 6, 7) the gross export commodity price index, and (3, 5, 6, 7) the gross import commodity price index. All specifications include country and year fixed effects. We report effective F-statistics following Montiel and Pflueger (2013). Robust standard errors are reported in parentheses. The sample period covers 2000 to 2022. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Figure C1 presents the impulse responses in a panel-VAR between aggregate SDG and conflict, where SDG is instrumented by the gross export commodity price index, gross import commodity price index and by annual precipitation.

Figure C1: Impulse response in a panel-VAR. SDG score instrumented by gross export commodity price index, gross import commodity price index and by annual precipitation

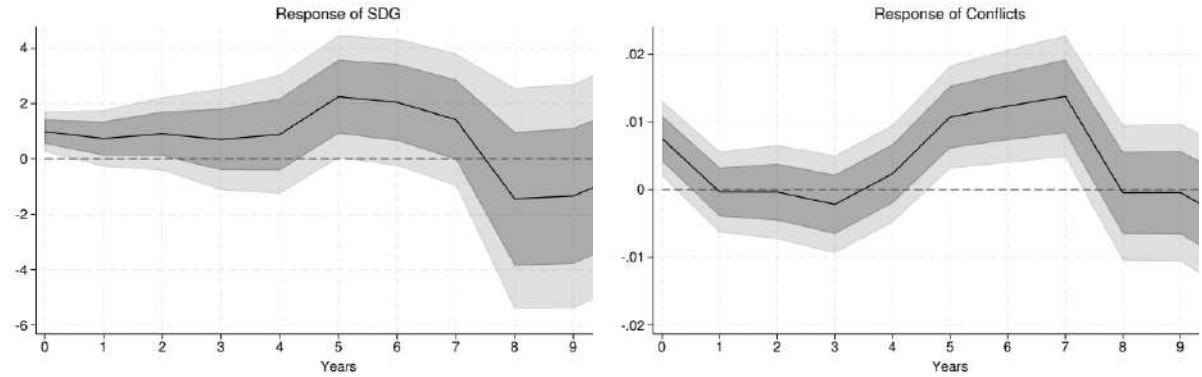


Note. This figure presents the impulse response from a panel VAR (1) between conflict fatalities per 10,000 population, and aggregate SDG scores, which is instrumented by gross export commodity price index, gross import commodity price index, and by annual precipitation measured in millimeters per year. The gray areas denote 95% confidence intervals based on 200 Monte Carlo simulations. Data are for 192 countries between 2000–2024.

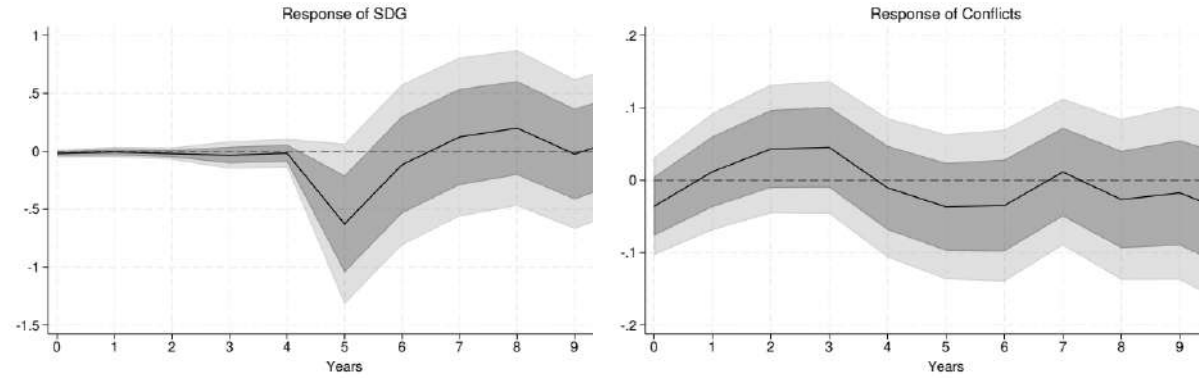
Supplementary Appendix D: Regional effects

Figure D1: Impulse response between aggregate SDG and conflicts, by regions

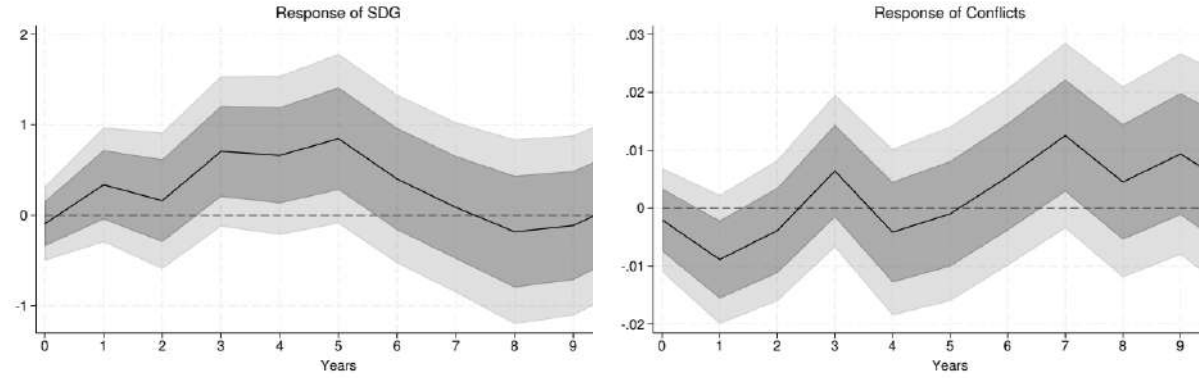
Panel A: East Asia and Pacific



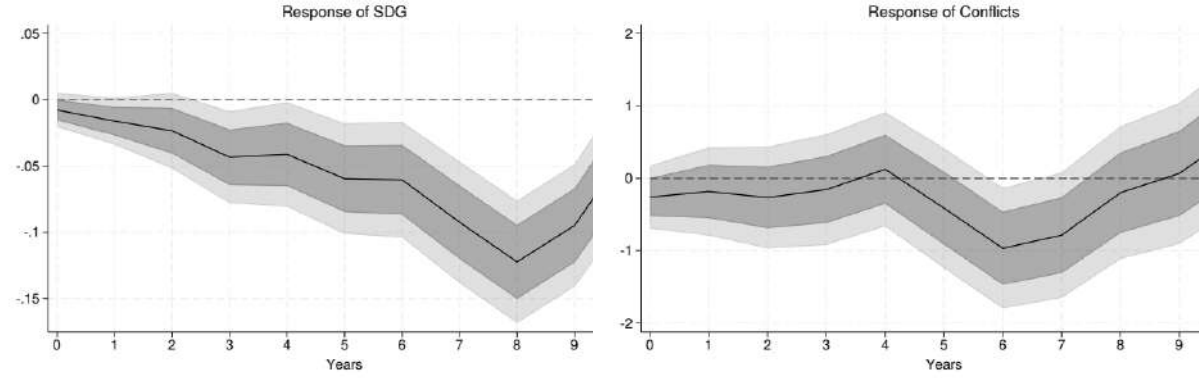
Panel B: Europe and Central Asia



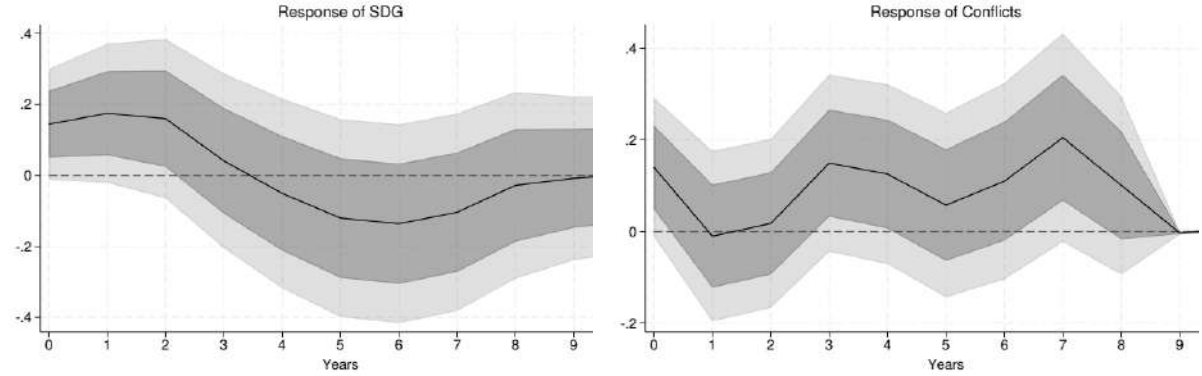
Panel C: Latin America and the Caribbean



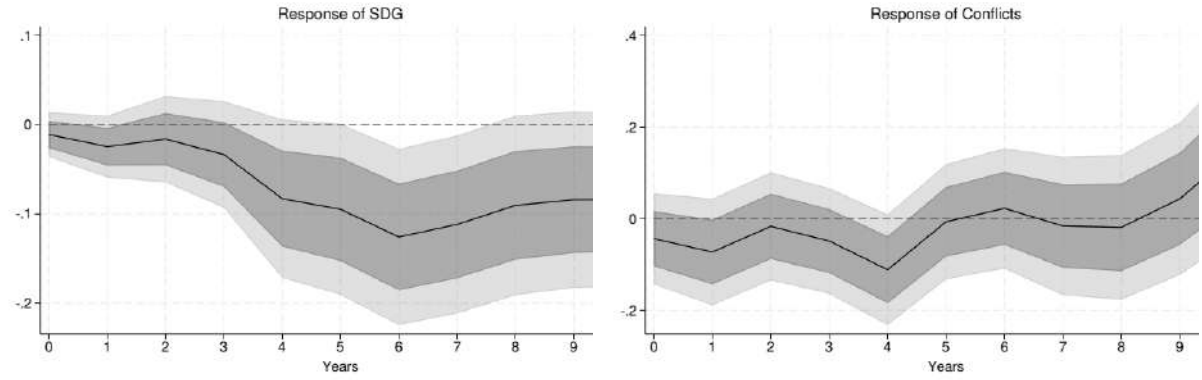
Panel D: MENA



Panel E: South Asia



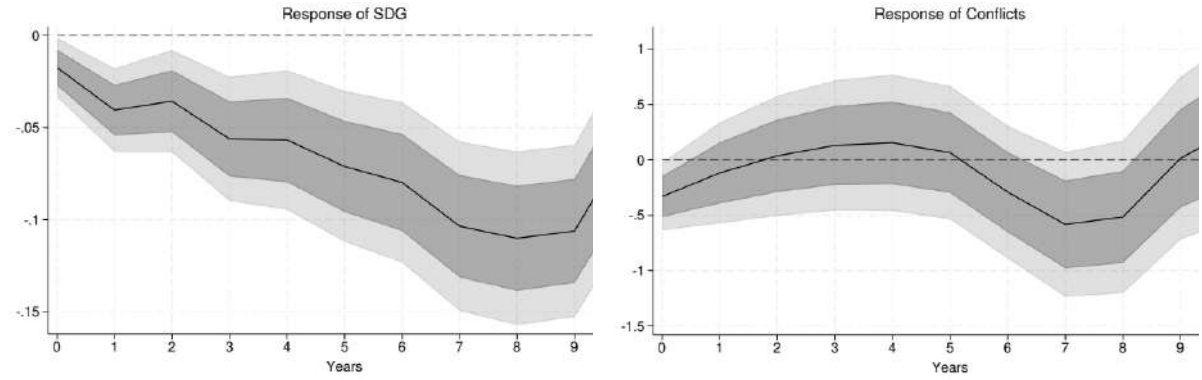
Panel F: Sub-Saharan Africa



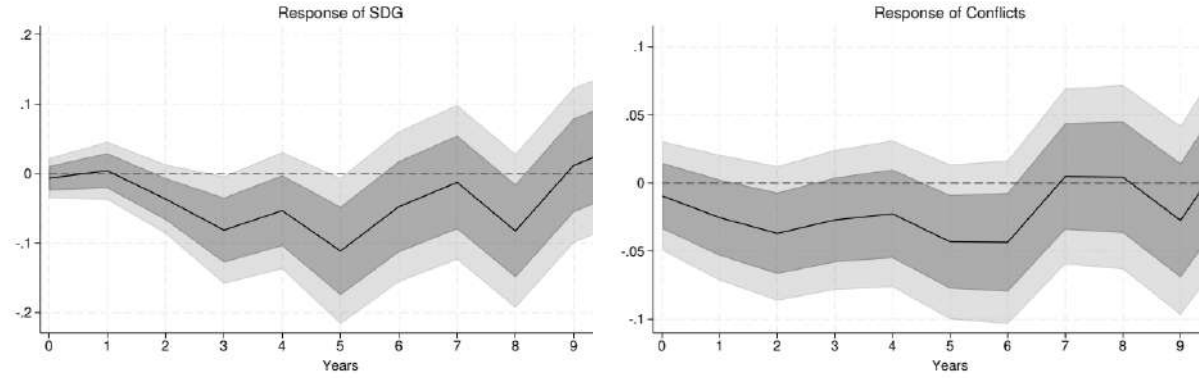
Note. This figure presents the impulse response of change in aggregate SDG performance scores to a unit increase in internal conflict fatalities per 10,000 population (left) and vie versa (right). We include fixed-effects for each country and each time period. The solid lines indicate point estimates. The dark and light gray areas denote 68% and 90% confidence intervals, respectively. Data are for 30 East Asia & Pacific countries, 52 Europe & Central Asia countries, 33 Latin America & Caribbean countries, 22 MENA countries, 6 South Asia countries, and 48 Sub-Saharan Africa countries between 2000–2024

Figure D2: Impulse response between aggregate SDG and conflicts, by income groups

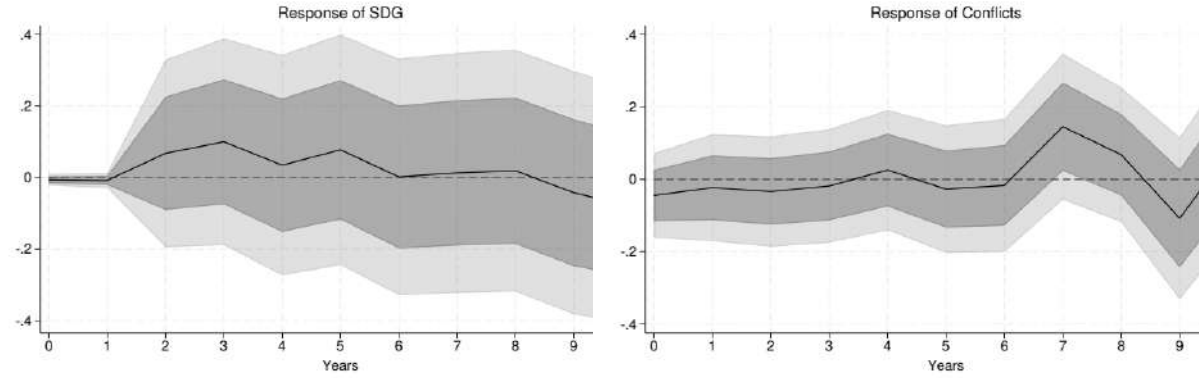
Panel A: Low-income



Panel B: Middle-income



Panel C: High-income



Note. This figure presents the impulse response of change in aggregate SDG performance scores to a unit increase in internal conflict fatalities per 10,000 population (left) and vie versa (right). We include fixed-effects for each country and each time period. The solid lines indicate point estimates. The dark and light gray areas denote 68% and 90% confidence intervals, respectively. Data are for 25 low-income countries, 102 middle-income countries, and 64 high-income countries between 2000–2024.

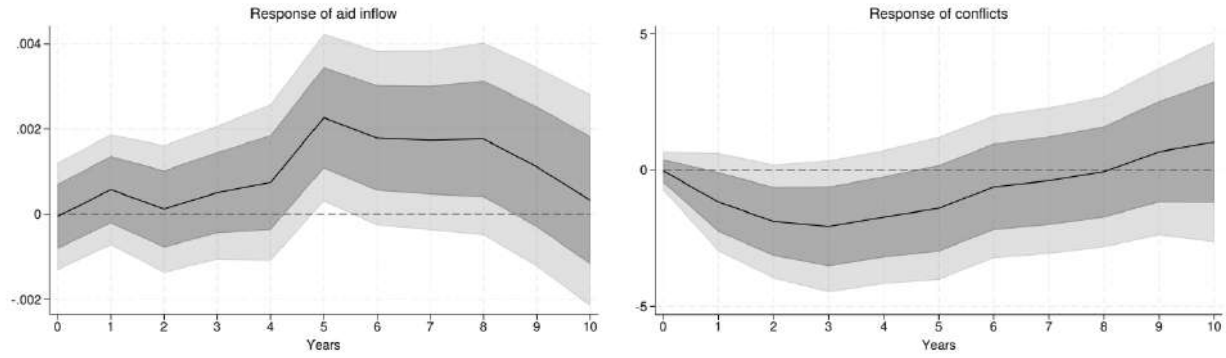
Supplementary Appendix E: Aid inflow and conflict

Table E1: Instrument variable regression

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	All conflicts fatalities		Internal conflicts fatalities		External conflicts fatalities	
Lagged aid inflow	-0.406	-1.355**	-0.677	-0.919	0.324	0.0203
	(1.029)	(0.652)	(0.886)	(0.583)	(0.248)	(0.189)
Lagged SDG		0.0132		0.0112		-0.000175
		(0.0166)		(0.0148)		(0.00480)
Lagged conflict fatalities		0.787***				
		(0.0115)				
Lagged internal conflict fatalities				0.764***		
				(0.0119)		
Lagged external conflict fatalities						0.697***
						(0.0146)
Observations	3,193	3,193	3,193	3,193	3,193	3,193
R-squared	0.299	0.725	0.285	0.697	0.160	0.521
Year FE	YES	YES	YES	YES	YES	YES
Country FE	YES	YES	YES	YES	YES	YES
Number of Countries	141	141	141	141	141	141

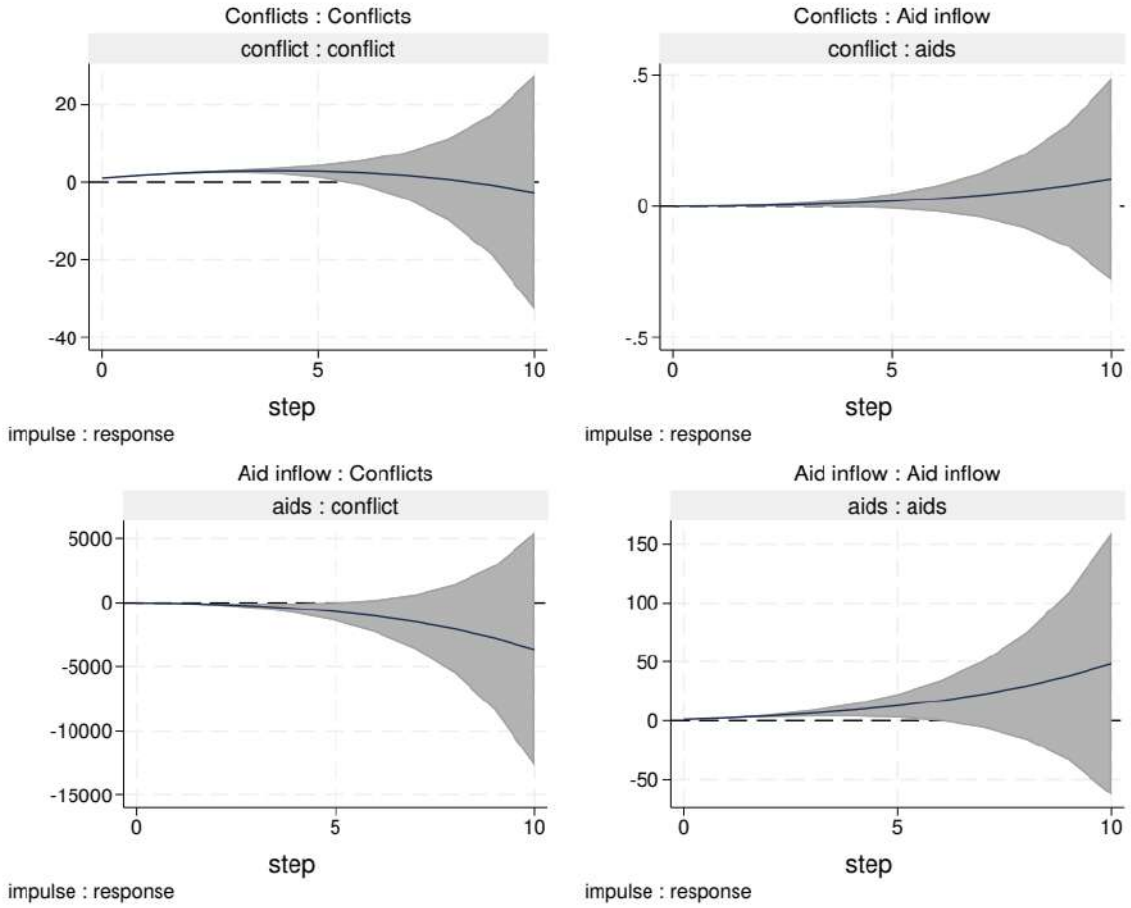
Note. This table reports estimates where the main dependent variable is the number of conflict fatalities per 10,000 population. The explanatory variable is the lag of aid inflow as shares of GDP (measured in 2023 and 2021 US Dollars, respectively). Columns (1), (3), and (5) include lag terms for aggregated SDG and the corresponding conflict variable. All specifications include country and year fixed effects. Robust standard errors are reported in parentheses. The sample period covers 2000 to 2022. *** p < 0.01, ** p < 0.05, * p < 0.1

Figure E1: Impulse response between aid inflow and conflicts



Note. This figure presents the impulse response of aid inflow as share of GDP (measured in 2023 and 2021 US Dollars, respectively) to a unit increase in conflict fatalities per 10,000 population (left) and vice versa (right). We include fixed-effects for each country and each time period. The solid lines indicate point estimates. The dark and light gray areas denote 68% and 90% confidence intervals, respectively. Data are for 141 countries between 2000--2024.

Figure E2: Impulse response in a panel-VAR between aid inflow and conflicts



Note. This figure presents the impulse response from a panel VAR (1) between conflict fatalities per 10,000 population, and aid inflow as shares of GDP (measured in 2023 and 2021 US Dollars, respectively). The gray areas denote 95% confidence intervals based on 200 Monte Carlo simulations. Data are for 141 countries between 2000--2024.

“ Sur quoi la fondera-t-il l’économie du monde qu’il veut gouverner ? Sera-ce sur le caprice de chaque particulier ? Quelle confusion ! Sera-ce sur la justice ? Il l’ignore. ”

Pascal

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