INTERNATIONAL MONETARY FUND

Echoes Across Borders:

Macroeconomic Spillover Effects of Conflict in Sub-Saharan African Countries

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WP/24/100

2024
MAY

WORKING PAPER

 WP/24/100

IMF Working Paper
African Department

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Authorized for distribution by Vitaliy Kramarenko
May 2024

ABSTRACT

This paper quantifies the macroeconomic spillover effects of conflict within sub-Saharan African (SSA) countries using a new Conflict Spillover Index (CSI), which accounts for conflict intensity and distance from conflict-affected countries. Our findings reveal an escalation in conflict spillovers across SSA since 2011, marked by considerable cross-country heterogeneity. Impulse responses show that conflict spillovers shocks significantly and persistently hinder economic growth, while concurrently elevating inflation in the "home" country. Conflict spillover shocks are also associated with increases in (current) government spending and government debt. Furthermore, the international trade transmission channel of spillovers operates mostly through increased imports, while negative effects on FDI winddown over time. Moreover, state-dependent impulse responses underscore the importance of good governance, fiscal space, and foreign aid in attenuating the adverse macroeconomic spillover effects of conflict. The detrimental impact of conflict on output is more severe in environments with weaker governance and limited fiscal space. Government expenditures tend to rise following a spillover shock in contexts of high governmental effectiveness, possibly reflecting the use of policy buffers to respond to shocks. In that context, the papers shed light on important factors to promote resilience in SSA economies.

JEL Classification Numbers:	E60, F40, O11
Keywords:	Macroeconomic Spillovers; Conflict; Sub-Saharan Africa
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* We are grateful to Guy Agbe, Hicham Bennouna, Paul Bisca, Carlos van Hombeeck, Vitaliy Kramarenko, Andrea Manera, Ivanova Reyes, Luca Ricci, Amadou Sy, Hans Weisfeld, and participants of the IMF's African Department seminar series for excellent comments and suggestions. All the usual caveats apply.

WORKING PAPERS

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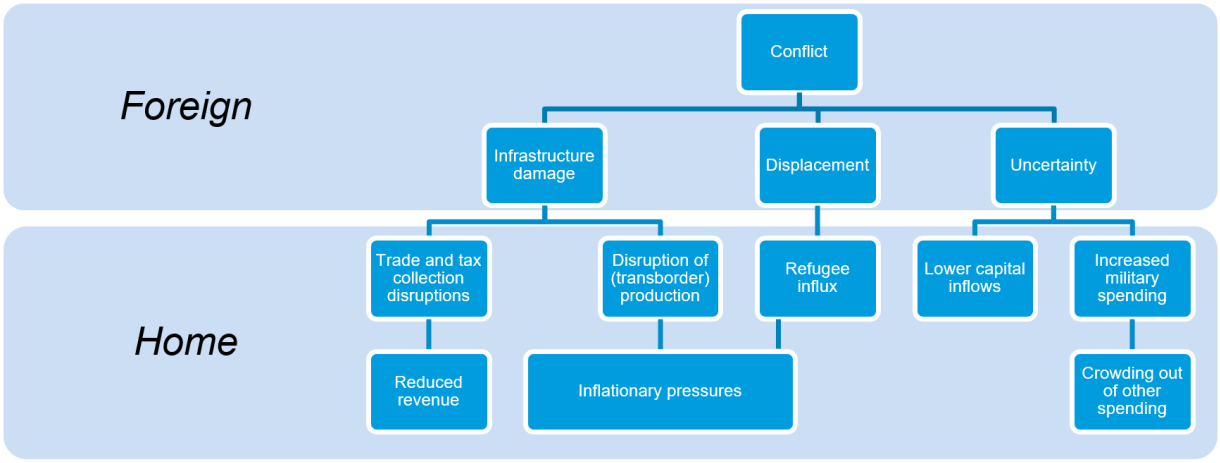
Contents

1. Introduction

In the past decade, security conditions within some parts of sub-Saharan Africa, notably in the Sahel, have deteriorated with well-documented adverse consequences for economic activity, public finances and development prospects more generally. But the effects of security incidents also extend beyond the borders of the affected nations, impinging on neighboring countries, and policymakers in the region are becoming increasingly concerned about the potential spillover effects of conflict.

The cross-country spillover effects of conflict propagate through various channels (Figure 1). The destruction of infrastructure, such as roads and capital, in a conflict-affected country can have ramifications on trade and broader economic activity in neighboring economies. Conflict incidents can also result in major direct disruptions to cross-border trade (both imports and exports), and related tax revenues. In addition, conflict events may also have significant effects on prices of specific commodities, including food if agricultural production is affected, with potential cross-border implications. Furthermore, the humanitarian consequences of conflict incidents, such as increased refugee flows, can have macroeconomic implications across countries. Increased uncertainty associated with conflict can also negatively affect investment and international capital flows. Another potential effect of conflict is an increase in military spending, possibly crowding-out other priority spending.

Figure 1. Conflict Spillover Transmission Channels



Recent research has documented conflict spillover effects with a special focus on economic growth. De Groot and others (2022), using a panel of 190 countries between 1970 and 2014, found significant negative spillovers from both international and civil conflicts in neighboring countries, impacting economic growth of the “home” country, potentially leading to reductions of up to 2 percentage points. Similarly, IMF (2019) estimated detrimental spillover effects of conflicts on economic activity through an examination of sub-national (state-level) data, revealing that the adverse spillover effects tend to decrease with the distance from the neighboring state embroiled in conflict.[1]

[1] This paper finds that a surge of 100 fatalities in neighboring states within a 500 kilometers radius is correlated with a 2-percentage points decline in growth. However, increases in fatalities in more distant states do not yield statistically significant effects.

Beyond the documented spillovers on overall growth, evidence points to the importance of additional macroeconomic channels, notably trade and military spending, through which foreign conflicts can exert influence on the domestic economy. Qureshi (2013) employs gravity models on a large panel of countries and discerns significant adverse spillover effects from conflicts in neighboring countries on bilateral trade, even if the home country remains uninvolved in any direct conflict. Furthermore, Boly and Kere (2023) establish the presence of spillover effects of terrorism in neighboring countries on the military spending of the "home" country in a sample of sub-Saharan African economies. Specifically, the occurrence of terrorism in neighboring countries induces a rise in the "home" country's military spending by 0.5 percentage points. These authors also document spillover effects of increased military spending in neighboring countries on military spending in the home country.

This paper aims to quantify the dynamic cross-country conflict spillover effects across sub-Saharan African countries, accounting for conflict intensity and distance from conflict-affected countries, between 2000 and 2022.[2] The paper's contribution to the literature is threefold. First, the current study proposes a new Conflict Spillover Index (CSI) which integrates various elements of conflicts, such as fatalities, incidents, and geographic proximity, into a comprehensive metric that captures conflict spillovers to a given country. To facilitate temporal and cross-country comparisons as well as the interpretation of the index, the CSI is normalized to range from zero (no spillover) to 1 (highest spillover). Our proposed index has a few advantages. First, the index integrates fatalities, incidents, and geographical proximity, thereby providing a multidimensional analysis of conflict spillovers. The inclusion of a weight matrix based on geographic proximity captures the relative importance of a given conflict, where the influence declines as the distance from the conflict location increases. Such geographic dimension is crucial in understanding cross-border conflict dynamics. By normalizing the index, we allow for comparative analyses across different regions and time periods, facilitating the identification of trends and patterns in conflict spillovers.

Second, this paper contributes to existing research by providing an exploration of the different transmission channels of conflict spillovers over time using impulse response functions estimated with the local projections method (Jorda, 2005). Specifically, this paper quantifies the effects of conflict spillover on an extensive array of macroeconomic variables. These encompass GDP growth, inflation, fiscal indicators (including aggregated and disaggregated components on both the revenue and spending sides as well as debt levels), and external sector indicators (including trade, the real exchange rate, and foreign direct investment inflows).

Our main identification assumption when estimating conflict spillover effects is that macroeconomic variables in the "home" country do not contemporaneously (within the same year) cause conflict in neighboring economies. Regarding omitted variables, our regressions include country fixed-effects that allow us to control for time-invariant country-specific factors and time-varying controls for global factors (including financial variables and oil prices) that affect all countries at the same time. In addition, omitted variables bias is further attenuated by the inclusion in all regressions of two lags of the dependent variable as well as lags of the conflict spillover variable.

Third, this paper examines potential sources of state-dependencies in the spillover effects, centering on the role of governance and fiscal space. Factors such as government effectiveness, control of corruption, the rule of law and the availability of fiscal space may be pivotal in shaping the responses to and the effects of conflict spillovers.

[2] This paper focuses purely on spillover effects emanating from conflict in neighboring countries, while controlling for the effects of conflict in the country itself. Therefore, the estimates presented here do not reflect the total effects of conflict (own conflict and spillovers).

These elements could act as crucial buffers, defining the resilience and adaptive capacities of nations against external shocks arising from neighboring conflicts.

We document increasing conflict spillovers in sub-Saharan Africa since 2011, but with substantial cross-country heterogeneity. The analysis indicates significant and persistent effects of foreign conflict on several macroeconomic indicators in the "home" country. Impulse response functions show that a one standard deviation conflict spillover shock has negative and persistent effects on economic growth, with an associated decrease in GDP by 0.5 percentage points on impact that lasts for three years. Zooming in on GDP components, while private investment decreases by up to -1.5 percent, the effect on private consumption remains statistically insignificant. Conflict spillover shocks are further associated with statistically significant increases in inflation, government spending, government debt, and imports. Conflict spillovers also have negative effects on FDI, which gradually wind down over time. We also uncover heterogeneous effects linked to governance, fiscal space, and levels of foreign aid. The results show that the adverse effects of conflict in neighboring countries are mitigated in home countries with good governance settings and fiscal buffers. A one standard deviation shock is associated with a decline in growth by close to 1.2 and 3 percent in countries with weak government effectiveness and limited fiscal space, respectively, while the effects are muted in countries with high government effectiveness and ample fiscal space.

The paper suggests that good governance and the availability of fiscal space play a crucial role in attenuating the magnitude of adverse spillover effects, possibly reflecting the effective use of available policy buffers, including increases in government spending. While financial and trade integration make countries more vulnerable to spillover effects, this paper sheds light on important factors that promote resilience. Good governance could help tackle the economic and financial headwinds from neighboring countries, while fiscal buffers would allow the use of available resources to cover the humanitarian and financial needs.

The subsequent sections of this paper are organized as follows. Section 2 provides details on the dataset, elaborating on its sources and the methodology employed to construct the Conflict Spillover Index, complemented by a presentation of stylized facts on recent conflict developments in sub-Saharan Africa. Section 3 describes our estimation approach. Section 4 summarizes the baseline results. Section 5 delves into extensions to our baseline estimation, exploring potential state-dependencies in cross-country spillover effects of conflict. Finally, Section 6 concludes by synthesizing the key findings and discussing their policy implications.

2. Data and Stylized Facts

2.1 Data Compilation and Sources

We harness the dataset on conflict incidents and fatalities compiled by the Armed Conflict Location & Event Data Project (ACLED) for the construction of the conflict spillover index (see below) as part of the empirical analysis, using the annual sum of events and fatalities per country for battles, explosions/remote violence, and violence against civilians. To capture only events related to violence between different conflict groups (or from one group towards civilians), we exclude demonstrations (i.e., protests and riots) and strategic developments (e.g., agreements, arrests, or non-violent transfers of territory). This choice is motivated by the fact that our main interest lies in quantifying the spillover effects of narrower conflict events rather than the effects of broader social unrest, since the latter may to a large extent reflect the expression of normal/legitimate grievances that are an integral part of democratic processes and a strong civil society.

ACLED data are derived from a wide range of local, national, and international sources in over 75 languages, spanning four broad categories: traditional media; reports by state actors, multilateral organizations, and NGOs; local data from conflict observatories with whom ACLED has partnerships; and targeted and verified "new media" sources (e.g., X, formerly known as Twitter). The collection methodology is characterized by the validation of information from multiple sources, ensuring the reliability and accuracy of the conflict events data. Although the database is continuously updated, ACLED ensures to historically back-code new high-yielding sources before adding them to the dataset to accurately capture historical trends relative to present patterns. A limitation of this source, however, is that the data is gathered based on publicly available, secondary reports and thus reflects the coverage and reporting priorities and potential biases of media outlets and other reporting organizations. This might, for instance, result in an underestimation of the volume of events of non-strategic importance, such as low-level communal conflict or events in isolated areas.

Data sources and definitions are presented in the Annex Table. Macroeconomic data from the IMF World Economic Outlook database (April 2023 vintage) is supplemented by more granular fiscal data from the World Bank and the Stockholm International Peace Research Institute, while additional structural indicators at the country and global level are derived from World Bank databases and Bloomberg Professional Services (e.g., CBOE VIX Volatility Index). To explore the extent to which effective governments and strong institutions can mitigate adverse effects of conflict spillovers (see Section 5), we employ the aggregate indicators "Government Effectiveness" and "Control of Corruption" from the Worldwide Governance Indicators (Kaufmann and Kraay, 2023). The government effectiveness indicator captures perceptions of the quality of public services, the quality and independence of the civil service, and the quality of policy formulation and implementation. Importantly, the Worldwide Governance Indicators cover six different dimensions of governance (including "Voice and Accountability," "Political Stability and Absence of Violence/Terrorism," "Regulatory Quality," and "Rule of Law"), thus aiding the interpretability of our results by providing well-defined subdivisions of the concept of governance. Finally, we also use data from the World Bank's World Development Indicators database on the level of foreign aid as a share of GDP to quantify state-dependencies.

The sample used in the econometric analysis includes information for 37 countries in Sub-Saharan Africa. While we excluded some countries due to lacking data (e.g., South Sudan), we did not consider island (or part-island) nations in the analysis either, given the construction of the Conflict Spillover Index based on geographical proximity.[3]

2.2 Stylized Facts

Violent conflict events in our sample of sub-Saharan African countries increased significantly over the past two decades, with the average quarterly number of incidents in 2022 being five times higher than in 2000. Concurrently, the number of fatalities resulting from these incidents doubled over the period (Figure 1). Most notably, after a period of relative calm over the mid-2000s, the data points to a trend acceleration in the number of conflict incidents starting around 2012.

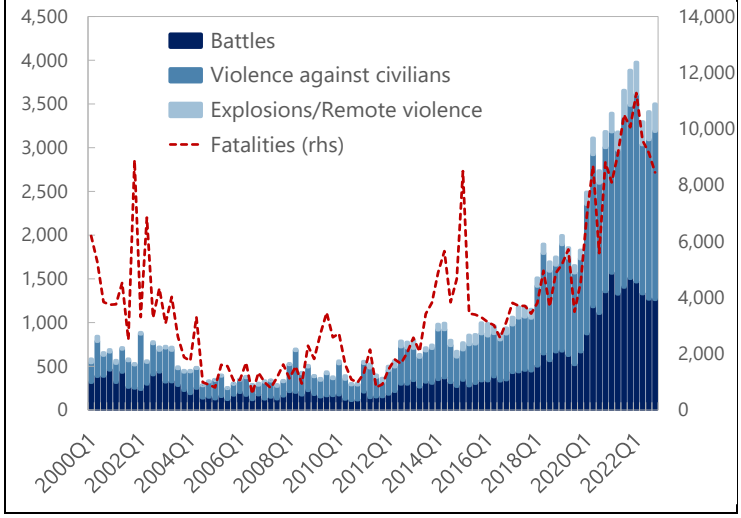
According to the Institute for Economics and Peace, Burkina Faso, Mali, Niger, and Nigeria are among the ten countries most impacted by terrorism in the world, with important spillover effects being seen in neighboring coastal countries in West Africa (e.g., Benin, Togo) as indicated by large deteriorations in their terrorism index in

[3] Comoros, Equatorial Guinea, Mauritius, Sao Tome and Principe, Seychelles, and Madagascar were thus excluded from the sample.

recent years (IEP 2023). In 2022, there were more deaths due to terrorism in the Sahel region alone than in South Asia and MENA combined.

Shifting modes of conflict across the continent and the surge in terrorism affecting parts of SSA are reflected in the breakdown of events by type (Figure 2). While the quarterly average of total battles increased by about 240 percent from 2000 to 2022, violence against civilians grew by more than twice as much (610 percent). Events associated with explosions and remote violence saw the largest uptick between 2000 and 2022, increasing by over 800 percent. Illustrating the rise of terrorism, violence against civilians represented on average about 54 percent of incidents in 2022, compared to just 39 percent in 2000; during the same time, the share of explosions/remote violence increased from about 5 to almost 9 percent, while the share of battles dropped from 56 to 38 percent.

Figure 2. Conflict Events[1] by Event Type and Fatalities in Sub-Saharan Africa, 2000-2022



Source: Armed Conflict Location & Event Data Project (ACLED)
1/ Refers to battles, explosions/remote violence, and violence against civilians (i.e., excludes protests, riots, and strategic developments).

The increase in conflict events and related fatalities in recent years is especially prominent in the Sahel region, as depicted in Figures 3 and 4. Turmoil in the Sahel has increased exponentially since 2018, and the share of the region in total conflict events and fatalities in sub-Saharan Africa has increased to about 25 percent, compared to only 5 percent as of 2015. The rise in explosions/remote violence is particularly striking, with almost 60 percent of all such events in SSA occurring in the Sahel in 2022.

Comparing these developments across continents is hindered by the fact that the ACLED database contains granular conflict data for non-SSA regions only starting in the mid-2010s, while Sub-Saharan Africa is covered from 1997 onwards. However, data from the Peace Research Institute Oslo (PRIO) confirms the overall observed trend of increasing non-state conflicts over the past twenty years and underscores the escalating nature of conflict in SSA. Based on UN data, PRIO finds that sub-Saharan Africa remains the region most severely affected by both state and non-state conflicts today, while the Middle East has seen a sharp decline in both types of conflict over recent years (and the Americas a steady increase in the number of non-state conflicts). Importantly, while the number of groups using one-sided violence decreased in both the Middle East and Asia between 2021 and 2022, one-sided violence increased in sub-Saharan Africa (and the Americas and Europe).

While an in-depth discussion of the causes of these conflict dynamics is beyond the scope of this paper, it is worth noting recent research into the nexus of conflict, social exclusion, and climate change. Abdel-Latif and El-Gamal (2024), for instance, show that perceptions of economic, social, or political exclusion increase the likelihood of conflict more than poverty alone, as they provide an opportune environment for armed groups to capitalize on discontent. Diallo and Tapsoba (2022), on the other hand, present evidence that more and more frequent weather-related shocks increase the likelihood of intercommunal conflict by as much as 38 percent, especially in countries with a more unequal income distribution and a large young, male demographic. These results exemplify the vivid debate into the interrelated causes of conflict in a world in which more frequent weather extremes are likely to exacerbate pre-existing grievances and competition for resources, as exemplified by farmer-herder conflicts in the Sahel, which can be further aggravated by poorly calibrated state responses and indiscriminate use of force. Rather than delving into this discussion, however, we turn towards conceptualizing the macroeconomic spillover effects of conflict.

Figure 3. Conflict Events[1] by Event Type and Fatalities in the Sahel,[2] 2000-2022
(total)

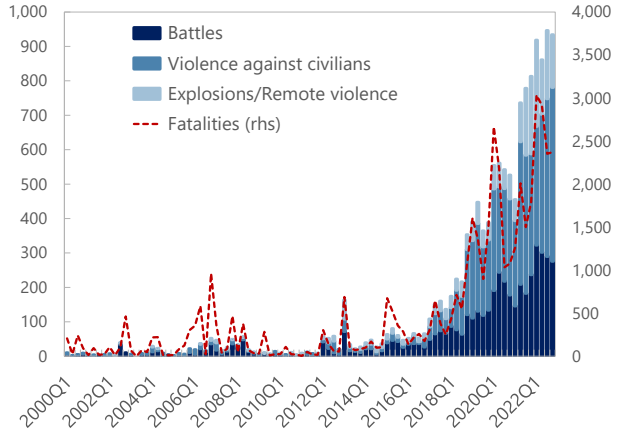
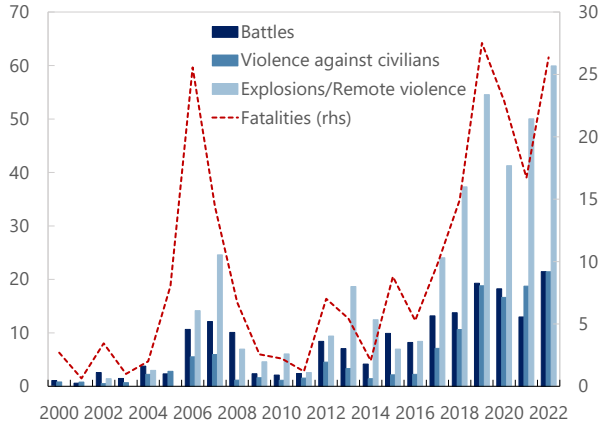


Figure 4. Conflict Events[1] by Event Type and Fatalities in the Sahel[2], 2000-2022
(percent of total SSA events by type and fatalities)



Source: Armed Conflict Location & Event Data Project (ACLED)
1/ Refers to battles, explosions/remote violence, and violence against civilians (i.e., excludes protests, riots, and strategic developments).
2/ G5-Sahel excl. Mauritania (i.e., Burkina Faso, Chad, Mali, Niger)

2.3 Conflict Spillover Index (CSI)

Any empirical exploration into the repercussions of conflict spillover necessitates a measure that is robust, multidimensional, and capable of accurately capturing cross border conflict intensity and proximity. The measure we propose, termed the Conflict Spillover Index (CSI), is designed to encapsulate various dynamics of regional and transborder conflicts. It combines diverse elements, including the intensity of conflict, geographical closeness, and temporal fluctuations, to form a comprehensive framework. This composition allows for an in-depth examination of the myriad ramifications associated with conflicts, thereby offering invaluable insights into the phenomenon of conflict spillover.

As such, the CSI is carefully constructed, integrating comprehensive ACLED data to represent conflict intensity and calculating a weighted average considering geographic proximity. Conflict intensity CI_{it} for a country i in time t is measured as:

$$CI_{it} = log(\mathrm{F}_{it} \times \mathrm{I}_{it}) \qquad (1)$$

Where F is the number of fatalities, and I is the number of incidents for country i in year j. This encapsulates the extent and the severity of conflicts within a given country. To capture spillovers, a weighted average of conflict intensities of all other countries $j \neq i$ is used, with weights w_{ij} being the inverse of geographic distance:

$$CSI_i = \sum_{j \neq i} w_{ij} * CI_j \qquad (2)$$

where $w_{ij} = \frac{1}{d_{ij}}$ and d_{ij} represents the geographic distance[4] between country i and j.

The introduction of weights based on geographic proximity allows for incorporating the spatial dimension inherent in conflict dynamics, attributing more significance to conflicts in neighboring countries and emphasizing the immediate and pronounced implications of proximity in conflict spillovers.

We then apply the following max-min normalization to ensure the index's values range between zero and one. This normalization facilitates comparisons across different temporal and spatial contexts.

$$\text{Normalized } CSI_i = \frac{CSI_i - \min(CSI)}{\max(CSI) - \min(CSI)} \qquad (3)$$

The CSI stands out due to its multidimensional nature, representing both the number and severity of conflicts and unravelling the complexities and multifaceted aspects of conflicts, such as their varying scopes, intensities, and impacts, that simpler, unidimensional measures overlook.

The geographic proximity-based weights bring forth a more precise representation of spillover effects by attributing more significance to neighboring countries. This level of precision and localization distinguish the CSI from broader measures of conflict, ensuring that the regional dynamics are addressed. Moreover, the index provides useful insights on conflict dynamics over time. Furthermore, the CSI goes beyond immediate, direct implications, delving into the ripple effects of conflicts, addressing how they permeate borders and induce spillover impacts like economic disruptions.

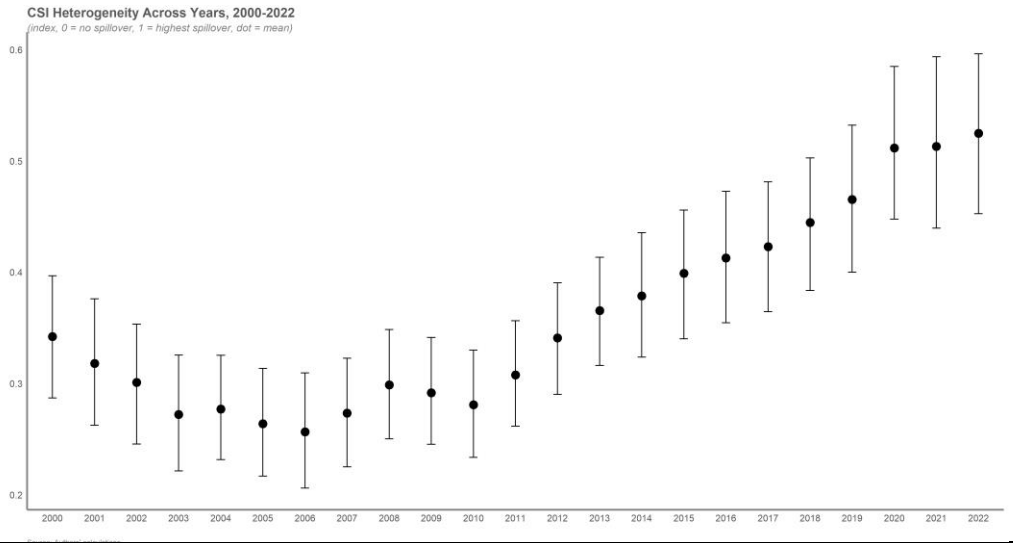
In this paper, we focus the analysis on data at the national level, including as far as the construction of the CSI is concerned. Nonetheless, conflict spillover effects are likely to be more acute in certain regions of a country (notably in border areas, see Abdel-Latif and El-Gamal, 2024) and therefore the use of disaggregated sub-national level data can capture more nuanced effects. IMF (2019) provides some interesting analysis on conflict spillovers effects in sub-Saharan Africa at the sub-national level, using satellite data on nightlights as a proxy for economic activity. We believe that the aggregate analysis considered here presents useful complementary insights to studies focusing on sub-national data, notably by quantifying the importance of spillovers at the national level.

[4] This paper calculates the distance between pairs of countries represented by their geographic coordinates—latitude and longitude—by employing the Haversine formula. This formula is predicated on the assumption of a spherical Earth and provides an estimate of the great-circle distance, which represents the shortest path traversable over the Earth's surface between two points. When applied to the boundaries of countries, the formula computes the minimum distance by determining the shortest span across the Earth's surface between the closest points on the peripheries of two distinct national territories. This approach is particularly valuable in macro-scale geographic studies where it is crucial to quantify the proximities between various geopolitical entities.

Figure 5 depicts the trajectory of conflict spillover from 2000 to 2022, illustrating a discernible increase in conflict spillovers since 2011. The period between 2000 and 2005 marked a decrement in mean spillover values, transitioning from 0.34 to 0.26. This initial phase was characterized by a semblance of stabilization in conflict spillovers, evidenced by minor fluctuations observed between 2003 and 2007. Following this stabilization phase, the index showed a consistent and incremental ascendancy in subsequent years. Specifically, 2011 and 2012 emerged as pivotal years, witnessing a substantial amplification in average spillover levels and culminating at a mean value of 0.34 in 2012. A sustained increase was observed post-2013, with the mean value of the conflict spillover index surpassing the 0.4 threshold in 2016. This upward trend intensified in the years 2020 and 2021, with the mean value of the spillover index elevating to 0.51 and persisting in its ascent to 0.52 in 2022. The bands around the mean values reveal a consistent broadening over the years, indicative of the increased heterogeneity in conflict spillover and pointing to years marked by a wider range for spillover values, both high and low.

This discernible increase in average spillover values indicates escalating conflict spillover intensities and a progressive deterioration in the geopolitical environment. While a general increasing trend is evident, the wide bands around mean values emphasize the heterogeneity of conflict spillover across countries and years. The escalation observed in recent years could potentially be correlated to intensified geopolitical frictions and regional conflicts, calling for an in-depth investigation of its possible macroeconomic impacts.

Figure 5. The Conflict Spillover Index (CSI) 2000-2022



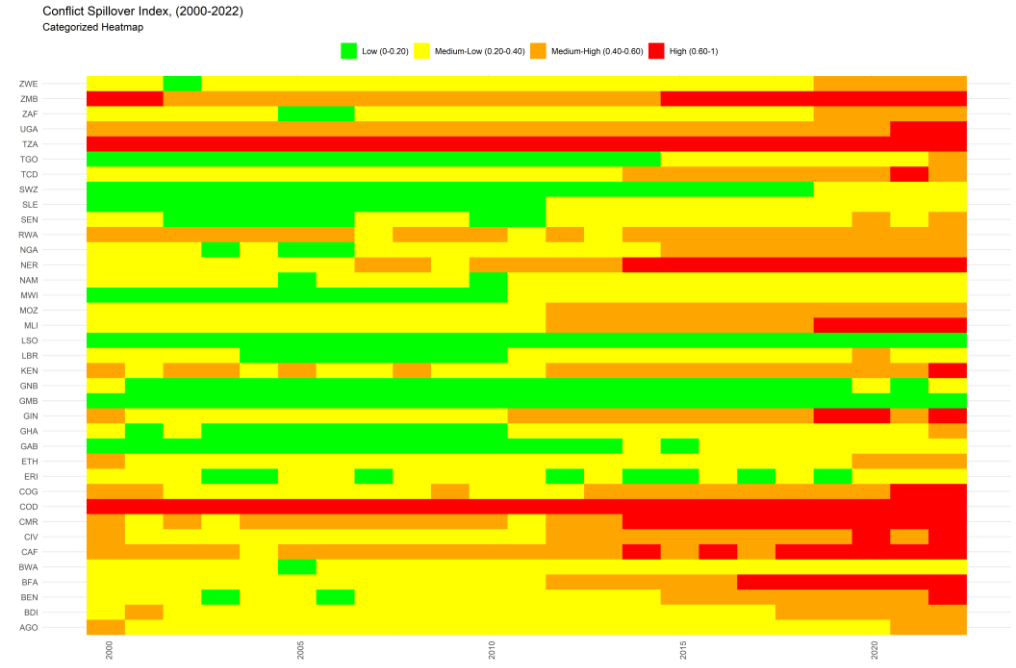
Source: Authors' estimates. Note: back circles represent the average index across countries and bands represent the interquartile range.

Figure 6 shows the conflict spillover index heatmap which displays the index values for each country in the sample over time, categorized as low (0-0.20), medium-low (0.20-0.40), medium-high (0.40-0.60), and high (0.60-1) spillover levels. The chart illustrates that some countries, which experienced lower conflict spillover in earlier years, have witnessed an increase in spillover effects in recent years. It also shows that many countries have endured prolonged periods of conflict spillover compared to others.

Figure 7 presents a map of the Conflict Spillover Index, which outlines the index values for 2022 by country. The map uses a gradient of color intensities to represent varying levels of conflict spillover, with darker shades signifying higher spillover levels. The chart illustrates the concentration of spillovers within the Sahel and Central African countries, which appear to be mutually reinforcing, leading to the emergence of conflict hotspots.

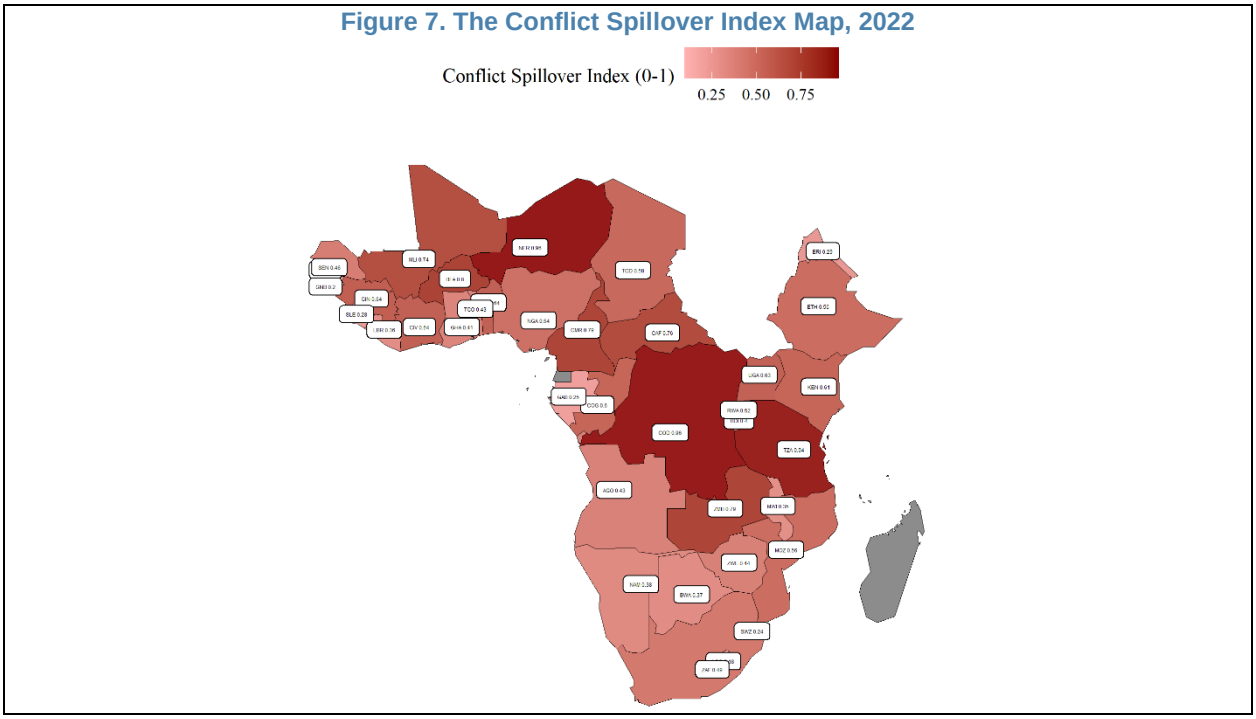
The regional impact of conflict spillover becomes starkly apparent upon comparing the average Conflict Spillover Index of the Sahel region to that of Sub-Saharan Africa (SSA), as illustrated in Figure 8. Despite both regions experiencing an increasing trend in conflict spillover, the rate of acceleration within the Sahel has superseded that of other SSA countries, particularly since 2011. The escalation of conflicts in the Sahel post-2011 coincides with the Libyan civil war, originating from a violent outbreak in Northern Mali. Initially confined to Northern Mali, this conflict subsequently permeated across national borders, affecting Burkina Faso, Niger, and Nigeria. Consequently, the Sahel region has morphed into a conflict hotspot where various conflicts mutually amplify.

Figure 6. The Conflict Spillover Index Heatmap 2000-2022



Source: Authors' estimates.

Figure 7. The Conflict Spillover Index Map, 2022



Source: Authors' estimates.

Finally, diverting attention from the Sahel, Figure 9 demonstrates that resource-abundant countries within SSA tend to experience a more pronounced trend of conflict spillover compared to their non-resource intensive counterparts. This pattern indicates a correlation between resource abundance and a heightened likelihood of conflict spillover, suggesting that competition and disputes over valuable resources can be significant drivers of regional instability.

Figure 8. Conflict Spillover Index, Sahel G5 versus SSA[1], 2000-2022
(Index, average)

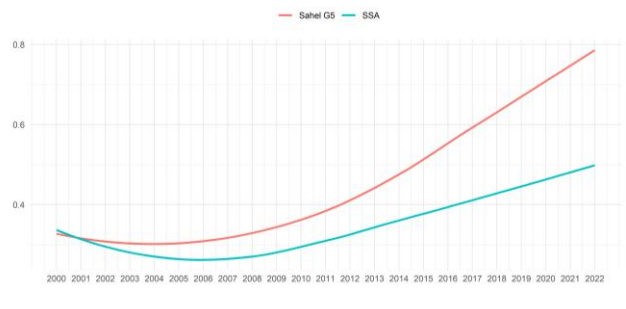
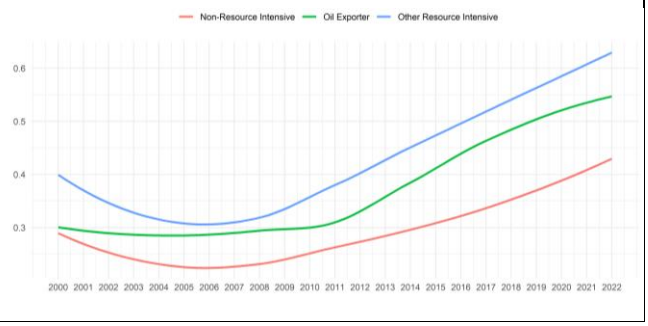


Figure 9. Conflict Spillover Index by SSA Country Group, 2000-2022
(Index, average)



Source: Authors' calculations.
1/ G5-Sahel excl. Mauritania (i.e., Burkina Faso, Chad, Mali, Niger)

3. Estimation Approach

We use the local projections method (Jorda, 2005) to estimate the dynamic effects of conflict spillovers on a number of macroeconomic variables using data for a panel of sub-Saharan African economies. We estimate specifications of the following form:

$$y_{i,t+h} - y_{i,t-1} = \alpha_i^h + \beta^h \sum_{j=0}^{h} CSI_{i,t+j} + \delta X_{i,t} + \gamma \vartheta_t + \varepsilon_{i,t+h} \qquad (4)$$

Where $y_{i,t+h}$ is the macroeconomic variable of interest (e.g., GDP, inflation, trade, government revenues and expenditures) for country i at horizon $t+h$. Moreover, α_i^h are country fixed effects. The main coefficient of interest, β^h, captures the cumulative conflict spillover (CSI) effects at horizon h. $X_{i,t}$ is a vector of control variables that includes lagged values of the dependent variable, the contemporaneous terms of trade gap[5] and its lags, lagged values of the conflict spillover variable, lagged conflict intensity in the home country, and lagged GDP growth. ϑ is a vector of "global" time varying variables that comprises the VIX uncertainty index, the US 3-month T-bill rate, and the simple average of three crude oil spot prices (Brent, West Texas Intermediate, and Dubai Fateh) to capture economic and financial conditions that are common across the countries in our sample. $\varepsilon_{i,t+h}$ is an error term.

The estimated impulse response functions illustrate the effects of a one standard deviation shock to the conflict spillover variable on impact ($t = 0$) and for the next five years. In addition, all impulse responses presented include confidence intervals based on Driscoll–Kraay standard errors that are robust to autocorrelation and cross-sectional dependence.

Our main identification assumption when estimating β^h is that macroeconomic variables in the "home" country do not contemporaneously (within the same year) cause conflict in neighboring economies. Regarding omitted variables, our regressions include country fixed-effects that allow us to control for time-invariant country-specific factors and time-varying controls for global factors (including financial variables and oil prices) that affect all countries at the same time. In addition, omitted variables bias is further attenuated by the inclusion in all regressions of two lags of the dependent variable, as well as lags of the conflict spillover variable.

One of the main advantages of the local projection method is its flexibility in dealing with nonlinearities and state dependency. Throughout the paper, we explore a number of such state-dependencies using a smooth-transition function. Specifications typically take the following form:

$$y_{i,t+h} - y_{i,t-1} = \big(1 - F(z_{i,t-1})\big)\big[\alpha_{high,i}^h + \beta_{high}^h \sum_{j=0}^{h} CSI_{i,t+j} + \delta_{high} X_{i,t} + \gamma_{high} \vartheta_t\big] + \big(F(z_{i,t-1})\big)\big[\alpha_{low,i}^h + \beta_{low}^h \sum_{j=0}^{h} CSI_{i,t+j} + \delta_{low} X_{i,t} + \gamma_{low} \vartheta_t\big] + \varepsilon_{i,t+h} \qquad (5)$$

With $F(z_{i,t-1})$ being smooth function of the state variable and z is a normalized version of the state variable such that $F(0) = \frac{1}{2}$. As is common in the literature, we assume F takes the following form:

$$F\big(z_{i,t-1}\big) = exp\big(-\lambda_0 z_{i,t-1}\big)/\Big(1 + exp\big(-\lambda_0 z_{i,t-1}\big)\Big) \qquad (6)$$

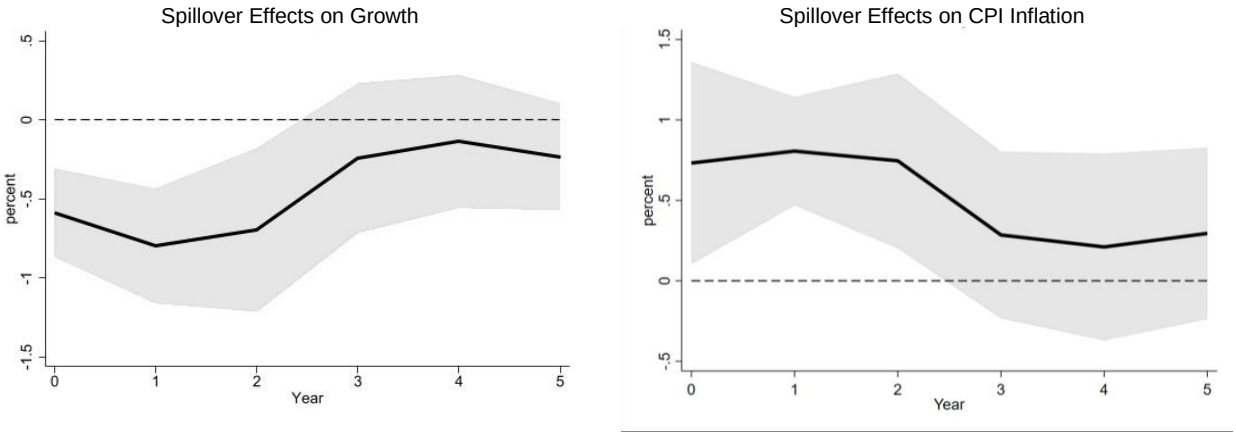
[5] The terms-of-trade gap is estimated using the Hamilton filter to separate the trend and cyclical components of the commodity terms of trade index constructed by Gruss and Kebhaj (2019).

4. Macroeconomic Spillovers from Conflict: Baseline Results

4.1 Effects of Conflict Spillovers on Economic Activity and Inflation

Figure 10 presents the impulse responses obtained when estimating the specification outlined in equation (4) for the real GDP growth and CPI inflation. A one standard deviation shock to the conflict spillover index is associated with a decrease in output by 0.5 percent and an increase in CPI by 0.5 percent on impact. These effects persist for three years after the shock and become statistically and economically insignificant by the end of the simulation horizon.

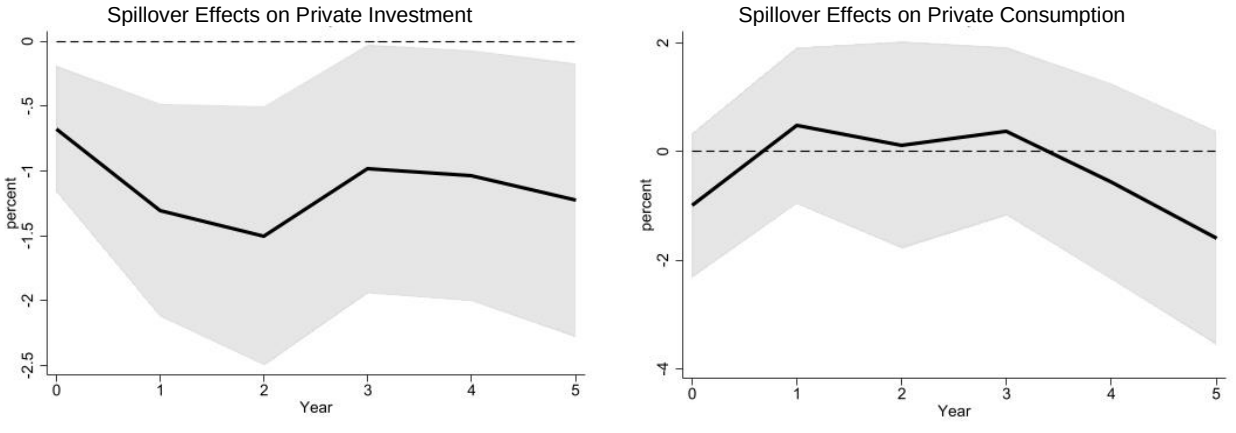
Figure 10. Conflict Spillover Effects on Output and Inflation



Note: Shaded area shows the 90 percent confidence interval for Driscoll-Kraay standard errors.

When looking into some sub-components of GDP, it appears that conflict spillovers have negative and persistent effects on private investment, while the effects on private consumption are not statistically significant (Figure 11). The effects of public investment and consumption as well as external sector variables are considered in other sub-sections below.

Figure 11. Conflict Spillover Effects on Private Investment and Consumption



Note: Shaded area shows the 90 percent confidence interval for Driscoll-Kraay standard errors.

4.2 Fiscal Effects of Conflict Spillovers

We now explore conflict spillover effects on the fiscal sector, focusing on tax revenue, spending, and debt, all expressed as a percentage of GDP. Figure 12 displays the impulse responses for tax revenue, total government spending and its different components including the breakdown between current and capital spending and social benefits. We also run the estimates for military spending, as well as for social benefits spending. The Figure shows that the cumulative effects of conflict spillovers on tax collection are negative and insignificant over the time horizon considered. While the effects are economically small and insignificant in the first year following a one standard deviation shock to the conflict index, they become larger by the third year following the eruption or intensification of conflict in neighboring countries but remain statistically insignificant.

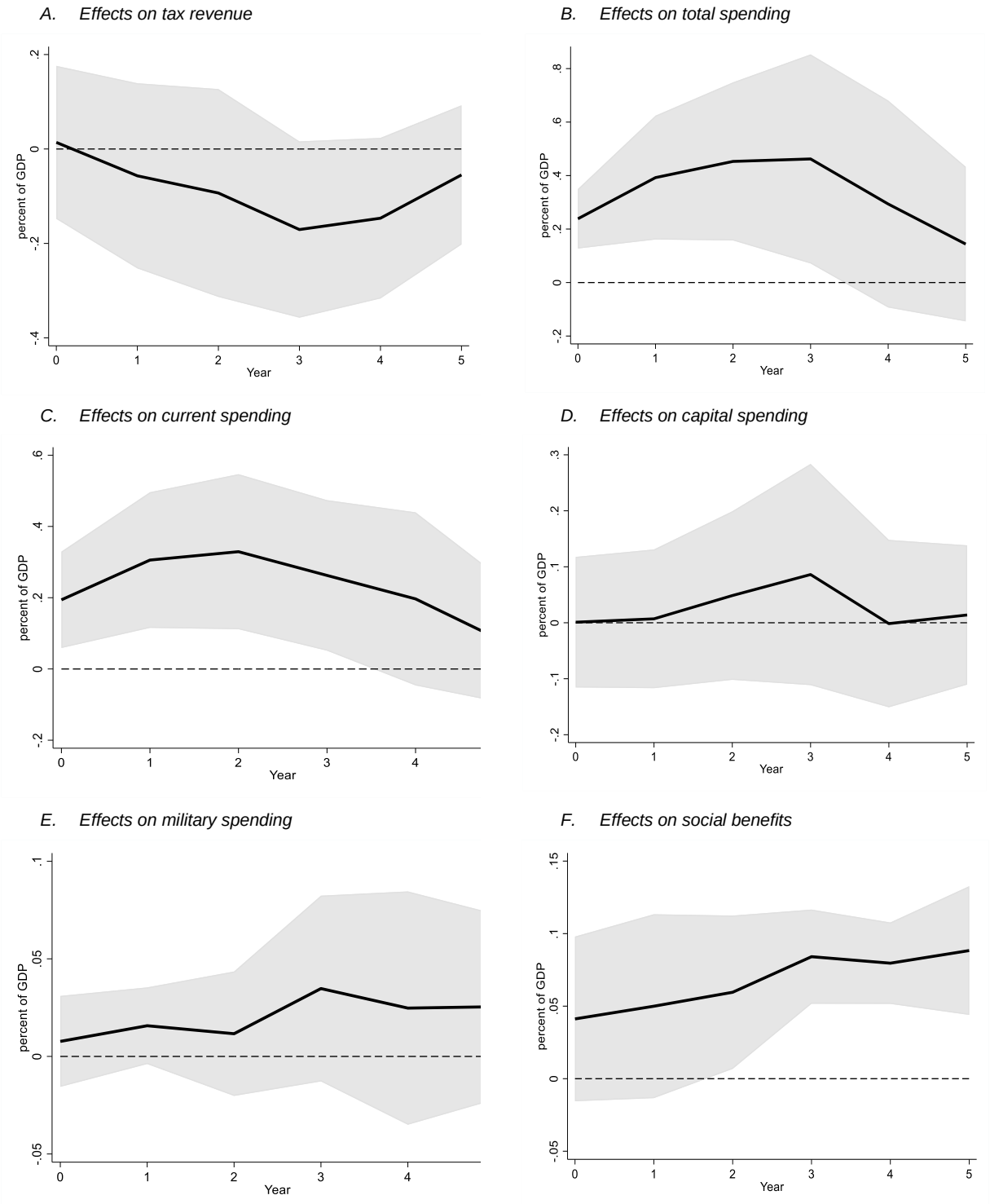
As for the effects on total spending, the impulse responses in Figure 12 shows that total spending tends to increase in the home country following conflict shock in neighboring countries, but this impact declines and becomes insignificant by the year 5. An increase by one standard deviation in conflict intensity in neighboring countries can lead to an increase in total public spending in the home country by 0.4 percent of GDP by year 3.

Looking at the different components of spending, the results show that effects on current spending are positive and significant in the early years of an intensification of conflict in neighboring countries, but they become statistically insignificant over time, while the effects on capital spending are not statistically significant at any horizon. We find that an increase of conflict intensity in neighboring countries by one standard deviation could lead to an increase in current spending in the home country by about 0.3 percent of GDP by the second year.

In addition, we find that an intensification of conflict in neighboring countries is positively correlated with an increase in military spending in the home country but surprisingly the effects are small and statistically insignificant. On the other hand, the effects on social spending are positive and statistically significant, suggesting that home countries tend to increase social spending when faced by conflict threats in neighboring countries. These social expenses not only help mitigate the spillover social effects of conflicts but reduce the adherence of local populations to militia fighters in neighboring countries, more particularly in the case of terror groups.

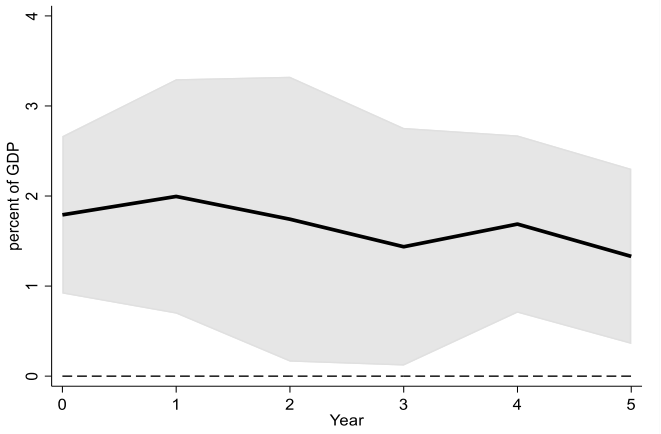
We present in Figure 13 the impulse responses for the conflict spillover effects on public debt. We find that while the effects on public debt are statistically significant and large in the early years following a conflict spillover shock, they slightly reduce over time. The results show that an increase in conflict intensity in neighboring countries by one standard deviation is associated with a rise in public debt in the home country by 2 percent of GDP in the first year of the conflict, declining to 1.5 percent of GDP on average in 5 years as tax collection slightly improves and spending pressures reduce.

Figure 12. Conflict Spillover Effects on the Fiscal Sector



Note: Shaded area shows the 90 percent confidence interval for Driscoll-Kraay standard errors.

Figure 13. Conflict Spillover Effects on Public Debt



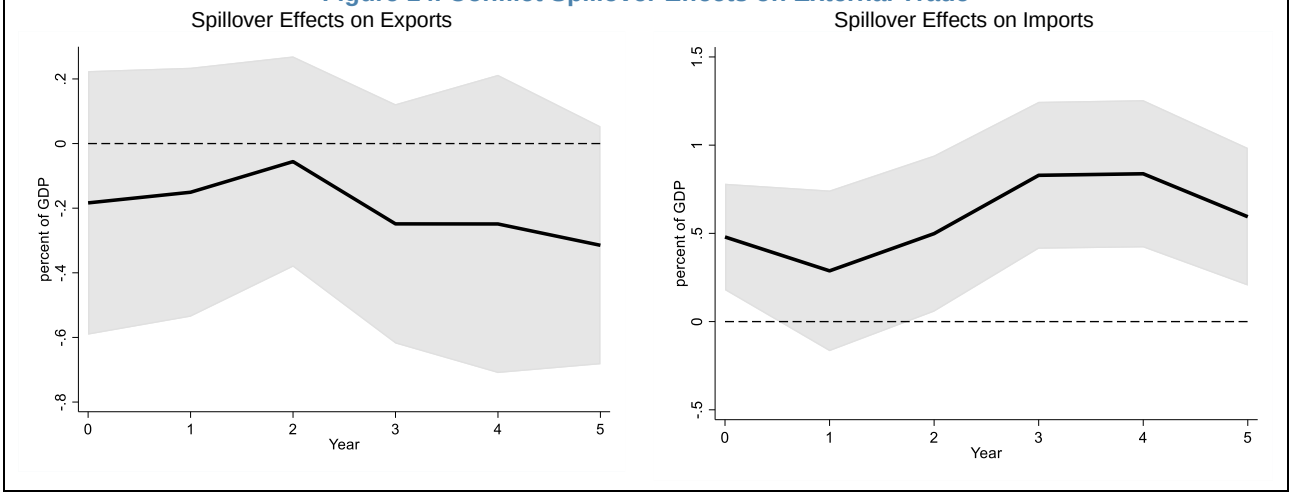
Note: Shaded area shows the 90 percent confidence interval for Driscoll-Kraay standard errors.

4.3 Effects of Conflict Spillovers on the External Sector

We now turn our attention to the effects of conflict spillovers on the external sector. We examine whether conflict in neighboring countries (as measured by the spillover index) affects exports, imports, the real effective exchange rate, and foreign direct investment. The impulse response depicted in Figure 14 indicates that the effects of conflict spillovers on the ratio of exports to GDP are small in an economic sense and are not statistically significant at the 10 percent level. A one standard deviation shock to the conflict spillover index variable is associated with a decline in exports in the home country by about 0.2 percent of GDP on impact, but this effect is not statistically significant. The cumulative effects over time are of similar small magnitude.

In contrast, a one standard deviation shock in the conflict spillover variable is associated with a statistically significant increase in the imports to GDP ratio of 0.5 percent of GDP on impact, which reaches a peak of 0.8 percent of GDP 3 to 4 years after the initial shock. Therefore, in the linear (non-state dependent) specifications, the international trade transmission channel of conflict spillovers appears to operate mostly through increased imports in our sample of sub-Saharan African countries, which could be linked to the increase in total and military spending documented previously to the extent that such increases involve military equipment imports, for example.

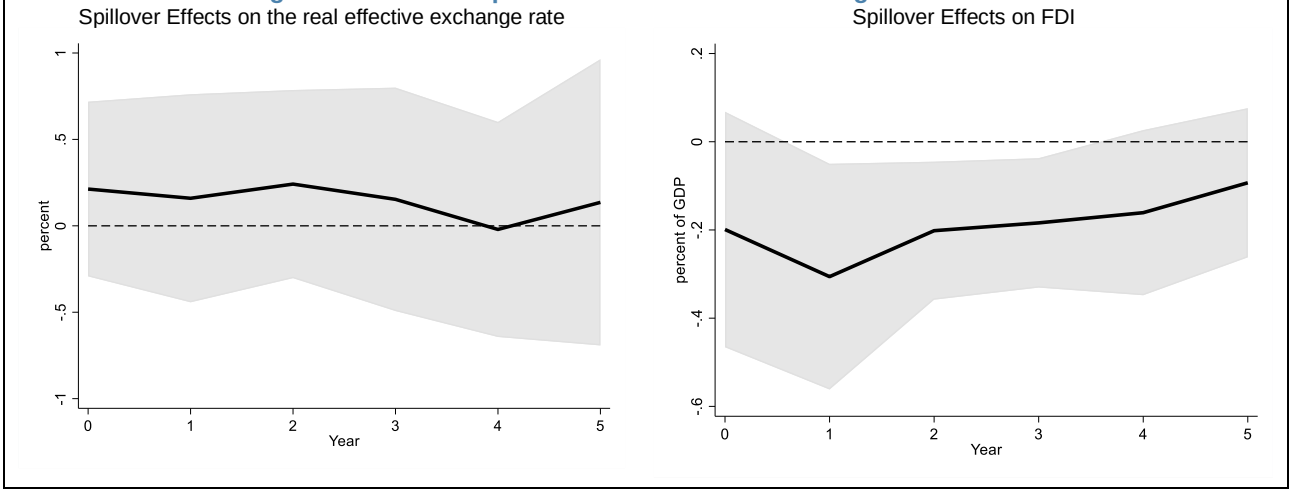
Figure 14. Conflict Spillover Effects on External Trade



Note: Shaded area shows the 90 percent confidence interval for Driscoll-Kraay standard errors.

Moreover, the effects of conflict spillovers on the real effective exchange rate are small and not statistically significant (Figure 15). A one standard deviation shock to the spillover index is associated with a real effective exchange rate appreciation of less than 0.3 percent on impact and cumulative effects are even smaller and not statistically significant. In addition, the effects of conflict in neighboring countries on the ratio of FDI to GDP are relatively modest. A conflict shock leads to a decline in FDI in the home country by 0.2 percent of GDP on impact (which is nevertheless only marginally significant). The effect increases to 0.3 percent of GDP after one year, before gradually decreasing and becoming statistically insignificant four years after the shock.

Figure 15. Conflict Spillover Effects on the Exchange Rate and FDI



Note: Shaded area shows the 90 percent confidence interval for Driscoll-Kraay standard errors.

Overall, the results for non-state dependent models indicate that as far as the external sector is concerned, the transmission of conflict spillover shocks operates mainly through increased imports and (marginally) lower foreign direct investment, while the effects on exports and the real exchange rate are muted. Nonetheless, these results should be interpreted with caution as state-dependencies may play an important role as discussed in subsequent sections. In addition, given the relevance of informal trade in the region, it is possible that official statistics at the

national level do not fully capture spillover effects, particularly as far as the effects of conflict in border areas is concerned.

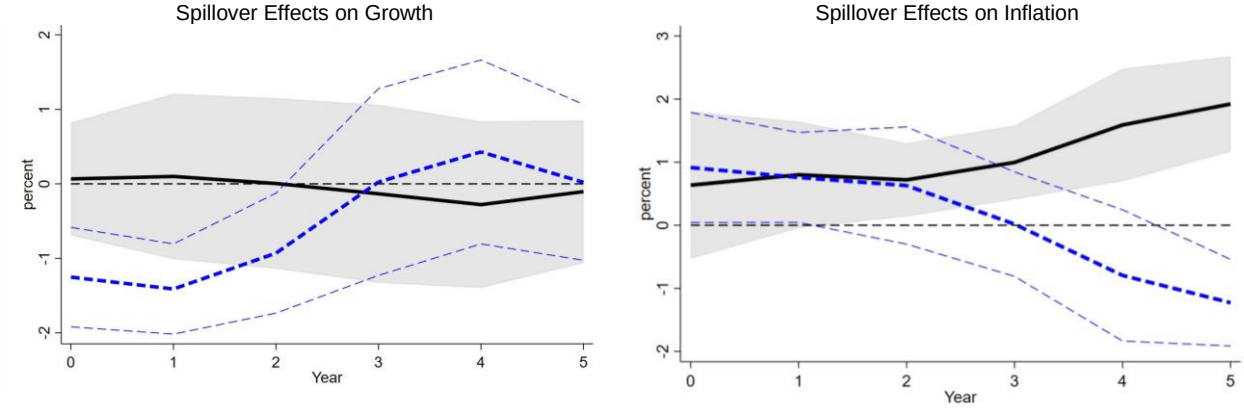
5. Extensions: Exploring State-Dependencies in Conflict Spillovers

5.1 The Role of Governance

Effective governments and strong institutions can facilitate quick and adaptive response to mitigate the adverse effects of conflict spillovers. They can ensure the deployment of appropriate policy measures, resources allocation, and intervention strategies to maintain domestic stability and security. In short, robust institutions foster a stable environment conducive to economic activity, allowing countries to enhance economic resilience despite external pressures. Therefore, whether conflict spillover shocks occur in periods of "good" governance in the "home" country could matter.

The state-dependent impulse responses show that negative spillover effects of conflict on GDP are attenuated in settings with relatively better government effectiveness, becoming statistically insignificant, while such effects persist elsewhere (Figure 16). Moreover, spillover effects on inflation are initially similar across states up to three years after the shock. There is some indication of a more persistent increase in inflation for good governance settings, but this finding should be interpreted with caution given the well-known problems with local projection estimates at longer horizons (Ramey and Zubairy, 2018).

Figure 16. Conflict Spillover Effects on Growth and Inflation for High/Low Government Effectiveness



Note: Solid black line refers to impulse response for periods of high government effectiveness. Shaded area shows the 90 percent confidence interval for Driscoll-Kraay (DK) standard errors. Dashed blue line refers to impulse response for periods of low government effectiveness and 90 percent DK confidence interval.

Figure 17 shows that the effects of conflict intensity in neighboring countries on the fiscal sector in the home country depend on the quality of governance. More specifically, we present the results conditional on the level of government effectiveness in Figure 17 and control of corruption in Annex Figure 2. We find that an intensification of conflict in neighboring countries can lead to a decline in tax revenue by 0.8 percent of GDP in the home countries after 3 years when governance is poor, while tax revenue increases by 0.7 percent of GDP on average over the same time horizon in home countries with good governance settings. This increase in revenue could be due to the limited economic effects in these countries (Figure 17) and/or the relocation of businesses to well governed countries. It may also reflect additional efforts to mobilize revenues by policy makers in these countries,

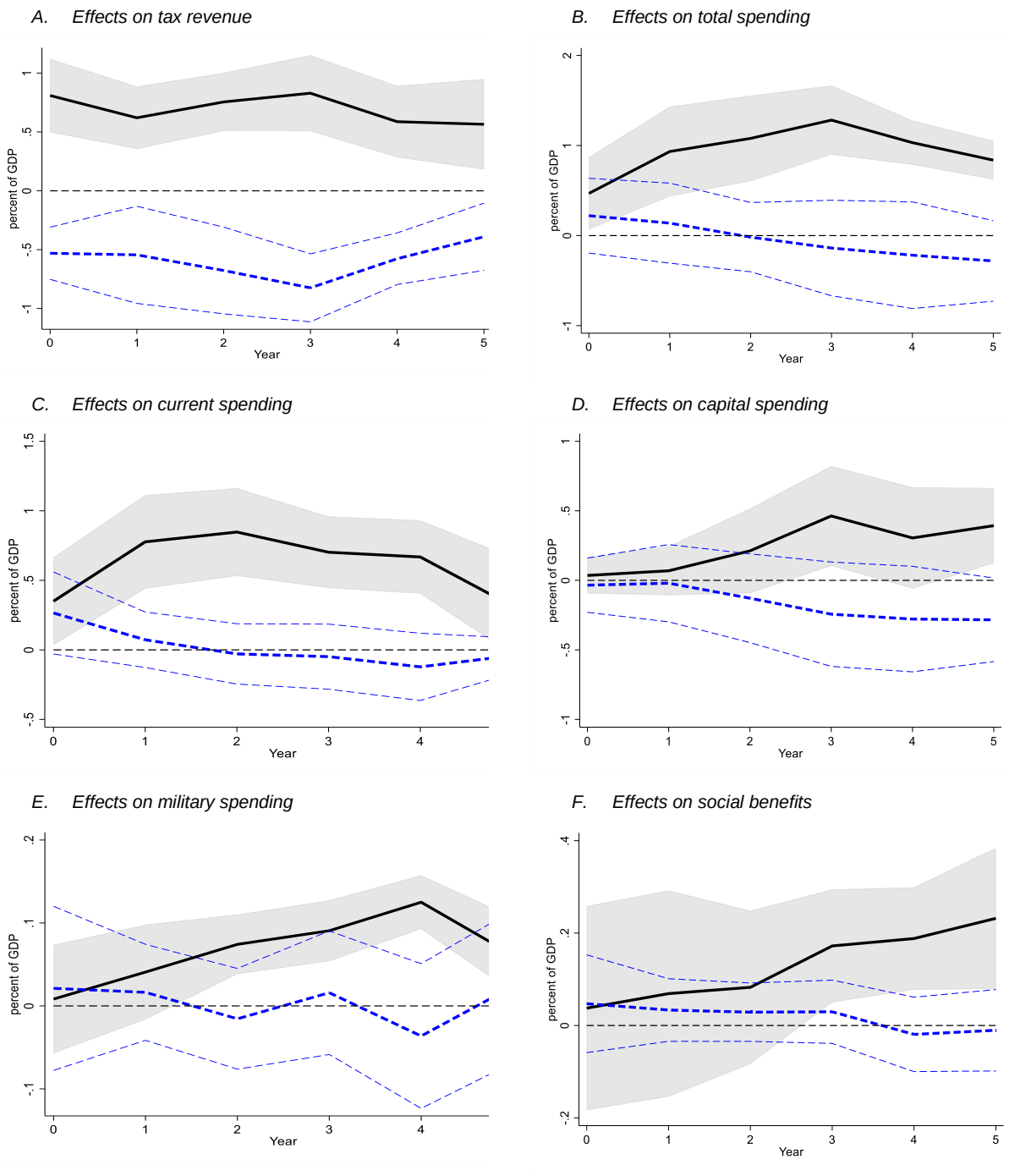
especially in light of the observed increase in government expenditures following conflict spillover shocks. For instance, Cote d'Ivoire experienced an increase of tax revenue from 12.6 percent of GDP in 2022 to 13.4 percent of GDP in 2023 despite the increased security incidents and spillover effects from neighboring countries including Burkina Faso and Mali. This strong performance is due to ongoing tax policy and administration reforms (such as elimination of exemptions, reform of property taxes, enhanced monitoring of transfer pricing, and so on).

Regarding spending behavior, the impulse responses in Figure 17 show that a conflict shock in neighboring countries is associated with an increase in total government spending in the home countries with high governance settings, as they respond to the fallout of conflict and humanitarian needs, while the effects for countries with low governance settings are not statistically significant. The same behavior is also observed for current spending, but the conflict spillover effects on capital spending are insignificant for both home countries with poor and good governance settings.

We also find that military spending in the home countries with high government effectiveness is positively associated with a conflict intensity shock in neighboring countries with persistent cumulative effects that are increasing over time, in contrast with military spending behavior in countries with low government effectiveness where the effects are small and not statistically significant. This finding contrasts with the impulse responses for the linear (non-state dependent) model and highlight the importance of governance when considering the effects of conflict spillovers on military spending. We also observe the same behavior when it comes to social benefits, with these expenses increasing only in countries with good governance settings.

To sum up, home countries with good quality of governance tend to increase current, military and social spending as they respond to threats and humanitarian needs from neighboring countries, in contrast of home countries with poor quality of governance where the effects are not statistically significant but tax revenue declines.

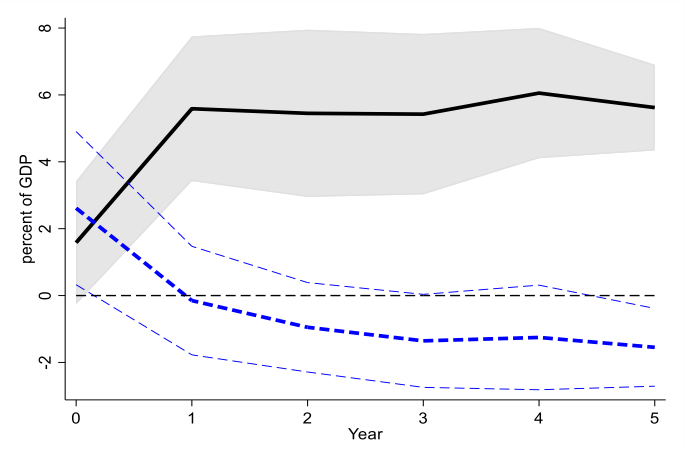
Figure 17. Conflict Spillover Effects on the Fiscal Sector for High/Low Government Effectiveness



Note: Solid black line refers to impulse response for periods of high government effectiveness. Shaded area shows the 90 percent confidence interval for Driscoll-Kraay (DK) standard errors. Dashed blue line refers to impulse response for periods of low government effectiveness and 90 percent DK confidence interval.

The impulse responses in Figure 18 illustrate that the effects of conflict spillovers on debt are positive and significant in the home countries with high governance settings, while small and not significant in the home countries with low governance settings. An increase of conflict intensity in neighboring countries by one standard deviation is correlated with a rise in public debt in the home countries with good governance settings by about 6 percent of GDP in 5 years (which is in line with the previously estimated increase in spending).

Figure 18. Conflict Spillover Effects on Public Debt for High/Low Government Effectiveness

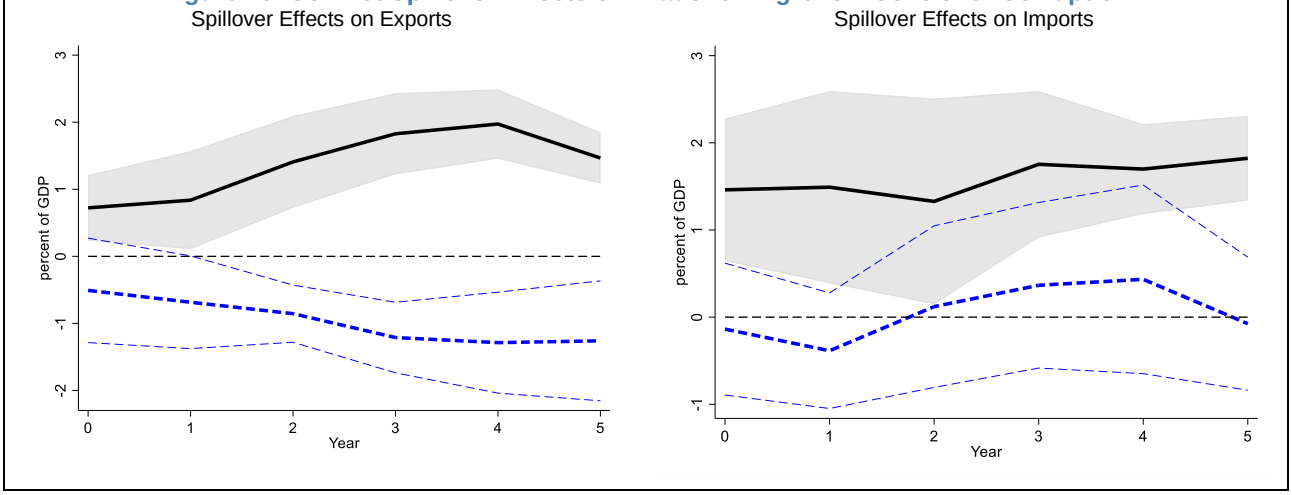


Note: Solid black line refers to impulse response for periods of high government effectiveness. Shaded area shows the 90 percent confidence interval for Driscoll-Kraay (DK) standard errors. Dashed blue line refers to impulse response for periods of low government effectiveness and 90 percent DK confidence interval.

As depicted in Figure 19, in settings where the control of corruption index (from the World Governance Indicators dataset) is stronger, exports tend to increase by over 0.5 percent of GDP on impact after a one standard deviation conflict spillover shock, while exports tend to decline in settings where control of corruption is weak. The cumulative positive effect approaches 2 percent of GDP for exports in high control of corruption settings, while the negative effects on low control of corruption settings can reach close to one percent of GDP. Similarly, overall imports increase following shocks in settings with high control of corruption, while they tend to remain constant in low governance settings. Therefore, as far as the control of corruption is concern, there is evidence of substantially different spillover effects on trade across “high” and “low” states.[6]

[6] When considering the real effective exchange rate and the foreign direct investment to GDP ratio, we did not find marked differences across high and low control of corruption “states” and therefore the results are not reported to save space.

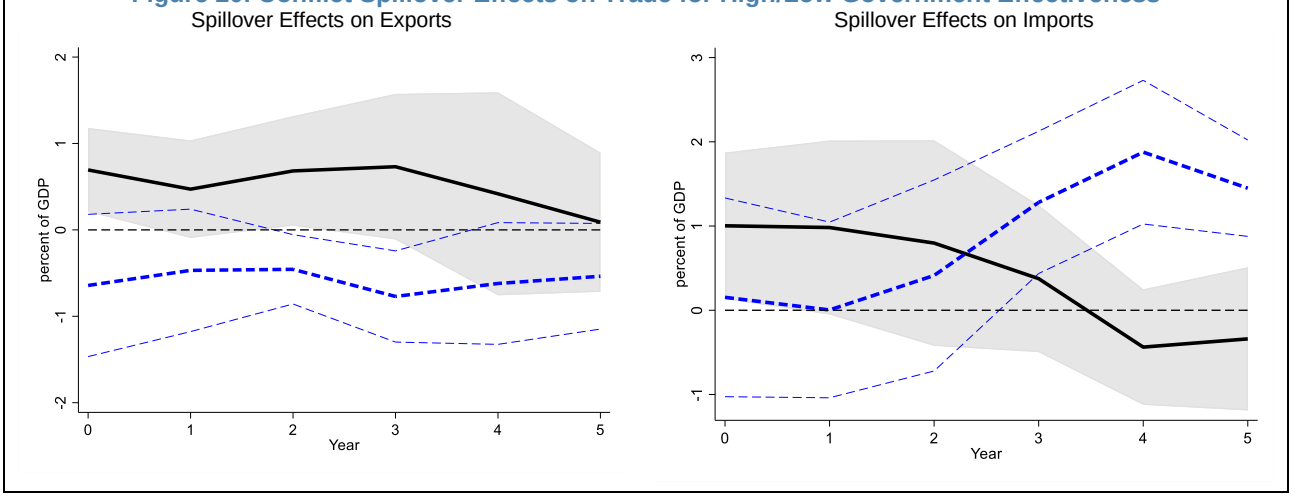
Figure 19. Conflict Spillover Effects on Trade for High/Low Control of Corruption



Note: Solid black line refers to impulse response for periods of high control of corruption. Shaded area shows the 90 percent confidence interval for Driscoll-Kraay (DK) standard errors. Dashed blue line refers to impulse response for periods of low control of corruption and 90 percent DK confidence interval.

The evidence is less-clear cut for an alternative governance indicator, namely the government effectiveness index (Figure 20). As far as the export to GDP ratio is concerned, point estimates present a similar pattern to the one described for the control of corruption variable with an increase in exports for high government effectiveness settings and a decrease in low-ones, but confidence bands are wider, and results are only marginally significant on impact and not significant at longer horizons. Regarding the imports to GDP ratio, results are not statistically significant for the "high" state of government effectiveness at all horizons and for the "low" state up to three years after the shock, but there is some evidence of an increase in imports 4 to 5 years after the shock. Nonetheless, the latter results should be interpreted with caution given the well-known issue that local projection estimates then to less reliable at longer horizons (Ramey and Zubairy, 2018).

Figure 20. Conflict Spillover Effects on Trade for High/Low Government Effectiveness

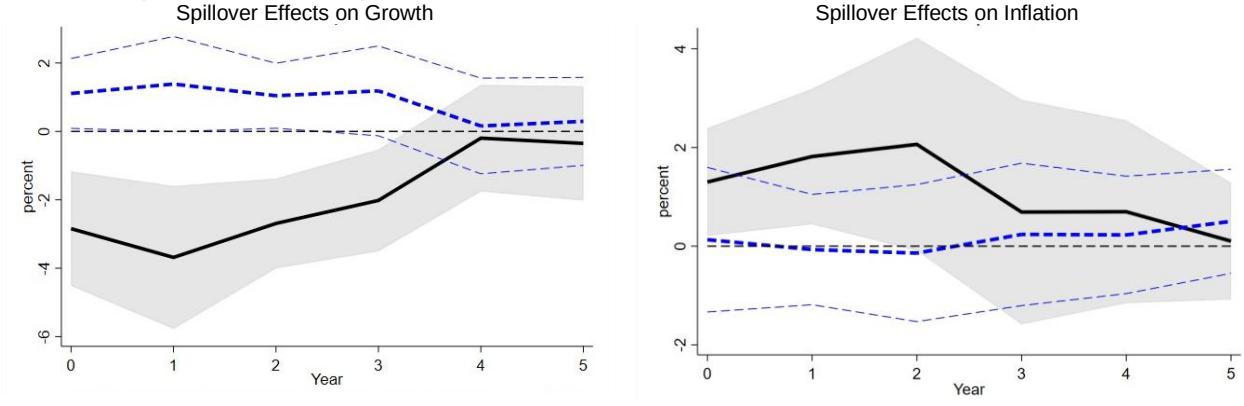


Note: Solid black line refers to impulse response for periods of high government effectiveness. Shaded area shows the 90 percent confidence interval for Driscoll-Kraay (DK) standard errors. Dashed blue line refers to impulse response for periods of low government effectiveness and 90 percent DK confidence interval.

5.2 The Role of Fiscal Space

In this section we examine whether the responses of macroeconomic variables to spillover shocks change depending on the level of debt prevailing before the shock, which could be interpreted as a measure of the availability of fiscal space (high debt levels implying lower space and conversely lower debt levels implying more room for maneuver). The impulse responses clearly show that the effects of conflict spillover shocks on economic growth are much more pronounced when fiscal space is more limited (Figure 21). A one standard deviation shock is associated with a decline in growth by close to 3 percent on impact that persists for three years (solid line in the Figure), which is substantially larger than the linear effects on growth previously presented. In contrast, the effects of a shock when fiscal space is more ample are muted (dashed line in the Figure), possibly indicating that countries with fiscal space can implement policies to mitigate the effects of shocks. There is not much evidence of stark differences in responses across states (high and low fiscal space) for inflation.

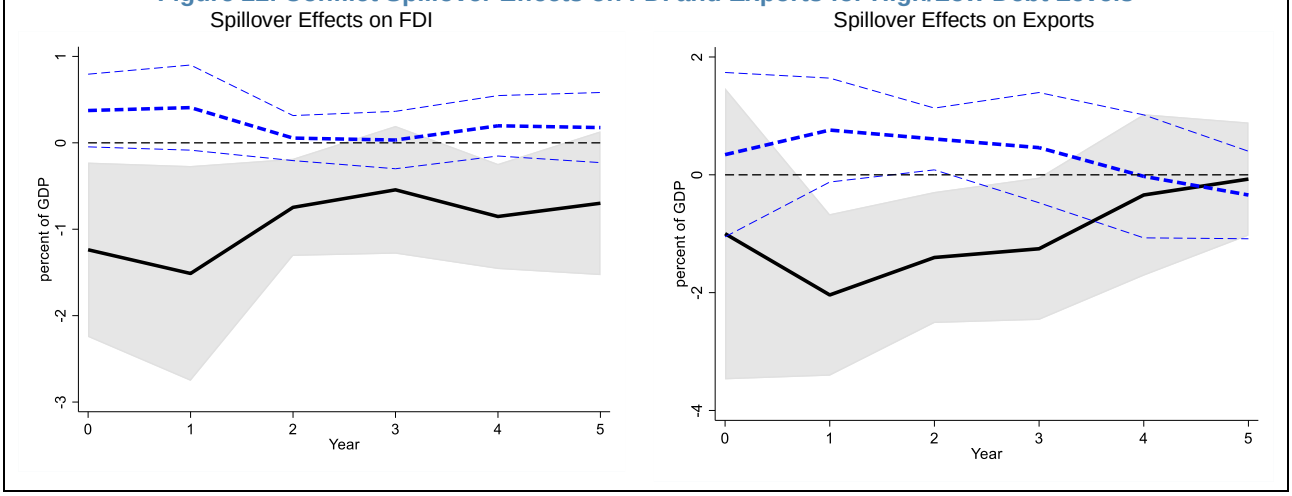
Figure 21. Conflict Spillover Effects on Growth and Inflation for High/Low Debt Levels



Note: Solid black line refers to impulse response for periods of high government debt. Shaded area shows the 90 percent confidence interval for Driscoll-Kraay (DK) standard errors. Dashed blue line refers to impulse response for periods of low government debt and 90 percent DK confidence interval.

Furthermore, impulse responses for external sector variables indicate that when debt levels are low, foreign direct investment presents a positive, but not statistically significant response to conflict spillover shocks (Figure 22). Nevertheless, when debt levels are high, FDI tends to present an economically important and statistically significant decline of more than one percent of GDP on impact, that persists up to three years after the shock. This may be evidence that the uncertainty channel of spillovers is amplified in contexts where fiscal space is reduced. In addition, the negative spillover effects on exports tend to be smaller (and not statistically significant) when debt levels are low. In contrast, for high debt levels, exports decline after a conflict shock and the decline is statistically significant one year after the shock, reaching close to 2 percent of GDP. The responses of other variables such as the imports to GDP ratio and the real exchange rate are not significantly different across states and is not reported here to save space.

Figure 22. Conflict Spillover Effects on FDI and Exports for High/Low Debt Levels

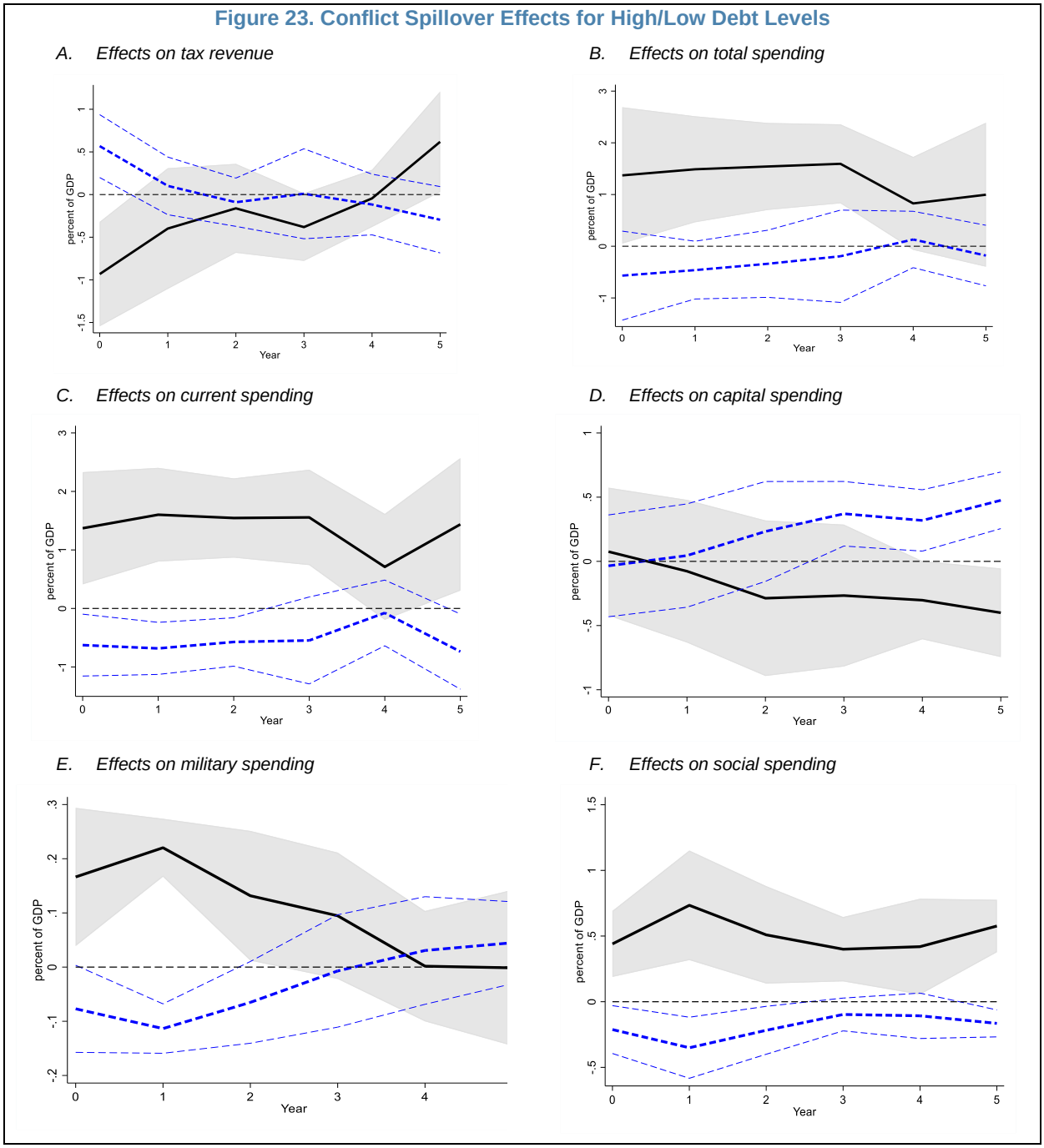


Note: Solid black line refers to impulse response for periods of high government debt. Shaded area shows the 90 percent confidence interval for Driscoll-Kraay (DK) standard errors. Dashed blue line refers to impulse response for periods of low government debt and 90 percent DK confidence interval.

Regarding the fiscal sector, Figure 23 shows that the spillover effects on tax revenue are only immediate, with taxes declining in countries with high debt and raising in countries with low debt. These effects become statistically not significant over time for the two groups of countries. On the contrary, an intensification of conflict in neighboring countries tends to be associated with an increase in total spending by up to 1.5 percent of GDP in the home countries with high debt levels, suggesting that home countries try to meet security and humanitarian needs even when faced with fiscal constraints. This increase in total spending is mostly driven by current spending, while capital spending tends to decline in countries with high debt levels.

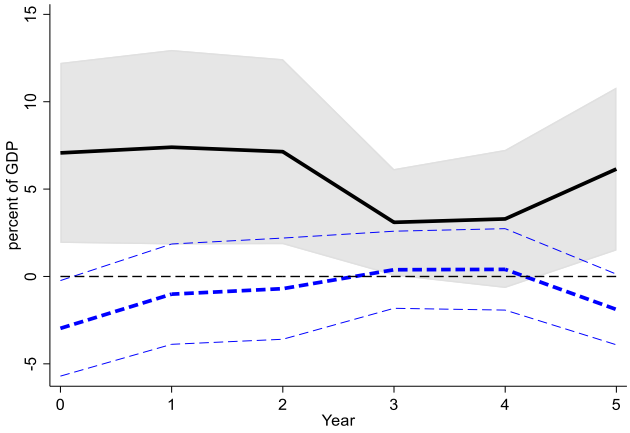
Interestingly, military spending tends to increase by 0.2 percent of GDP on impact in countries with high debt levels, while they decline by 0.1 percent of GDP in countries with low debt levels, but these effects vanish over time and become statistically insignificant. As for social spending, it increases by up to 0.5 percent of GDP in countries with high debt levels over the full time period, while declining slightly only in the first year in countries with low debt levels. As a result of higher spending, public debt increases by up to 7 percent of GDP in 5 years in countries with high debt levels, thus further worsening the fiscal constraints (Figure 24).

Figure 23. Conflict Spillover Effects for High/Low Debt Levels



Note: Solid black line refers to impulse response for periods of high government debt. Shaded area shows the 90 percent confidence interval for Driscoll-Kraay (DK) standard errors. Dashed blue line refers to impulse response for periods of low government debt and 90 percent DK confidence interval.

Figure 24. Conflict Spillover Effects on Public Debt for High/Low Debt Levels



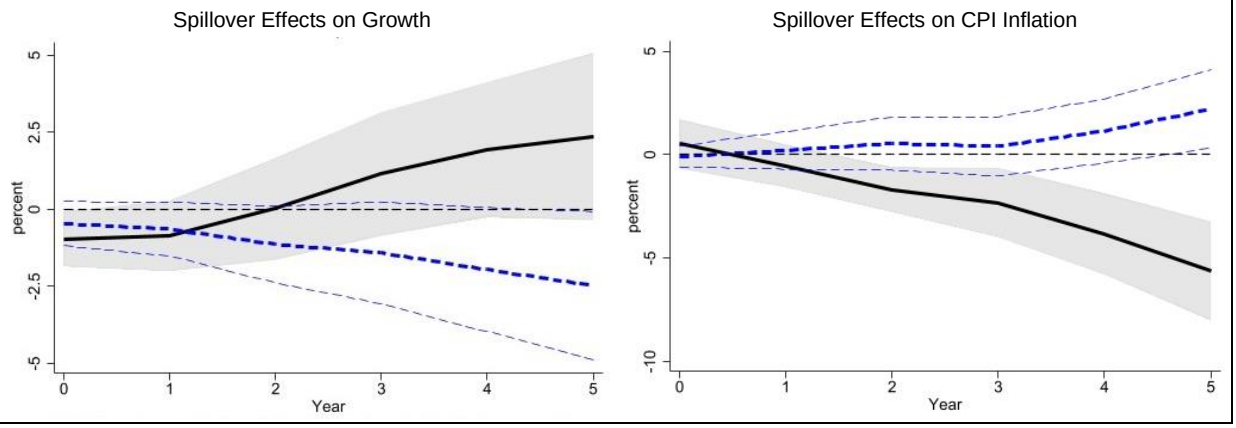
Note: Solid black line refers to impulse response for periods of high government debt. Shaded area shows the 90 percent confidence interval for Driscoll-Kraay (DK) standard errors. Dashed blue line refers to impulse response for periods of low government debt and 90 percent DK confidence interval.

5.3 The Role of Foreign Aid

We finally investigate whether the spillover effects also depend on the allocation of foreign aid to "home" countries. As an alternative source of financing, official development assistance is provided to developing countries to promote economic growth and help stabilize economies following economic shocks, by for example building infrastructure projects, supporting to productive sectors, and providing humanitarian assistance (including the provision of food and other essential commodities). In that context, foreign aid could help countries attenuate the spillover effects of conflicts from neighboring countries.

The impulse response for GDP growth (Figure 25) shows that the negative effect of a one standard deviation shock to the conflict spillover variable observed in the linear case (Figure 10) is mitigated along the simulation horizon in a context of high levels of foreign aid. More specifically, the effects on growth are similar in the short term but start to diverge in "year two" with more pronounced negative effects in low aid settings. Nonetheless, it is important to note that the results are only marginally significant. When it comes to inflation, akin to the impulse response for growth, the effects for the two states are similar on impact and diverge by "year two." While we observe an increase in CPI by 0.5 percent on impact in the linear case persisting for three years after the shock, inflation declines by up to 5 percent in high-aid settings by the end of the simulation horizon. This inflation reduction effect arguably due to the fact that foreign aid helps alleviate shortages of goods and improve domestic production, which is particularly important when neighboring trade partners are affected by conflict. Results for low levels of aid are not statistically significant.

Figure 25. Conflict Spillover Effects on Output and Inflation for High/Low Level of Foreign Aid



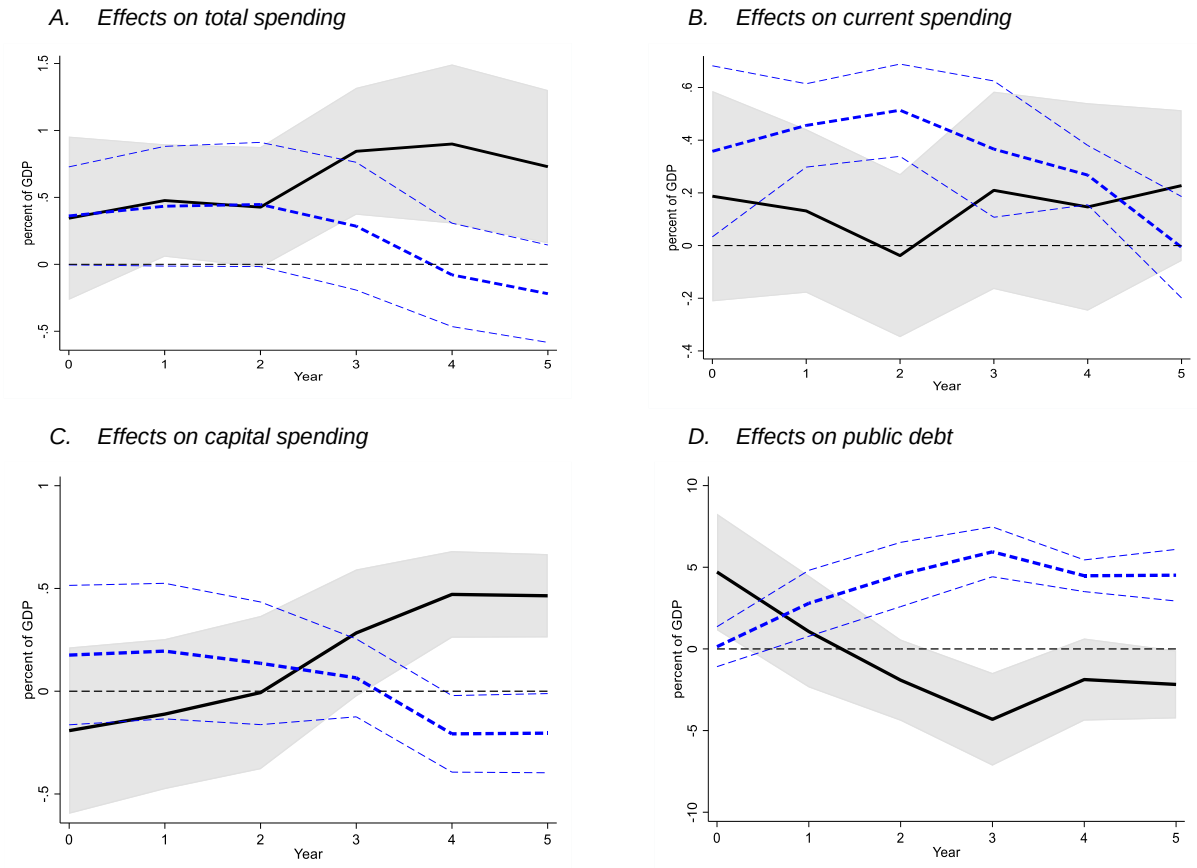
Note: Solid black line refers to impulse response for periods of high foreign aid. Shaded area shows the 90 percent confidence interval for Driscoll-Kraay (DK) standard errors. Dashed blue line refers to impulse response for periods of low government debt and 90 percent DK confidence interval.

Figure 26 presents the impulse responses of the fiscal variables depending on the level of foreign aid. The results show that the spillovers effects of conflicts on government spending and debt depend on the level of foreign aid received by the home countries. The Figure indicates that even if the effects on total spending are insignificant and similar in the two groups of countries during the first two years, they only remain positive and significant in the group of countries receiving high level of foreign aid from year 3 onwards. Total spending increases by 0.9 percent of GDP by year 4 in home countries receiving a high level of foreign aid, suggesting that the allocation of significant foreign assistance allowed these countries to increase their public spending to cope with the adverse spillover effects of conflict. This increase in total spending is driven by public investment as capital spending increases by about 0.5 percent of GDP by year 4 in these countries. In contrast, the effects on total spending are statistically insignificant throughout 5-year horizon in countries being allocated a low level of foreign aid. Current spending tends to increase by about 0.5 percent of GDP by year 2 in these countries receiving low levels of foreign assistance, but the effects fade away and become statistically insignificant over time.

We also find that the behavior of military spending does not seem to depend on the allocation of foreign aid as the effects of conflicts in neighboring countries are statically insignificant in the two groups of countries (see Annex Figure 4). This result could be due to the strategic and sovereign nature of the military sector and the fact that the military aid and promotion of donors' security interests are not considered as official development assistance. Regarding social spending (Annex Figure 4), the results are unexpected as it increases in countries receiving low foreign aid, while the effects are statistically insignificant in countries being allocated significant foreign aid.

Turning to the behavior of public debt, Figure 26 shows that it increases by about 5 percent of GDP in countries receiving low level of foreign aid by year 3 following the eruption of conflicts in neighboring countries and declines by around 4 percent of GDP in countries receiving significant foreign aid. In a nutshell, foreign aid allows home countries facing adverse spillover effects of conflicts in neighboring countries to increase their total public spending while containing debt vulnerabilities.

Figure 26. Conflict Spillover Effects for High/Low Foreign Aid



Note: Solid black line refers to impulse response for periods of high foreign aid. Shaded area shows the 90 percent confidence interval for Driscoll-Kraay (DK) standard errors. Dashed blue line refers to impulse response for periods of low government debt and 90 percent DK confidence interval.

6. Conclusions and Policy Implications

The analysis undertaken in this paper uncovered significant and persistent effects of conflict abroad on several macroeconomic variables in the "home" country. The impulse response functions show that a one standard deviation conflict spillover shock is associated with a decrease in GDP growth in the home country of about 0.5 percentage points on impact that remains significant after three years. Conflict spillovers also have negative and persistent effects on private investment. In addition, conflict spillover shocks are also linked to statistically significant increases in inflation, government spending (in particular current and social spending) and government debt, while an associated decrease in government revenues is not statistically significant. The increase in government spending (by about 0.4 percent of GDP after three years following a one standard deviation shock) could be caused by the use of policy buffers to respond to shocks.

Furthermore, the international trade transmission channel of conflict spillovers operates mostly through increased imports. While the effects of conflict spillovers on exports and on the real exchange rate are economically and statistically small, a one standard deviation conflict spillover shock is associated with an increase in imports by up to 0.8 percent of GDP within 3 to 4 years. Moreover, conflict spillovers have negative effects on FDI of about 0.3 percent of GDP after a year, which gradually wind-down over time.

The paper also explored the importance of state dependencies. The impulse responses obtained indicate that the negative effects of conflict spillovers on output are more pronounced in less effective governance settings and when fiscal space is relatively limited, while in higher governance settings and when fiscal space is more ample, the effects are attenuated. Foreign aid also seems to play a role, with more pronounced negative effects on growth in low aid settings over the medium-term. In addition, total government expenditures tend to increase by about one percent of GDP following spillover shocks in high government effectiveness settings, while they remain broadly constant in low governance settings. We also find that tax revenue declines persistently by up to 0.8 percent of GDP in low governance settings following a conflict spillover shock.

Overall, these findings entail a number of relevant policy implications. Firstly, the evidence points to the important role of fiscal space in attenuating the negative effects of spillovers on growth and therefore highlights the need for policy makers in the region to pursue fiscal strategies marked by prudence that allow for buffers that would permit to appropriately respond to conflict-related shocks. In addition, given the large estimated macroeconomic effects of spillover shocks (that go well beyond the country of "origin" of conflict events) and associated externalities, there is a rationale for a coordinated response across countries, including in areas such social spending, in particular in terms of public spending related to refugees and internally displaced people. In addition, the results suggest that the implementation of reforms to improve governance could contribute to mitigate the adverse spillover effects.

Furthermore, these externalities also provide a strong case to carveout space for spending on measures to prevent conflict in IMF-supported programs, in line with the IMF's Strategy for Fragile and Conflict-Affected (FCS) States (IMF, 2022), which stipulates the need for the IMF to help member countries in effectively implementing macro-fiscal and monetary policies to prevent conflict (for instance through targeted social protection programs) as well as to remain engaged in cases of active conflict to reduce stress on the population (e.g., by deploying low-level technical capacity development to keep central banks functioning or by providing safe payment corridors for proven low-risk remittances).

Finally, given the multilateral aspects of the problem at hand, there is a case for increased efforts by development partners and the international community to provide additional financing to implement policies aiming at attenuating conflict spillover effects. The evidence discussed in this paper quantifying the macroeconomic spillover effects of conflict relates directly to the debate around the need to support peace and stability as global public goods (Bousquet, 2023) and the role that the international community could play in ramping-up assistance and developing financing solutions to achieve this goal.

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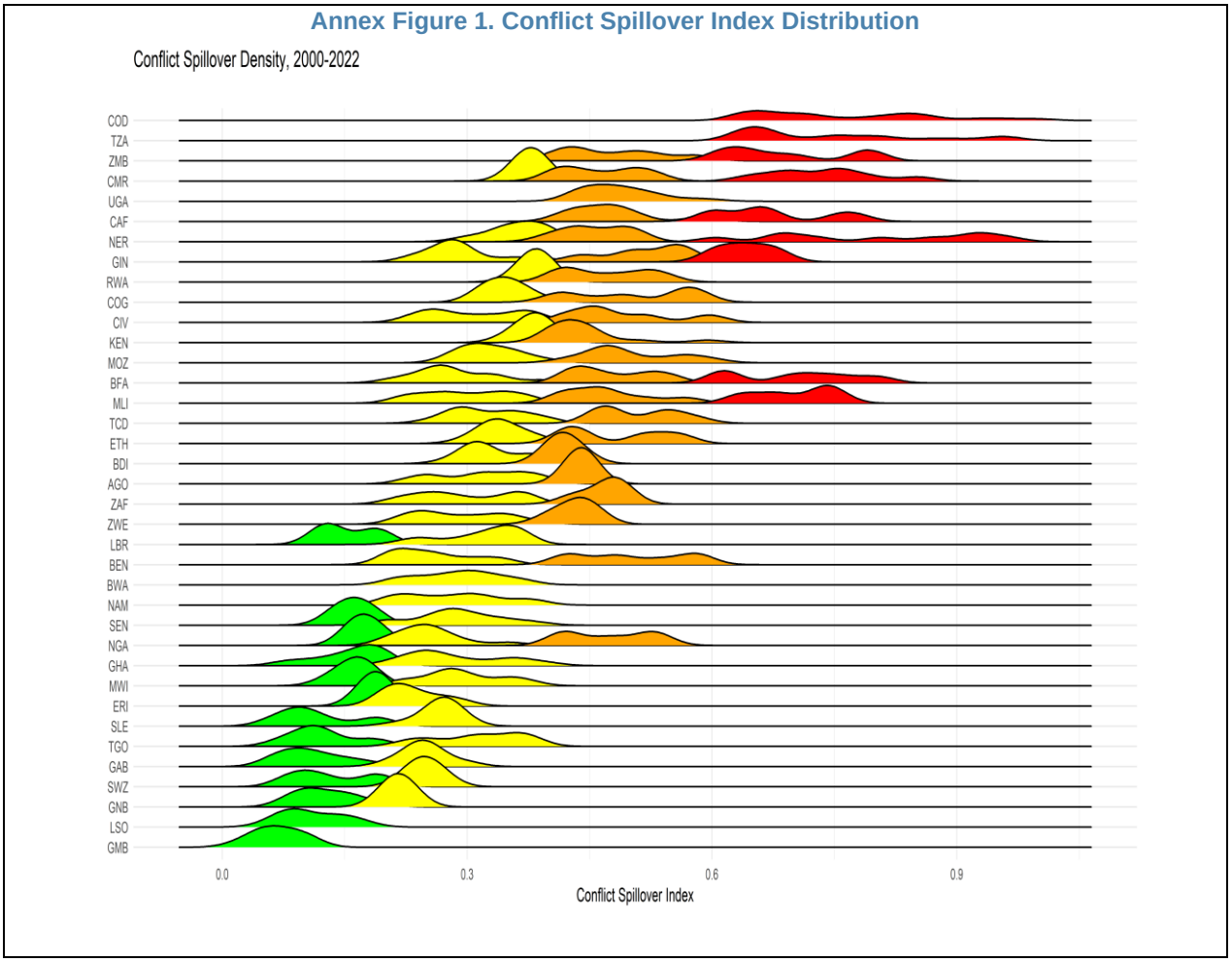
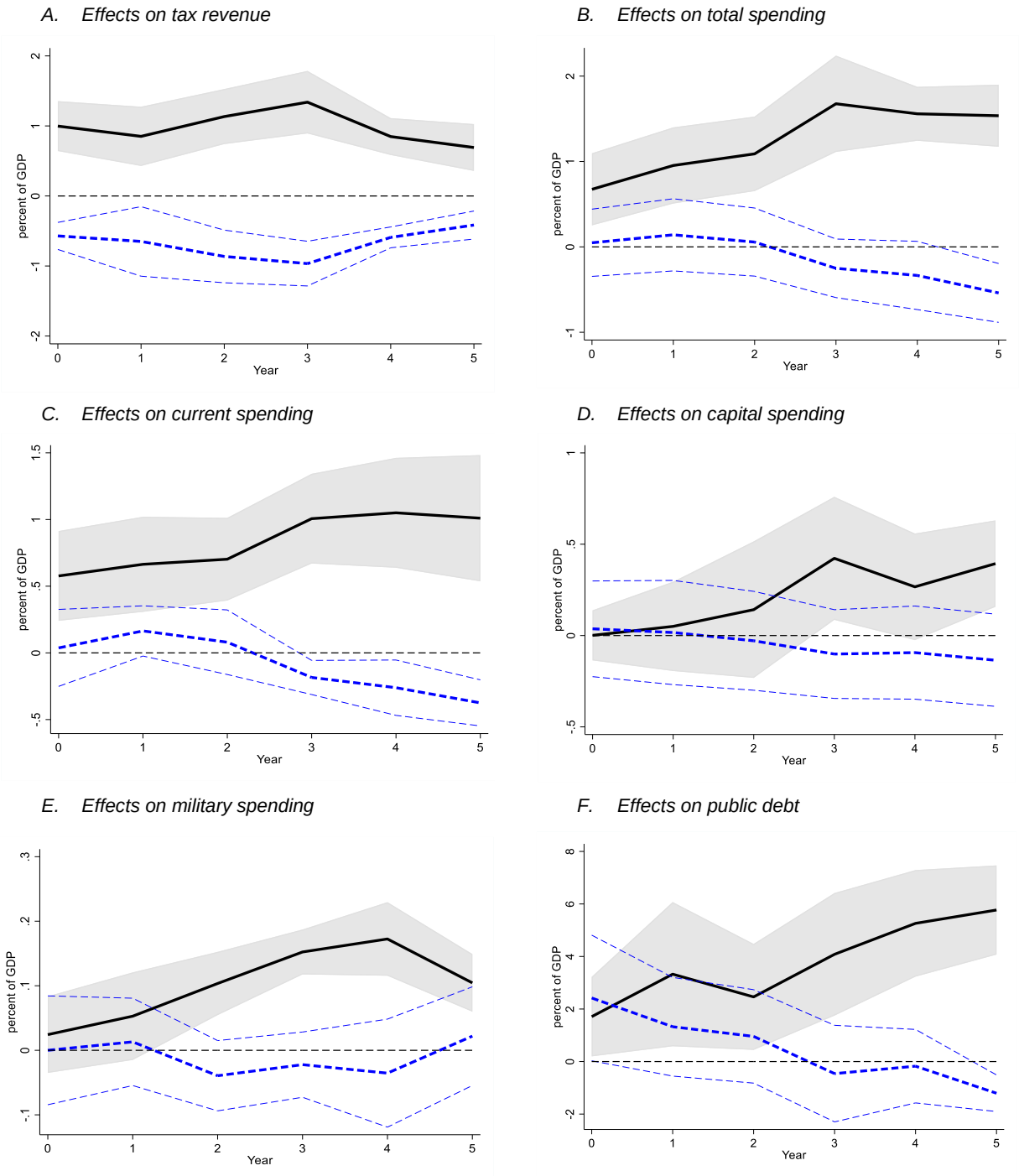
Annex

Annex Figure 1. Conflict Spillover Index Distribution

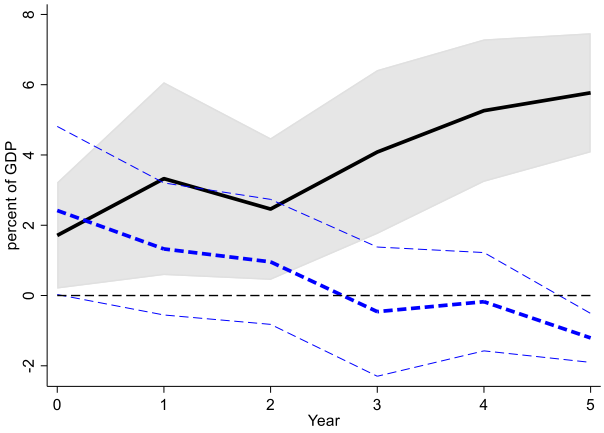


Annex Figure 2. Conflict Spillover Effects on the Fiscal Sector for High/Low Control of Corruption



Note: Solid black line refers to impulse response for periods of high control of corruption. Shaded area shows the 90 percent confidence interval for Driscoll-Kraay (DK) standard errors. Dashed blue line refers to impulse response for periods of low control of corruption and 90 percent DK confidence interval.

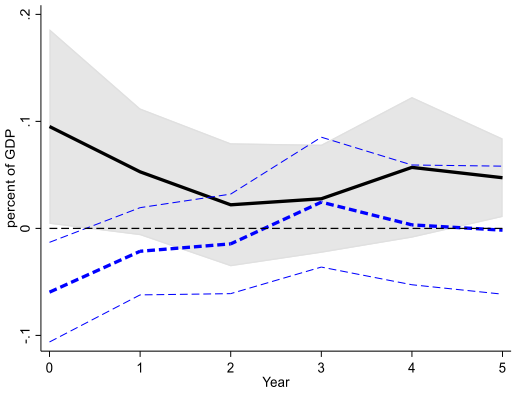
Annex Figure 3. Conflict Spillover Effects on Public Debt for High/Low Control of Corruption



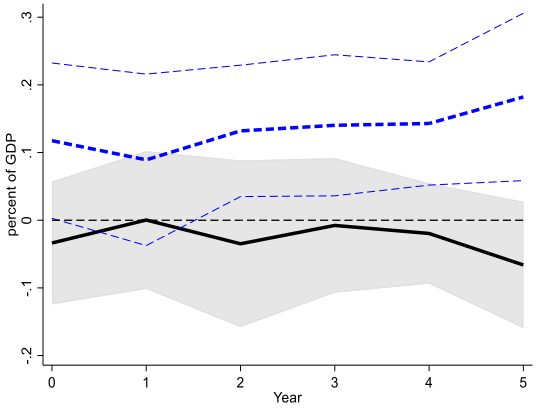
Note: Solid black line refers to impulse response for periods of high control of corruption. Shaded area shows the 90 percent confidence interval for Driscoll-Kraay (DK) standard errors. Dashed blue line refers to impulse response for periods of low control of corruption and 90 percent DK confidence interval.

Annex Figure 4. Conflict Spillover Effects for High/Low Foreign Aid

A. Effects on military spending



B. Effects on social spending



Annex Table 1. Data Sources

Indicator	Data source(s)
Macroeconomic indicators	
Gross domestic product	IMF World Economic Outlook (April 2023 vintage)
Inflation	World Bank Global Database on Inflation
Public debt	IMF World Economic Outlook (April 2023 vintage)
Government revenue	IMF World Economic Outlook (April 2023 vintage)
Military spending	World Bank's World Development Indicators and Stockholm International Peace Research Institute (SIPRI)
Terms of trade	IMF Commodity Terms of Trade Database, Gruss and Kebhaj. (2019).
Exports of goods and services	IMF World Economic Outlook (April 2023 vintage)
Imports of goods and services	IMF World Economic Outlook (April 2023 vintage)
FDI (% of GDP)	IMF World Economic Outlook (April 2023 vintage)
Real Effective Exchange Rate	IMF International Financial Statistics database
Foreign aid (% of GDP)	World Bank's World Development Indicators
Structural indicators	
Government effectiveness	Kaufmann and Kraay (2023). Worldwide Governance Indicators, 2023 Update (www.govindicators.org).
Control of Corruption	Kaufmann and Kraay (2023). Worldwide Governance Indicators, 2023 Update (www.govindicators.org).
Other indicators	
Conflict data	Armed Conflict Location and Event Data Project (ACLED)
CBOE VIX Volatility Index	Bloomberg Professional Services
Oil prices	IMF World Economic Outlook (April 2023 vintage; simple average of Dated Brent, West Texas Intermediate, and Dubai Fateh crude oil spot prices)
US 3-month T-bill rate	United States Federal Reserve Bank of St. Louis

PUBLICATIONS

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