

This Online Annex to Chapter 3 of the April 2026 World Economic Outlook lays out the data sources, sample coverage, variable definitions and methodologies used in the main chapter. The Online Annex follows the structure of the chapter.

Online Annex 3.1. Data Sources, Sample Coverage, and Variable Definitions

The analysis in the chapter covers a broad sample of advanced economies and emerging market and developing economies over the 1946–2024 period. The detailed list of data sources is presented in Online Annex Table 3.1.1 and the sample of economies used in analytical exercises is presented in Online Annex Table 3.1.2.

Conflict Data

The primary source for the conflict list is the Uppsala Conflict Data Program and Peace Research Institute Oslo (UCDP/PRIO) Armed Conflict Dataset, which covers state-based conflicts with at least 25 battle-related deaths over the period 1946–2024. Conflicts are classified as interstate (between states), intrastate (including civil conflicts), intrastate with foreign intervention, and extrasystemic (such as colonial conflicts). For each conflict-year in which a conflict is active, intensity is recorded as either *minor* (25–999 battle-related deaths) or *major* (1,000 or more battle-related deaths). The dataset further reports the two main sides of each conflict, as well as parties providing support to either side. Although a conflict location is reported, it does not always correspond to the precise geographic areas where hostilities occurred.¹ For the analysis in this chapter, large language models (LLMs), complemented by manual review, are used to achieve three primary objectives.

First, given the chapter’s interest in accurately distinguishing conflict-site economies from belligerents, LLMs are used to identify the precise geographic location of each conflict event.² Participants in a conflict—either as primary parties or as supporters—that do not experience conflict on their own territory are classified as belligerents.

¹ In the database, the reported location corresponds to the government side of the conflict rather than to the geographic area in which hostilities took place (Pettersson 2025). For example, in the conflict between the Government of Egypt and the Government of the United Kingdom over the Suez Canal in 1951–52, the location is recorded as “Egypt, United Kingdom.”

² For each conflict-year, the following question was posed to ChatGPT version 4.1 with a temperature setting of 0.3 (for more focused and factual answers): “You are an expert in history and geography. You will be given a description of a conflict between two parties in a given year. Reply whether the provided location of the conflict is geographically accurate (the events or battles took place on the country’s soil). Provide information only for the exact year asked, even if the conflict lasted over several years. Sometimes you will be given several countries for location, provide information for each of them. Provide additional comments to justify your answer. Example: In the conflict between the Government of Egypt and the Government of United Kingdom over Suez in 1951 is the following geographical location of the conflict accurate: Egypt, United Kingdom?” The responses from ChatGPT were further reviewed manually, verifying that location is based on modern-day country borders and that various cases (such as cross-border skirmishes or global anti-terrorist operations) are treated consistently. As a further check, the location was compared to the UCDP Georeferenced Event Database (GED) that has precise location data over 1989–24, focusing on state-based conflicts with at least 25 deaths in a given year—the match in locations reported in the annual UCDP/PRIO dataset and the GED dataset was improved by 5 percent. All in all, compared to the original UCDP/PRIO dataset, 11 percent of the location entries were modified to better reflect the actual geographical location of the conflict.

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Online Annex Table 3.1.1. Data Sources

Indicators	Sources
Conflict Data	
Yearly conflict incidence, intensity, duration, type (1946–2024)	UCDP/PRIO Armed Conflict Dataset, version 25.1 (Gleditsch and others 2002; Davies and others 2025)
Georeferenced yearly conflict incidence and battle-related deaths (1989–2024)	UCDP Georeferenced Event Dataset (GED) Global, version 25.1 (Sundberg and Melander 2013)
Yearly conflict incidence and type (1816–2007)	Correlates of War Non-State War data set, version 4.0; Intra-State War data set, version 5.1; Inter-State War data set, version 4.0, and Extra-State War data set, version 4.0 (Sarkees and Wayman 2010)
Battle-related deaths (1946–2008)	PRIO Battledaths Dataset, version 3.1 (Lacina and Gleditsch 2005)
Geopolitical Threats Index (GPRT)	Caldar and Iacoviello (2022)
UN peace missions	UN Peace Missions Mandates Dataset, Version 2.2 (Hellmüller, Pinaud, and Lanfranchi 2025)
Peacebuilding strategies	UCDP Peace Agreement Dataset, version 22.1 (Pettersson, Högbladh, and Öberg 2019)
Groups	
Neighboring countries	Geographic Distance Database (Pellegrino, Spolaore, and Wacziarg 2025)
Trading partners	CEPII, <i>TRADHIST</i> (Fouquin and Hugot 2016); International Monetary Fund, <i>International Trade in Goods (by partner country) (IMTS)</i>
Commodity exporters	World Bank, <i>World Integrated Trade Solution (WITS)</i>
Macroeconomic Data	
Real GDP, private and public consumption, investment, imports, exports; GDP deflator; consumer price index; government debt and tax revenue; exchange rate; gross national savings	Global Macro Database (Müller and others 2025); IMF, <i>World Economic Outlook</i> ; World Bank, <i>World Development Indicators</i>
Capital stock and total factor production (at constant national prices), employment	Penn World Table, version 11.0 (Feenstra, Inklaar, and Timmer 2015)
Population	Global Macro Database (Müller and others 2025); IMF, <i>World Economic Outlook</i> ; World Bank, <i>World Development Indicators</i> ; UN DESA, <i>World Population Prospects</i>
Defense spending	Getthin (2024); SIPRI Military Expenditure Database; and World Human Capital Expenditure Database (Bharti and others 2026)
Social spending	Getthin (2024)
Foreign direct investment liabilities; portfolio debt and other liabilities	External Wealth of Nations (Lane and Milesi-Ferretti 2018)
Reserve assets	IMF, <i>World Economic Outlook</i>
Official development assistance (ODA)	OECD, <i>DAC2A: Aid(ODA) disbursements to countries and region</i>
Personal remittances, received	World Bank, <i>World Development Indicators</i>
Refugees	Office of the United Nations High Commissioner for Refugees (UNHCR), <i>Refugee Population Statistics Database</i>
World Uncertainty Index	Ahir, Bloom, and Furceri (2022), updated
Informality (percent of GDP)	Medina and Schneider (2019)
Financial openness (Chinn-Ito Index)	Chinn and Ito (2006), updated
Debt restructurings	Horn, Reinhart, and Trebesch (2022)
IMF programs	IMF, <i>Fund Arrangements since 1952</i>
Count of participants in IMF training programs	IMF, <i>Participant and Applicant Tracking System (PATS)</i>
Banking crisis, sovereign debt crisis, currency crisis	Global Macro Database (Müller and others 2025)
Natural disasters	Emergency Events Database (EM-DAT) (Delforge and others 2025)
Worldwide Governance Indicators	World Bank, <i>World Development Indicators</i>
State capacity, corruption, and ownership	V-Dem (Coppedge and others 2025)
Micro-Level Data	
Individual survey of health outcomes among older individuals	Gateway to Global Aging; national household surveys (for further details, see IMF <i>World Economic Outlook</i> April 2025 Chapter 2)
Development project outcomes	Honig, Lall, and Parks (2022)
Geocoded aid-funded development projects	Bomprezzi and others (2025)
Subnational nightlights intensity	Li and others (2020), updated
Subnational corruption	Crombach and Smits (2024)
Refugees' return intentions	United Nations High Commissioner for Refugees (UNHCR) intention surveys for Nigerian refugees in the Diffa region in Niger (surveyed in August–September 2021), Ukrainians' refugees in Europe (August 2024), and South Sudanese's refugees in Uganda and Ethiopia (July 2022).
Firm-level data on capital, labor, total factor production, and other firm-level covariates	Orbis

Source: IMF staff compilation.

Second, to complement the information available in the UCDP/PRIO state-based conflict dataset, text analysis is used to identify non-state and one-sided conflicts, for which systematic data coverage in the UCDP Georeferenced Event Database (GED) begins only in 1989 (see Sundberg and Melander 2013). Following Sundberg and Melander (2013), non-state conflicts are defined as the use of armed force or violence between two organized armed groups within a country, neither of which is the government of a state, while one-sided conflicts are defined as the use of armed force or violence by a government or an organized group against civilians. Annual reports of the United Nations Security Council covering the period 1946–2024 are processed using LLMs (GPT-5.1 Pro, which offers faster processing, higher-accuracy retrieval, and improved multi-hop reasoning for large documents) to systematically extract references to organized violence involving non-state actors and violence against civilians. The extracted information includes the country of occurrence, timing, associated fatalities (when available), and a brief description of each incident. Model outputs are subsequently reviewed and validated through manual checks to ensure consistency with standard UCDP data and definitions and to minimize classification errors.

CHAPTER 3 THE MACROECONOMICS OF CONFLICTS AND RECOVERY

Online Annex Table 3.1.2. Sample of Economies Included in Analytical Exercises

List of Economies by Exercise

Macroeconomic Dynamics Before and After Wars End

AEs: Andorra; Australia; Austria; Belgium; Canada; Croatia (1991*, 1993*); Cyprus (1955*, 1960*, 1974*, 1975*); Czech Republic; Denmark; Estonia (1949*); Finland; France; Germany; Greece (1950*); Iceland; Ireland; Israel; Italy; Japan; Korea (1954*); Latvia; Liechtenstein; Lithuania; Luxembourg; Malta; Netherlands; New Zealand; Norway; Portugal; Puerto Rico; San Marino; Singapore; Slovak Republic; Slovenia; Spain (1978*, 1992*); Sweden; Switzerland; United Kingdom (1971*, 1992*, 1998*, 1999*); United States (2001*, 2002*).

EMEs: Albania; Algeria (1954*, 1964*, 1991*); Angola (1961*, 2003*); Antigua and Barbuda; Argentina (1955*, 1956*, 1963*, 1964*, 1974*, 1978*); Armenia (1990*, 1992*); Aruba; Azerbaijan (1990*, 1999*, 2005*); Bahamas, The; Bahrain; Barbados; Belarus; Belize; Bolivia (1953*, 1967*, 1968*); Bosnia and Herzegovina (1992*, 1996*); Botswana; Brazil; Brunei Darussalam; Bulgaria; Cabo Verde; Chile (1973*, 1974*); China (1963*, 1969*, 1970*, 1980*, 1988*, 2020*); Colombia (1964*); Costa Rica (1949*); Dominica; Dominican Republic (1965*, 1966*); Ecuador (1995*, 1996*); Egypt (1951*, 1957*, 1967*, 1974*, 1993*, 1999*, 2014*); El Salvador (1969*, 1973*, 1979*, 1992*); Equatorial Guinea; Eswatini; Fiji; Gabon; Georgia (1991*, 1994*); Grenada; Guatemala (1955*, 1963*, 1996*); Guyana; Hungary (1956*, 1957*); India (1952*, 1962*, 1972*, 1983*); Indonesia (1962*, 1975*, 2006*); Iran (1947*, 1966*, 1969*, 1974*, 1997*, 2016*, 2019*); Iraq (1961*, 1997*, 2003*, 2004*); Jamaica; Jordan (1950*, 1967*, 1968*); Kazakhstan; Kosovo (1998*, 2000*); Kuwait (1990*, 1992*); Lebanon (1950*, 1958*, 1959*, 1975*, 1977*, 1982*, 2001*, 2006*, 2007*, 2023*); Libya (2011*); Malaysia (1967*, 1974*, 1976*, 1981*, 1982*); Maldives; Marshall Islands; Mauritius; Mexico; Micronesia; Mongolia; Montenegro, Rep. of; Morocco (1953*, 1964*, 1975*, 1990*); Namibia (1966*, 1990*); Nauru; North Macedonia; Oman (1957*, 1958*, 1969*, 1976*); Pakistan (1949*, 1965*, 1966*, 1971*, 1978*, 1990*); Palau; Panama (1989*, 1990*); Paraguay (1948*, 1954*, 1955*, 1989*, 1990*); Peru (1965*, 1966*, 1982*, 2000*, 2007*, 2011*); Philippines (1955*, 1969*); Poland; Qatar; Romania (1989*, 1990*); Russia (1969*, 1970*, 1994*, 2008*, 2015*); Samoa; Saudi Arabia; Serbia (1991*, 1993*, 1998*, 2000*); Seychelles; South Africa (1966*, 1990*); Sri Lanka (1971*, 1972*, 1984*, 2010*); St. Kitts and Nevis; St. Lucia; St. Vincent and the Grenadines; Suriname (1987*, 1988*); Syria (1950*, 1966*, 1968*, 1973*, 1974*, 1979*, 1983*, 2011*); Thailand (1951*, 1952*, 1974*, 1983*, 2003*); Tonga; Trinidad and Tobago (1990*, 1991*); Tunisia (1953*, 1957*, 1980*, 1981*, 2013*, 2016*); Turkmenistan; Tuvalu; Türkiye (1984*); Ukraine (1951*, 2014*); United Arab Emirates; Uruguay; Vanuatu; Venezuela; Vietnam (1988*); West Bank and Gaza.

LICs: Afghanistan (1978*); Bangladesh (1971*, 1992*); Benin (2022*); Bhutan; Burkina Faso (1987*, 1988*, 2018*); Burundi (1965*, 1966*, 1991*, 2009*, 2014*); Cambodia (1954*, 1967*, 1999*); Cameroon (1957*, 1960*, 1996*, 1997*, 2015*); Central African Republic (2001*); Chad (1966*); Comoros; Congo, Democratic Republic of the (1960*, 1968*, 1977*, 1979*, 1996*); Congo, Republic of (1993*, 2003*, 2016*, 2017*); Côte d'Ivoire (2002*, 2005*, 2011*, 2012*); Djibouti (1991*, 2000*); Eritrea (1964*, 1992*, 1998*, 2001*, 2016*, 2017*); Ethiopia (1960*, 1992*, 1998*, 2001*, 2016*); Gambia, The; Ghana (1966*, 1967*, 1981*, 1984*); Guinea; Guinea-Bissau (1963*, 1974*, 1998*, 2000*); Haiti (1989*, 1992*, 2004*, 2005*, 2024*); Honduras (1969*, 1970*); Kenya (1952*, 1957*, 2015*); Kiribati; Kyrgyz Republic; Lao P.D.R. (1954*, 1959*, 1974*, 1989*, 1991*); Lesotho (1998*, 1999*); Liberia (1980*, 1981*, 1989*, 1991*, 2000*, 2004*); Madagascar (1948*); Malawi (1990*, 1995*, 2007*); Mauritania (1957*, 1959*, 1975*, 1979*); Moldova (1992*, 1993*); Mozambique (1964*, 1993*, 2013*); Myanmar (1995*, 2013*); Nepal (1960*, 1963*, 1996*, 2007*); Nicaragua (1977*, 1991*); Niger (1991*, 1998*, 2007*, 2009*, 2021*); Nigeria (1966*, 1971*, 1996*, 1997*, 2009*); Papua New Guinea (1990*, 1997*); Rwanda (1990*, 2001*, 2009*, 2010*, 2019*); Senegal; Sierra Leone (1991*, 2002*); Solomon Islands; Somalia (1982*); South Sudan (2011*); Sudan (1963*, 1977*, 1983*); São Tomé and Príncipe; Tajikistan (1992*, 2001*, 2010*, 2012*); Tanzania (1978*, 1979*); Timor-Leste (1975*, 2000*); Togo; Uganda (1971*, 2017*); Uzbekistan; Yemen (1949*, 1962*, 1973*, 1979*, 1983*, 2009*); Zambia; Zimbabwe (1967*, 1980*).

Postconflict Recovery Analysis

AEs: Croatia; Cyprus; Estonia; Greece; Korea.

EMEs: Algeria; Angola; Argentina; Armenia; Azerbaijan; Bolivia; Bosnia and Herzegovina; Chile; China; Costa Rica; Dominican Republic; Ecuador; Egypt; El Salvador; Georgia; Guatemala; Hungary; India; Indonesia; Iran; Iraq; Jordan; Kosovo; Kuwait; Lebanon; Malaysia; Morocco; Namibia; Oman; Pakistan; Panama; Paraguay; Peru; Philippines; Romania; Russia; Serbia; South Africa; Sri Lanka; Suriname; Syria; Thailand; Trinidad and Tobago; Tunisia; Ukraine; Vietnam.

LICs: Bangladesh; Burkina Faso; Burundi; Cambodia; Cameroon; Congo, Democratic Republic of the; Congo, Republic of; Côte d'Ivoire; Djibouti; Eritrea; Ethiopia; Ghana; Guinea-Bissau; Haiti; Honduras; Kenya; Lao P.D.R.; Lesotho; Liberia; Madagascar; Mali; Mauritania; Moldova; Mozambique; Myanmar; Nepal; Nicaragua; Niger; Nigeria; Papua New Guinea; Rwanda; Sierra Leone; Sudan; Tajikistan; Tanzania; Timor-Leste; Uganda; Yemen; Zimbabwe.

Long-Term Scarring Effects of Wars on Individuals

AEs: Austria; Belgium; Croatia; Cyprus; Czech Republic; Denmark; Estonia; Finland; France; Germany; Greece; Ireland; Israel; Italy; Japan; Korea; Latvia; Lithuania; Luxembourg; Malta; Netherlands; Portugal; Slovak Republic; Slovenia; Spain; Sweden; Switzerland; United Kingdom; United States.

EMEs: Brazil; Bulgaria; China; Costa Rica; Hungary; India; Malaysia; Mexico; Poland; Romania; South Africa; Thailand.

Project Outcome Analysis

AEs: Croatia; Cyprus; Czech Republic; Estonia; Finland; Greece; Iceland; Ireland; Israel; Korea; Latvia; Lithuania; New Zealand; Portugal; Singapore; Slovak Republic; Slovenia; Spain.

EMEs: Albania; Algeria; Angola; Antigua and Barbuda; Argentina; Armenia; Azerbaijan; Bahamas, The; Barbados; Belarus; Belize; Bolivia; Bosnia and Herzegovina; Botswana; Brazil; Bulgaria; Cabo Verde; Chile; China; Costa Rica; Dominica; Dominican Republic; Ecuador; Egypt; El Salvador; Equatorial Guinea; Eswatini; Fiji; Gabon; Georgia; Grenada; Guatemala; Guyana; Hungary; India; Indonesia; Iran; Iraq; Jamaica; Jordan; Kazakhstan; Kosovo; Lebanon; Malaysia; Maldives; Marshall Islands; Mauritius; Mexico; Micronesia; Mongolia; Montenegro, Rep. of; Morocco; Namibia; Nauru; North Macedonia; Oman; Pakistan; Palau; Panama; Paraguay; Peru; Poland; Romania; Russia; Samoa; Serbia; Seychelles; South Africa; Sri Lanka; St. Kitts and Nevis; St. Lucia; St. Vincent and the Grenadines; Suriname; Syria; Thailand; Tonga; Trinidad and Tobago; Tunisia; Turkmenistan; Tuvalu; Türkiye; Ukraine; Uruguay; Vanuatu; Venezuela; Vietnam; West Bank and Gaza.

LICs: Afghanistan; Bangladesh; Benin; Bhutan; Burkina Faso; Burundi; Cambodia; Cameroon; Central African Republic; Chad; Comoros; Congo, Democratic Republic of the; Congo, Republic of; Côte d'Ivoire; Djibouti; Eritrea; Ethiopia; Gambia, The; Ghana; Guinea; Guinea-Bissau; Haiti; Honduras; Kenya; Kiribati; Kyrgyz Republic; Lao P.D.R.; Lesotho; Liberia; Madagascar; Malawi; Mali; Mauritania; Moldova; Mozambique; Myanmar; Nepal; Nicaragua; Niger; Nigeria; Papua New Guinea; Rwanda; Senegal; Sierra Leone; Solomon Islands; Somalia; South Sudan; Sudan; São Tomé and Príncipe; Tajikistan; Tanzania; Timor-Leste; Togo; Uganda; Uzbekistan; Yemen; Zambia; Zimbabwe.

Subnational Analysis

AEs: Croatia; Estonia; Latvia; Lithuania; Slovenia.

EMEs: Albania; Algeria; Angola; Argentina; Azerbaijan; Belarus; Bolivia; Bosnia and Herzegovina; Botswana; Brazil; Bulgaria; Chile; China; Colombia; Costa Rica; Dominican Republic; Ecuador; Egypt; El Salvador; Equatorial Guinea; Eswatini; Fiji; Gabon; Georgia; Guatemala; Guyana; Hungary; India; Indonesia; Iran; Iraq; Jordan; Kazakhstan; Lebanon; Malaysia; Mexico; Mongolia; Morocco; Namibia; Oman; Pakistan; Panama; Paraguay; Peru; Philippines; Romania; Russia; Samoa; Serbia; South Africa; Sri Lanka; Suriname; Syria; Thailand; Tunisia; Türkiye; Ukraine; Uruguay; Vanuatu; Venezuela; Vietnam; West Bank and Gaza.

LICs: Afghanistan; Bangladesh; Benin; Bhutan; Burkina Faso; Burundi; Cambodia; Cameroon; Central African Republic; Chad; Congo, Democratic Republic of the; Congo, Republic of; Côte d'Ivoire; Djibouti; Eritrea; Ethiopia; Gambia, The; Ghana; Guinea; Guinea-Bissau; Haiti; Honduras; Kenya; Kyrgyz Republic; Lao P.D.R.; Liberia; Madagascar; Malawi; Mali; Mauritania; Mozambique; Myanmar; Nepal; Nicaragua; Niger; Nigeria; Papua New Guinea; Rwanda; Senegal; Sierra Leone; Solomon Islands; Somalia; Sudan; São Tomé and Príncipe; Tajikistan; Tanzania; Timor-Leste; Togo; Uganda; Uzbekistan; Yemen; Zambia; Zimbabwe.

Firm-Level Analysis

AEs: Croatia; Israel.

EMEs: Algeria; Argentina; Armenia; Brazil; Colombia; Ecuador; Egypt; El Salvador; India; Iran; Iraq; Jordan; Kosovo; Kuwait; Lebanon; Mexico; Morocco; North Macedonia; Pakistan; Peru; Philippines; Russia; Saudi Arabia; Serbia; South Africa; Sri Lanka; Syria; Thailand; Tunisia; Türkiye; Ukraine; Venezuela; West Bank and Gaza.

LICs: Afghanistan; Bangladesh; Burkina Faso; Congo, Democratic Republic of the; Congo, Republic of; Côte d'Ivoire; Ethiopia; Honduras; Kenya; Liberia; Mali; Myanmar; Nepal; Nigeria; Sudan; Uganda; Uzbekistan.

Source: IMF staff compilation.

Note: * indicates conflict onset (the first year when a country becomes a conflict-site as long as the preceding five years were without conflict, see Online Annex 3.2 for further details); ^ indicates the first year of nonfragile peace (the first year of peace as long as all of the five years following conflict termination remain conflict-free, see Online Annexes 3.4 for further details). AEs = advanced economies; EMEs = emerging market economies; LICs = low-income countries.

Third, given the chapter's focus on macroeconomic dynamics during and after conflicts, the combined sample constructed through the process described above is further restricted to exclude episodes unlikely to generate economy-wide effects—such as isolated skirmishes, terrorist attacks, or highly fragmented violence with low casualty counts—based on a systematic

reading and coding of individual conflicts.³ This approach is broadly consistent with practices in the literature, which often focus on major conflicts defined by casualty thresholds (see, for example, Benmelech and Monteiro 2025; Federle and others 2026). At the same time, it allows for the inclusion of conflicts that may appear marginal based on casualties alone but are nonetheless sufficiently severe to generate sizable macroeconomic effects. Nonetheless, regression results based on the entire sample of conflicts are reported in the following Online Annex 3.2 (Table 3.2.1, column 8).

For the analysis in the chapter, the assembled conflict-level data are transformed into a country-year panel in which an indicator variable takes the value of one if a conflict occurs on a country’s territory (the “conflict site”) in a given year, and zero otherwise. Online Annex Table 3.1.3 illustrates this mapping. Separate indicators are constructed for major, minor, between states, and within states conflicts.

Belligerent countries are also treated analogously. To analyze spillover effects of conflict on third countries, the chapter examines conflict exposure through geographic proximity (land border) and trade linkages. To capture exposure through trade linkages, the share of imports from conflict-site economies in total imports is first computed for each country-year. A country is then classified as exposed through trade if this share exceeds the 90th percentile of the sample distribution.

Additional conflict-related datasets are used to supplement specific parts of the analysis, including UCDP Georeferenced Event Database (GED), PRIO Battledeaths Dataset. When the best estimate of the number of deaths is unavailable in the GED, the average of the low and high estimates is used and rounded to the nearest whole number.

Macroeconomic Data

The primary sources of macroeconomic data are the Global Macro Database (Müller and others 2025), the IMF’s World Economic Outlook database (October 2025 vintage), the World Bank’s World Development Indicators database, and the Penn World Table. When the same concept is available from multiple sources, data are combined to improve country and year coverage. Series are reviewed to eliminate structural breaks, and for most variables only the most recent continuous vintage is used to minimize data gaps.

When comparing the magnitudes of the impacts of different shocks on output (Figure 3.4), data on financial crises are drawn from the Global Macro Database, while data on natural disasters are taken from the EM-DAT database. A country is considered to have experienced a major natural disaster when the share of people killed, expressed as a percentage of the population,

Online Annex Table 3.1.3. Example of Mapping Between Conflict-Level Data to Country-Year Panel

Year	Separate Conflict IDs					Combined	
	13219	13243	13246	13247	13306	All Conflict	Major Conflict
2014	Minor		Major	Major	Major	1	1
2015					Major	1	1
2016					Minor	1	0
2017					Minor	1	0
2018					Minor	1	0
2019					Minor	1	0
2020					Minor	1	0
2021					Minor	1	0
2022		Major			Minor	1	1
2023		Major				1	1
2024		Major				1	1

Sources: UCDP/PRIO Armed Conflict Dataset and IMF staff compilation.
 Note: The table shows how several conflicts from the UCDP/PRIO dataset are combined into a single time-series using, as an example, conflicts in which Ukraine is identified as a conflict site. “Minor” indicates conflicts with 25–999 battle-related deaths, “major” indicates conflicts with 1,000 and more battle-related deaths.

³ For each conflict, the following prompt was posed to ChatGPT (version 5.1) with a temperature setting of 0.3 to elicit focused and factual responses: “You are an expert in history and wars. You are given a description of a conflict, including information on participants, start and end year, and location. Provide a description of the conflict and indicate whether the conflict had a large impact on the economy.” Explanations of the reasons behind the classification were also extracted. The model outputs were manually reviewed for each conflict to verify accuracy and ensure consistency in classification across episodes. The final sample used in the analysis consists of 183 conflict episodes.

exceeds the 99th percentile of the distribution. Definitions of banking, currency, and debt crises follow standard dummy-variable classifications used in the literature. A banking crisis is defined as the convergence of significant financial distress (bank runs, insolvencies, or liquidations) and major policy interventions (bank rescues, closures, or freezes). A currency crisis is defined as a nominal depreciation of the currency vis-à-vis the U.S. dollar of at least 30 percent that is also at least 10 percentage points higher than the rate of depreciation in the year before. Finally, a country is considered to be in a sovereign debt crisis when it fails to meet its principal and/or interest payments on the due date and/or when it reschedules its debts with less favourable terms. Additional details on data sources and transformations are provided in the annexes corresponding to each empirical exercise.

Several datasets are used to conduct more granular analyses of post-conflict recovery dynamics at the micro-level. These include project-level performance ratings (Honig, Lall, and Parks 2023), geocoded aid data (Bomprezzi and others 2025), night-time lights intensity (Li and others 2020), subnational corruption measures (Crombach and Smits 2024), and firm-level data from Orbis. Additional details are provided in Online Annexes 3.6–3.8.

Online Annex 3.2. Macroeconomic Dynamics During Wars

The impact of conflict onset is estimated using a local projection difference-in-differences (LP-DiD) approach (Dube and others 2025). The approach combines local projections (Jordà 2005) with clean-control restrictions that limit the sample to observations that either experience conflict (treated units) or are unaffected by conflict (clean controls). These restrictions exclude observations that may still be subject to lingering effects from past conflict episodes, ensuring that they are not used as comparators in the regressions. Specifically, the following set of regressions is estimated:

$$\ln(y_{i,t+h}) - \ln(y_{i,t-1}) = \beta^h \text{Conflict Onset}_{i,t} + \delta^h \text{Controls}_{i,t} + \theta_t^h + \mu_i^h + \varepsilon_{i,t}^h, \\ \text{for } h = 0, \dots, 5$$

where the left hand side represents the cumulative growth of the dependent variable of interest for country i in year t and horizon h ; $\text{Conflict Onset}_{i,t}$ takes the value of one in the first year when a country becomes a conflict-site as long as the preceding five years were without conflict ($\Delta \text{Conflict}_{i,t} = 1$ & $\text{Conflict}_{i,t-j} = 0$ for $1 \leq j \leq L$, where $L = 5$), and zero otherwise; $\text{Controls}_{i,t}$ include three lags of the dependent variable of interest; θ_t^h are year fixed effects that control for time-specific shocks; μ_i^h are country fixed effects that control for all time-invariant country characteristics; and $\varepsilon_{i,t}^h$ is the error term (an alternative specification using the DiD notation where the country fixed effects are omitted has also been estimated and shows comparable results). The sample is restricted to observations that experience conflict onset and clean controls that are not affected by conflict within a five-year window ($\text{Conflict}_{i,t-j} = 0$ for $-h \leq j \leq L$, where $L = 5$). Robustness checks use a longer time window ($L = 10$). The regressions are estimated using all available data, with fewer observations available at higher horizons. The left-hand-side variables are winsorized at the 1st/99th percentiles to minimize the impact of outliers. In figures and tables, horizons $h = 0, \dots, 4$ are relabeled as 1, ..., 5.

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Column (1) of Online Annex Table 3.2.1 reports results from the baseline specification corresponding to panel 1 of Figure 3.4 in the main text. The remaining columns present robustness checks. Across all specifications, the results consistently show a negative impact of conflict onset on output, with magnitudes and signs broadly consistent with the baseline.

Column (2) estimates the cumulative effect of conflict over a 10-year horizon, maintaining the baseline definition of conflict onset (that is, no conflict in the preceding five years). Column (3) defines conflict onset using a 10-year window and excludes from the clean-control group observations exposed to conflict within that window. Columns (4) and (5) relax the clean-control restrictions and report results over 5- and 10-year horizons, respectively, while including additional lags of the conflict-onset indicator. Column (6) restricts the sample to conflicts lasting at least five consecutive years, and column (7) excludes conflicts motivated by economic considerations based on a narrative classification of conflicts' motives. Column (8) reports estimates using the full conflict sample rather than the chapter's reclassification. Columns (9) and (10) apply alternative conflict definitions based on battle-related deaths per capita, using thresholds of 50 and 100 deaths per million inhabitants, respectively, with onset defined as the first year in which the threshold is crossed following five years below it.

Online Annex Table 3.2.1. Impact of Conflict on Output: Baseline Estimate and Robustness Checks

	Longer Horizon		Without Clean Controls		Sample Selection			Battle-Deaths / Population		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
h = 1	-2.795 *** (0.599)	-2.739 *** (0.598)	-2.764 *** (0.644)	-2.963 *** (0.631)	-3.076 *** (0.664)	-1.437 * (0.797)	-2.565 *** (0.616)	-2.097 *** (0.518)	-4.937 *** (0.754)	-6.531 *** (0.855)
h = 2	-4.728 *** (0.834)	-4.981 *** (0.896)	-5.016 *** (0.988)	-4.863 *** (0.861)	-5.985 *** (1.106)	-5.383 *** (1.649)	-4.400 *** (0.866)	-3.751 *** (0.757)	-7.543 *** (1.082)	-9.938 *** (1.100)
h = 3	-5.578 *** (1.120)	-5.945 *** (1.222)	-6.525 *** (1.423)	-5.553 *** (1.053)	-8.005 *** (1.527)	-6.598 *** (2.066)	-5.316 *** (1.157)	-4.141 *** (1.000)	-9.088 *** (1.471)	-11.357 *** (1.580)
h = 4	-5.766 *** (1.360)	-6.211 *** (1.516)	-6.778 *** (1.652)	-5.622 *** (1.243)	-8.218 *** (1.724)	-7.289 *** (2.561)	-5.738 *** (1.437)	-4.108 *** (1.203)	-8.147 *** (1.641)	-10.924 *** (1.959)
h = 5	-6.659 *** (1.624)	-7.225 *** (1.829)	-7.875 *** (2.098)	-6.361 *** (1.481)	-9.327 *** (2.196)	-9.068 *** (3.025)	-6.716 *** (1.712)	-4.876 *** (1.467)	-8.717 *** (2.082)	-11.090 *** (2.524)
h = 6		-7.813 *** (2.079)	-8.668 *** (2.351)		-10.221 *** (2.439)					
h = 7		-8.756 *** (2.372)	-9.802 *** (2.686)		-11.067 *** (2.715)					
h = 8		-9.906 *** (2.688)	-11.044 *** (3.007)		-11.996 *** (2.961)					
h = 9		-10.779 *** (2.967)	-12.685 *** (3.318)		-13.476 *** (3.204)					
h = 10		-11.135 *** (3.245)	-14.250 *** (3.701)		-14.406 *** (3.336)					
Number of Observations	10,648	9,667	9,684	12,841	11,212	10,532	10,725	10,214	10,589	10,577
Number of Countries	191	191	191	194	194	191	191	189	192	192
Number of Conflict Onsets	160	149	125	158	106	44	148	196	118	100
R ²	0.28	0.28	0.29	0.24	0.25	0.28	0.27	0.27	0.28	0.29

Source: IMF staff calculations.

Note: The table presents local-projection difference-in-differences (LP-DID) estimates of the effect of conflict on output. The dependent variable is the cumulative change in output up to horizon h , where $h = 1$ corresponds to the year of conflict onset. The regressions control for three lags of the dependent variable and include country and year fixed effects. Column (1) reports the baseline estimate, while columns (2)–(10) present robustness checks using a longer horizon (columns 2–3), alternative clean-control restrictions (columns 4–5), alternative sample restrictions (columns 6–8), and alternative definitions of conflict (columns 9–10). The number of observations and R² are reported for $h = 1$. Standard errors, clustered at the country level, are reported in parentheses.

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Online Annex Table 3.2.2. Comparison to Other Shocks

	Conflict	Banking Crises	Currency Crises	Sovereign Debt	Natural Disasters
	(1)	(2)	(3)	(4)	(5)
h = 1	-2.795 *** (0.599)	-1.493 *** (0.341)	-1.157 *** (0.336)	-2.009 *** (0.384)	-1.659 * (0.893)
h = 2	-4.728 *** (0.834)	-2.379 *** (0.594)	-1.766 *** (0.584)	-3.311 *** (0.681)	-1.960 (1.477)
h = 3	-5.578 *** (1.120)	-2.683 *** (0.719)	-1.595 ** (0.793)	-3.193 *** (0.830)	-3.898 (2.576)
h = 4	-5.766 *** (1.360)	-3.377 *** (0.897)	-1.346 (1.007)	-3.214 *** (1.102)	-5.039 (3.173)
h = 5	-6.659 *** (1.624)	-3.301 *** (1.142)	-1.101 (1.154)	-4.358 *** (1.326)	-5.626 (3.634)
Number of Observations	10,648	10,828	10,074	10,994	12,924
Number of Countries	191	158	158	158	194
Number of Crisis Onsets	160	295	392	200	36
R ²	0.28	0.18	0.18	0.18	0.24

Source: IMF staff calculations.

Note: The table presents local-projection difference-in-differences (LP-DID) estimates of the effects of conflict and other shocks (banking, currency, and sovereign debt crises, as well as severe natural disasters) on output. The dependent variable is the cumulative change in output up to horizon h , where $h = 1$ corresponds to the year of conflict onset or the onset of other shocks. The regressions control for three lags of the dependent variable and include country and year fixed effects. Column (1) reports the baseline estimate of the effect of conflicts. Columns (2)–(5) report the effects of banking crises, currency crises, sovereign debt crises, and severe natural disasters, respectively. Definitions of banking, currency, and debt crises follow standard dummy-variable classifications used in the literature. Major natural disasters are identified when disaster-related deaths as a share of the population exceed the 99th percentile of the sample distribution. The number of observations and R² are reported for $h = 1$. Standard errors, clustered at the country level, are reported in parentheses.

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Online Annex Table 3.2.2 compares the baseline estimate of conflict onset with that of other shocks, as plotted in panel 2 of Figure 3.4 in the main text. All regressions are estimated using the same LP-DiD framework for comparability. The results indicate that estimated output costs from conflicts exceed those typically associated with economic crises—including banking, currency, or debt crises—as well as those induced by severe natural disasters.

Online Annex Table 3.2.3 examines heterogeneity in the effects of conflict by intensity, duration, and type, as reported in panel 3 of Figure 3.4 in the main text. The results show that conflict onset has a negative impact across all dimensions considered. Major conflicts generate the largest output losses. Minor conflicts have statistically significant effects at shorter horizons, which fade over time. Short conflicts tend to produce larger immediate impacts than longer conflicts. Conflicts between states generate initially large but less persistent effects, whereas conflicts within states are associated with more protracted output losses.

Online Annex Table 3.2.4 reports results corresponding to Figure 3.5 in the main text, which examines the impact of major conflicts on belligerent countries and third countries, defined based on geographic proximity and trade linkages. The results show that effects on belligerent countries are not statistically significant overall, while exposure through geographic proximity or trade linkages is associated with negative output effects in the first two years, which subsequently fade.

Online Annex Tables 3.2.5.A–D report estimates of the impact of major conflict onset on additional macroeconomic variables. Focusing on the expenditure components of real GDP (Online Annex Table 3.2.5.A and the corresponding panel 1 of Figure 3.6 in the main text), investment declines sharply following conflict onset and does not recover within five years. Private consumption also falls, while the effect on public consumption is not statistically significant. Both imports and exports contract, with exports experiencing larger decline.

Online Annex Table 3.2.5.B (corresponding panel 2 of Figure 3.6 in the main text) shows that government debt (expressed in real terms using the GDP deflator) tends to rise following conflict onset, particularly in the early years. The exports-to-imports ratio declines, reflecting a

Online Annex Table 3.2.3. Heterogeneity in the Output Effects of Conflict

	By Intensity						
	By Intensity			By Duration		By Type	
	All Conflict	Major	Minor	Short	Long	Between States	Within States
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
h = 1	-2.795 *** (0.599)	-4.500 *** (0.760)	-1.238 * (0.647)	-5.059 *** (1.155)	-1.306 ** (0.522)	-4.152 ** (1.932)	-2.441 *** (0.557)
h = 2	-4.728 *** (0.834)	-7.630 *** (1.252)	-1.538 * (0.901)	-6.220 *** (1.501)	-3.760 *** (0.890)	-4.922 ** (1.956)	-4.615 *** (0.872)
h = 3	-5.578 *** (1.120)	-8.708 *** (1.546)	-1.710 (1.269)	-6.777 *** (1.998)	-4.727 *** (1.281)	-4.207 * (2.153)	-5.805 *** (1.206)
h = 4	-5.766 *** (1.360)	-8.725 *** (1.802)	-1.753 (1.555)	-6.372 *** (2.163)	-5.235 *** (1.644)	-3.606 (2.186)	-6.109 *** (1.501)
h = 5	-6.659 *** (1.624)	-8.598 *** (2.304)	-2.380 (1.819)	-6.722 *** (2.393)	-6.479 *** (2.053)	-5.235 * (2.812)	-6.870 *** (1.789)
Number of Observations	10,648	12,062	10,585	10,551	10,585	10,519	10,625
Number of Countries	191	194	191	191	191	191	191
Number of Conflict Onsets	160	114	97	63	97	31	137
R ²	0.28	0.26	0.28	0.28	0.28	0.27	0.28

Source: IMF staff calculations.

Note: The table presents local-projection difference-in-differences (LP-DiD) estimates of the effect of conflict on output, reporting the baseline specification (column 1) and heterogeneity by conflict intensity (columns 2–3), duration (columns 4–5), and type (columns 6–7). The dependent variable is the cumulative change in output up to horizon h, where h = 1 corresponds to the year of conflict onset. The regressions control for three lags of the dependent variable and include country and year fixed effects. Major conflicts are defined as those involving 1,000 or more battle-related deaths, while minor conflicts involve 25–999 battle-related deaths. Short conflicts last up to two years, and long conflicts last more than two years. Between-state conflicts refer to interstate conflicts, while within-state conflicts include intrastate, intrastate with foreign intervention, and extrasystemic conflicts. The number of observations and R² are reported for h = 1. Standard errors, clustered at the country level, are reported in parentheses.

*** p < 0.01; ** p < 0.05; * p < 0.1.

Online Annex Table 3.2.4. Output Cost Spillovers from Conflicts

	Belligerent	Neighboring Countries	Trade Partners
	(1)	(2)	(3)
h = 1	-0.094 (0.361)	-1.165 *** (0.427)	-0.613 * (0.358)
h = 2	-0.044 (0.630)	-1.385 ** (0.667)	-1.071 * (0.577)
h = 3	-0.393 (0.774)	-1.068 (0.953)	-1.039 (0.855)
h = 4	-0.955 (0.897)	-1.000 (1.229)	-1.367 (1.075)
h = 5	-1.603 (1.174)	-1.154 (1.556)	-1.206 (1.298)
Number of Observations	10,362	9,299	6,918
Number of Countries	194	189	189
Number of Conflict Exposure Onsets	196	190	289
R ²	0.25	0.27	0.27

Source: IMF staff calculations.

Note: The table presents local-projection difference-in-differences (LP-DiD) estimates of the spillover effects of conflict on output for belligerent countries (column 1), neighboring countries (column 2), and trade partners (column 3). The dependent variable is the cumulative change in output up to horizon h, where h = 1 corresponds to the year of conflict onset. The regressions control for three lags of the dependent variable and include country and year fixed effects. Belligerent countries are defined as those that participate in a conflict without experiencing hostilities on their own territory. Neighboring countries are those sharing a land border with a conflict-site economy. Trade partners are defined as countries whose import share from conflict-site economies exceeds the 90th percentile of the distribution. The number of observations and R² are reported for h = 1. Standard errors, clustered at the country level, are reported in parentheses.

*** p < 0.01; ** p < 0.05; * p < 0.1.

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larger contraction in exports than in imports. As foreign exchange earnings from exports weaken, wartime governments tend to rely more on primary and secondary income flows: (i) personal remittances received (measured in U.S. dollars) increase, although the effect is not statistically significant; and (ii) official development assistance (ODA) rises, especially at longer horizons. At the same time, heightened uncertainty leads to capital outflows, with the stock of FDI liabilities (foreign-owned domestic investment) and portfolio debt liabilities declining after conflict onset.

Online Annex Table 3.2.5.A. Impact of Conflict on Demand-Side of Output

	Investment	Private Consumption	Public Consumption	Imports	Exports
	(1)	(2)	(3)	(4)	(5)
h = 1	-8.838 *** (2.300)	-4.182 *** (0.883)	2.091 (1.931)	-6.632 *** (1.968)	-11.772 *** (2.423)
h = 2	-12.190 *** (3.345)	-8.195 *** (1.890)	3.732 (2.718)	-8.822 *** (3.040)	-17.100 *** (3.206)
h = 3	-15.458 *** (4.055)	-10.076 *** (2.113)	3.432 (3.501)	-9.024 ** (4.070)	-16.630 *** (4.113)
h = 4	-17.207 *** (5.178)	-11.520 *** (2.322)	1.187 (4.391)	-11.139 ** (4.662)	-19.245 *** (5.077)
h = 5	-16.041 ** (6.791)	-12.714 *** (2.908)	-2.250 (5.354)	-12.745 ** (5.108)	-20.013 *** (6.199)
Number of Observations	9,973	6,858	6,958	10,216	10,252
Number of Countries	194	177	178	194	194
Number of Conflict Onsets	98	65	65	102	103
R ²	0.06	0.11	0.09	0.11	0.11

Source: IMF staff calculations.

Note: The table presents local-projection difference-in-differences (LP-DID) estimates of the effect of conflict on the demand-side components of output. The dependent variable is the cumulative change in each component up to horizon h, where h = 1 corresponds to the year of conflict onset. The regressions control for three lags of the dependent variable and include country and year fixed effects. The number of observations and R² are reported for h = 1. Standard errors, clustered at the country level, are reported in parentheses.

*** p < 0.01; ** p < 0.05; * p < 0.1.

Online Annex Table 3.2.5.C. External Sector (Continued) and Price-Level Vulnerabilities Following Conflict Onset

	Financial Openness (Change in index)	Exchange Rate (USD per Nat. Cur.)	Reserve Assets (USD)	CPI
	(1)	(2)	(3)	(4)
h = 1	-0.012 (0.010)	-4.664 *** (1.570)	-13.215 * (7.333)	1.252 (1.210)
h = 2	-0.031 ** (0.013)	-7.327 ** (2.957)	-26.509 *** (8.111)	8.789 *** (2.256)
h = 3	-0.046 ** (0.021)	-13.288 *** (4.787)	-26.813 ** (12.603)	15.170 *** (4.248)
h = 4	-0.036 (0.029)	-16.844 *** (6.445)	-31.643 (20.331)	23.386 *** (6.467)
h = 5	-0.033 (0.037)	-20.233 *** (7.575)	-36.405 (27.425)	32.673 *** (8.491)
Number of Observations	6,673	11,219	4,561	10,734
Number of Countries	179	191	184	193
Number of Conflict Onsets	61	103	30	104
R ²	0.07	0.43	0.13	0.71

Source: IMF staff calculations.

Note: The table presents local-projection difference-in-differences (LP-DID) estimates of the effect of conflict on external sector variables and the consumer price index (CPI). The dependent variable is the cumulative change in the indicator listed at the top of each column up to horizon h, where h = 1 corresponds to the year of conflict onset. The regressions control for three lags of the dependent variable and include country and year fixed effects. The number of observations and R² are reported for h = 1. Standard errors, clustered at the country level, are reported in parentheses. Nat. = national; Cur. = currency.

*** p < 0.01; ** p < 0.05; * p < 0.1.

Online Annex Table 3.2.5.B. Fiscal and External Sector Vulnerabilities Following Conflict

	Gov. Debt (Real)	Exports-to-Imports Ratio	Remittances (USD)	ODA (USD)	FDI Liabilities (USD)	Portfolio Debt Liabilities (USD)
	(1)	(2)	(3)	(4)	(5)	(6)
h = 1	3.468 (2.359)	-5.946 *** (1.774)	3.446 (7.539)	11.848 * (7.048)	-3.610 ** (1.651)	-23.957 ** (9.260)
h = 2	6.145 ** (2.634)	-8.393 *** (2.539)	-1.082 (11.131)	17.818 * (9.665)	-9.240 *** (2.970)	-57.703 *** (21.408)
h = 3	7.430 ** (3.566)	-7.104 ** (3.275)	7.595 (14.994)	21.389 * (11.760)	-14.990 *** (3.995)	-81.091 ** (36.689)
h = 4	4.438 (5.646)	-8.130 * (4.269)	13.237 (16.479)	31.369 ** (14.102)	-22.816 *** (5.599)	-77.762 ** (31.070)
h = 5	-0.522 (6.675)	-9.345 * (5.577)	25.564 (17.882)	43.303 ** (16.465)	-18.697 * (9.672)	-31.609 (32.368)
Number of Observations	8,317	10,205	5,737	6,730	7,208	3,765
Number of Countries	190	194	181	167	192	172
Number of Conflict Onsets	65	102	41	84	63	27
R ²	0.12	0.07	0.08	0.13	0.17	0.11

Source: IMF staff calculations.

Note: The table presents local-projection difference-in-differences (LP-DID) estimates of the effect of conflict on fiscal and external sector variables. The dependent variable is the cumulative change in the indicator listed at the top of each column up to horizon h, where h = 1 corresponds to the year of conflict onset. The regressions control for three lags of the dependent variable and include country and year fixed effects. The number of observations and R² are reported for h = 1. Standard errors, clustered at the country level, are reported in parentheses. FDI = foreign direct investment. Gov. = government. ODA = official development assistance.

*** p < 0.01; ** p < 0.05; * p < 0.1.

Online Annex Table 3.2.5.D. Impact of Conflict on Production Factors and Casualties

	Capital Stock	TFP	Employment	Deaths
	(1)	(2)	(3)	(4)
h = 1	-0.625 *** (0.164)	-2.878 *** (0.747)	-0.872 *** (0.273)	3.791 *** (0.624)
h = 2	-1.450 *** (0.390)	-4.460 *** (1.349)	-1.467 *** (0.485)	1.531 * (0.856)
h = 3	-2.186 *** (0.707)	-3.918 *** (1.389)	-1.952 *** (0.701)	0.055 (0.952)
h = 4	-2.843 *** (0.988)	-3.161 * (1.864)	-2.347 ** (0.909)	-0.227 (1.181)
h = 5	-3.605 *** (1.271)	-3.183 (2.281)	-2.843 ** (1.110)	-0.636 (1.369)
Number of Observations	8,970	5,851	8,361	12,376
Number of Countries	171	117	174	190
Number of Conflict Onsets	89	47	88	116
R ²	0.82	0.22	0.40	0.23

Source: IMF staff calculations.

Note: The table presents local-projection difference-in-differences (LP-DID) estimates of the effect of conflict on production factors and deaths. The dependent variable is the cumulative change in the indicator listed at the top of each column up to horizon h, where h = 1 corresponds to the year of conflict onset. The regressions control for three lags of the dependent variable and include country and year fixed effects. The number of observations and R² are reported for h = 1. Standard errors, clustered at the country level, are reported in parentheses. TFP = total factor productivity.

*** p < 0.01; ** p < 0.05; * p < 0.1.

Online Annex Table 3.2.5.C (corresponding to panel 3 of Figure 3.6 in the main text) shows that financial openness, measured by the Chinn–Ito index, declines following conflict onset, consistent with wartime governments’ efforts to limit capital outflows. The exchange rate depreciates; reserve assets decline; and consumer prices rise sharply, with the price level increasing by about 30 percent five years after conflict onset.

Online Annex Table 3.2.5.D examines the effects of war on production factors and the human toll in conflict-site economies, as shown in panels 1 and 2 of Figure 3.7 in the main text. The results indicate that the capital stock declines persistently, with no evidence of recovery. Total factor productivity (TFP) falls in the early periods, with the effect becoming statistically insignificant at longer horizons. Employment declines significantly across all horizons. The number of deaths also rises sharply following conflict onset.

Online Annex Table 3.2.6. Additional Evidence on the Impact of Conflict

	Value Added (Real)				Gov. Spending (Percent of Pre-War GDP)		Trade Balance (Percent of Pre-War GDP)		Uncertainty Index (Change in Index)	Informality (Percent of GDP) (Percentage points)	Short-Term Interest Rate (Percentage points)
	Agriculture	Industry	Manufacturing	Services	Defense (Percentage points)	Social (Percentage points)	(Percent of Pre-War GDP) (Percentage points)	Gross National Savings (Real)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(10)
h = 1	-3.408 *** (1.172)	-6.273 *** (1.752)	-5.076 *** (1.572)	-4.507 *** (1.011)	0.254 ** (0.126)	-0.404 * (0.223)	-0.946 (0.958)	-7.031 (5.041)	0.009 ** (0.004)	0.848 ** (0.345)	-0.588 (0.834)
h = 2	-5.483 *** (1.845)	-12.399 *** (2.904)	-8.423 *** (2.834)	-6.211 *** (1.572)	0.399 * (0.210)	-0.698 ** (0.340)	-3.420 ** (1.401)	-10.878 * (6.422)	0.008 (0.005)	1.300 *** (0.425)	1.392 (0.933)
h = 3	-6.082 *** (2.009)	-14.227 *** (3.139)	-9.568 *** (3.039)	-7.007 *** (2.035)	0.337 (0.269)	-1.044 *** (0.376)	-2.230 * (1.248)	-14.688 * (8.719)	0.017 *** (0.006)	1.515 *** (0.548)	1.520 (1.700)
h = 4	-6.019 ** (2.407)	-15.050 *** (3.724)	-8.914 ** (3.752)	-8.185 *** (2.477)	0.363 (0.323)	-1.318 *** (0.441)	-0.399 (1.803)	-16.895 * (9.063)	0.006 (0.006)	1.817 *** (0.661)	3.879 * (2.093)
h = 5	-9.471 *** (2.576)	-16.975 *** (4.660)	-8.870 ** (4.136)	-9.501 *** (2.789)	0.408 (0.381)	-1.855 *** (0.528)	0.448 (2.152)	-19.020 ** (9.621)	0.009 (0.007)	1.442 * (0.780)	4.931 ** (1.988)
Number of Observations	6,687	6,478	5,934	6,222	8,091	6,154	10,205	6,630	7,079	3,306	4,637
Number of Countries	187	186	178	186	172	172	194	168	141	156	136
Number of Crisis Onsets	65	63	54	60	90	59	102	59	83	28	24
R ²	0.11	0.21	0.20	0.30	0.07	0.13	0.05	0.12	0.19	0.33	0.12

Source: IMF staff calculations.

Note: The table presents local-projection difference-in-differences (LP-DID) estimates of the effect of conflict on sectoral value added (columns 1–4), additional fiscal, external, and real sector variables (columns 5–8), uncertainty (column 9), informality (column 10), and the monetary policy rate (column 11). The dependent variable is the cumulative change in the indicator listed at the top of each column up to horizon h, where h = 1 corresponds to the year of conflict onset. The regressions control for three lags of the dependent variable and include country and year fixed effects. The number of observations and R² are reported for h = 1. Standard errors, clustered at the country level, are reported in parentheses. Gov. = government.

*** p < 0.01; ** p < 0.05; * p < 0.1.

Additional results are presented in Online Annex Table 3.2.6 to support the chapter’s narrative in the main text. First, examining sectoral value added, conflict onset has a negative and statistically significant impact across all sectors of the economy, with the contraction in industry value added being the most pronounced. Second, on the fiscal side, defense spending increases after conflict onset, while social spending declines, reflecting in part a reallocation of expenditures toward defense purposes. Third, the trade balance widens, though this widening is confined to the first four years of conflict, pointing to import compression in subsequent years. In parallel, real gross national savings fall, with the decline exceeding the drop in investment, consistent with the accounting identity linking domestic investment to domestic and foreign savings in a wartime economy. Fourth, conflicts are associated with higher uncertainty (measured by the uncertainty index) and greater informality (proxied by the size of the shadow economy as a percentage of GDP). Fifth, monetary authorities tend to respond to wartime

economic pressures by raising short-term nominal interest rates, particularly at medium horizons.

Online Annex 3.3. Scarring Effects of Wars on Individuals

Panel 3 of Figure 3.7 in the main text illustrates how exposure to war affects individuals' health outcomes later in life. The analysis uses micro-level survey data covering individuals aged 50 and above, across 41 economies, surveyed over the period 2000–22. The results, reported in Online Annex Table 3.3.1, are based on the following specification:

$$H_{i,t} = \beta_1 YearsInConflict_{i,t} + \beta_2 X_{i,t} + \varphi_c + \varepsilon_{i,t}$$

where $H_{i,t}$ represents various health indicators for individual i at time t . The main independent variable $YearsInConflict_{i,t}$, measures the number of years the individual lives in a conflict-site country over the lifecycle. $X_{i,t}$ is a set of control variables measuring individual socio-economic characteristics (including year of birth, age, gender, education, and household wealth). φ_c are country fixed effects, while $\varepsilon_{i,t}$ is the error term.

Online Annex Table 3.3.1. Scarring Effects of Wars on Individuals' Health Outcomes

	Composite Health	Cognitive PC	Physical PC	Psych. well-being
	(1)	(2)	(3)	(4)
Number of Years Living in Conflict	-0.014*** (0.004)	-0.010* (0.005)	-0.017*** (0.005)	-0.016*** (0.005)
Number of Observations	755,958	382,436	628,729	345,479
R ²	0.33	0.38	0.13	0.18
Number of Countries	41	34	34	30
Country Fixed Effects	Yes	Yes	Yes	Yes
SE cluster	Country	Country	Country	Country

Sources: Gateway to Global Aging; national household surveys; and IMF staff calculations.

Note: The table reports coefficients from OLS regressions of standardized health indicators (mean 0, standard deviation 1) on the number of years an individual lived in conflict. Regressions control for individuals' year of birth, age, gender, education, and household wealth. Columns (1)–(4) report results for composite health, cognitive PC, physical PC, and psychological well-being, respectively. Cognitive PC is the principal component of verbal fluency, orientation, memory, and basic numeracy. Physical PC is the principal component of activities of daily living (ADLs), instrumental ADLs, pain frequency, and hearing ability. Composite health averages all health measures. OLS = ordinary least squares; Psych. = psychological. Robust standard errors in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Online Annex Table 3.4.1. Macroeconomic Dynamics after Conflict

	Peace Type				CPI	Factors of Production			Uncertainty Index (Change in Index)	Government Tax Revenue (Real)
	Nonfragile	Fragile	All	Nonfragile Commodity Exporters		Capital Stock	TFP	Employment		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
h = 1	1.160 * (0.639)	1.165 * (0.625)	1.173 ** (0.495)	1.553 * (0.868)	1.231 (1.331)	0.016 (0.199)	0.416 (0.796)	0.357 (0.232)	-0.002 (0.004)	0.687 (1.922)
h = 2	2.572 ** (0.992)	1.341 (1.145)	2.107 *** (0.760)	2.661 * (1.406)	2.555 (2.903)	-0.015 (0.451)	0.770 (1.119)	0.798 ** (0.393)	-0.002 (0.005)	6.887 ** (2.719)
h = 3	2.727 ** (1.325)	1.530 (1.503)	2.281 ** (0.991)	2.952 * (1.769)	3.426 (4.570)	-0.114 (0.708)	0.292 (1.514)	1.369 ** (0.548)	0.000 (0.005)	8.642 ** (3.336)
h = 4	3.361 ** (1.595)	1.789 (1.978)	2.750 ** (1.264)	3.319 (2.180)	4.670 (6.483)	-0.457 (0.977)	0.980 (1.757)	1.714 ** (0.683)	-0.005 (0.005)	10.029 ** (4.502)
h = 5	3.879 ** (1.817)	1.124 (2.562)	2.788 * (1.611)	3.839 (2.575)	5.309 (8.833)	-0.922 (1.236)	1.155 (1.990)	2.234 *** (0.846)	-0.004 (0.005)	11.087 ** (5.281)
Number of Observations	10,007	9,979	10,122	10,298	8,767	7,302	4,799	6,727	5,500	5,967
Number of Countries	191	193	193	191	190	169	115	170	138	180
Number of Conflict Ends	142	114	257	74	134	119	70	112	104	84
R ²	0.28	0.28	0.28	0.28	0.70	0.82	0.23	0.46	0.20	0.10

Sources: IMF staff calculations.

Note: The table presents local-projection difference-in-differences (LP-DID) estimates of the effect of postconflict peace on selected macroeconomic indicators. The dependent variable is the cumulative change in output (columns (1)–(4)), CPI (column (5)), production factors (columns (6)–(7)), uncertainty (column (9)), and tax revenue (column (10)) up to horizon h , where $h = 1$ corresponds to the first year of peace. In columns (1)–(3), peace is classified as non-fragile if conflict does not restart within the first five years, and as fragile if conflict restarts within that period. Columns (5)–(10) focus on non-fragile peace episodes. The regressions control for three lags of the dependent variable and include country and year fixed effects. The number of observations and R² are reported for $h = 1$. Standard errors, clustered at the country level, are reported in parentheses. Commodity-exporting countries are defined as a fixed group of countries in which fuel and primary commodity exports exceed 50 percent of total exports over 2015–24. CPI = consumer price index; TFP = total factor productivity.

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

Online Annex 3.4. Macroeconomic Dynamics After Wars End

This annex provides details on the empirical analysis of macroeconomic dynamics following conflict termination. The regression approach follows the same methodology described in Online Annex 3.2 for the analysis of macroeconomic dynamics after conflict onset. In particular, the following regression is estimated:

$$\ln(y_{i,t+h}) - \ln(y_{i,t-1}) = \beta^h Conflict Termination_{i,t} + \delta^h Controls_{i,t} + \theta_t^h + \mu_i^h + \varepsilon_{i,t}^h$$

for $h = 0, \dots, 5$

where the left hand side represents the cumulative growth of the dependent variable of interest for country i in year t and horizon h ; $Conflict Termination_{i,t}$ takes the value of one in the first year of peace as long as all of the five years following conflict termination remain conflict-free ($Conflict_{i,t-1} = 1$ & $Conflict_{i,t} = 0$ & $Conflict_{i,t+j} = 0$ for $1 \leq j \leq L - 1$, where $L = 5$). The

sample is restricted to observations that experience conflict termination and clean controls that are not affected by conflict within a five-year window ($Conflict_{i,t-j} = 0$ for $-h \leq j \leq L$, where $L = 5$). $Controls_{i,t}$ include three lags of the dependent variable, year fixed effects (θ_t^h), and country fixed effects (μ_i^h). $\varepsilon_{i,t}^h$ is the error term.

Columns (1) and (2) of Online Annex Table 3.4.1 report regression results on output dynamics in nonfragile and fragile post-conflict economies, respectively, as illustrated in panel 1 of Figure 3.9 in the main text. As discussed in the main text, the results indicate that recoveries are conditional on the maintenance of peace and, even when peace endures, recoveries remain slow and uneven. Column (3) presents additional results on unconditional recovery dynamics (that is, pooling all conflict-termination episodes), showing that in such cases, recoveries are even slower. Column (4) reports results for nonfragile peace episodes in commodity-exporting countries (defined as a fixed group of countries in which fuel and primary commodity exports exceed 50 percent of total exports). In these economies, output initially rebounds strongly but becomes statistically insignificant in subsequent years. The remaining columns (5)–(8) document post-conflict dynamics of inflation and production factors (as shown in panels 2 and 3 of Figure 3.9), while column (9) reports the muted response of uncertainty following conflict termination, and column (10) reflects increases in tax revenue collection.

Online Annex 3.5. Drivers of Post-Conflict Recovery

To assess the role of policies during the recovery phase, the analysis focuses on the first five years of each post-conflict recovery episode and estimates the following specification:

$$Recovery_{r,i,t} = \beta_1 Policies_{r,i,t} + \gamma_{r,i} + \delta_t + \varepsilon_{r,i,t}$$

where $Recovery_{r,i,t}$ is the percentile distribution of real GDP growth within each horizon $t = 1, \dots, 5$ of recovery episode r in country i . $Policies_{r,i,t}$ captures policy outcomes during the recovery (including low inflation, stable inflation, stable REER, debt restructuring, capacity development, and social spending). The terms $\gamma_{r,i}$ and δ_t denote recovery-specific and horizon fixed-effects, respectively. The episode fixed effects control for time-invariant factors of each recovery, including the duration and intensity of the related conflict. Online Annex Table 3.5.1 reports the regression results, with policy variables entered one at a time to account for potential multicollinearity. These estimates underpin Figure 3.10 in the main text.⁴

Case studies from selected high post-conflict recoveries further develop the chapter’s narrative on recovery dynamics, drawing on the experiences of six

Online Annex Table 3.5.1. Policy Correlates of Postconflict Recovery

	(1)	(2)	(3)	(4)	(5)	(6)
Low Inflation	0.353* (0.181)					
Stable Inflation		0.222 (0.283)				
Stable REER			0.361* (0.206)			
Debt Restructuring				0.461* (0.234)		
Capacity Development					0.366*** (0.123)	
Social Spending						0.491*** (0.093)
Number of Observations	693	684	545	737	336	431
R ²	0.393	0.397	0.398	0.399	0.516	0.490

Source: IMF staff calculations.

Note: The table shows policy correlates of the distribution of growth outcomes over the first five years of postconflict recovery. The dependent variable is the percentile of the growth distribution at each horizon ($t = 1, \dots, 5$). Regressions control for postconflict episode and horizon fixed effects. Columns (1)–(3) report results for measures of macroeconomic stabilization; column (4) for debt restructuring; column (5) for capacity development; and column (6) for social spending. Low inflation, stable inflation, and stable REER are indicator variables equal to 1 if the respective measure falls below the sample mean, based on inflation levels, inflation volatility, and REER volatility. Debt restructuring equals 1 if a restructuring occurs. Capacity development is measured by the log number of participants in IMF training. Robust standard errors are in parentheses. REER = real effective exchange rate.

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

⁴ As an alternative, the analysis considers the percentage growth differential between average real GDP per capita during the recovery period and its average level in the two years preceding the conflict; the resulting percentile distribution is regressed on policy outcome variables, controlling for conflict characteristics. Results under this alternative specification are broadly comparable to those from the baseline strategy.

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countries: Bosnia and Herzegovina (1992–95), Cambodia (1989–98), Nepal (1996–2006), Rwanda (1990–2001), Sri Lanka (1983–2009), and Côte d’Ivoire (2010–11). The analysis is organized around four policy blocs: macroeconomic stabilization, financing and international assistance, institutions, and inclusive policies and security. Online Annex Table 3.5.2 reports summary statistics for key indicators during the first 5 years of the post-conflict period for each country, which structure the case-study narratives in the main text. As shown in the table, output per capita grew strongly during the first 5 years in these successful cases, averaging between 3.7 percent per year in Nepal and 21.1 percent per year in Bosnia and Herzegovina.

Online Annex Table 3.5.2. Case Studies of Postconflict Recoveries

	Bosnia and Herzegovina (1)	Cambodia (2)	Nepal (3)	Rwanda (4)	Sri Lanka (5)	Côte d'Ivoire (6)
Conflict Characteristics						
Conflict duration	1992–1995	1989–1998	1996–2006	1990–2001	1983–2009	2010–2011
Human casualties (percent)	1.46	0.08	0.06	11.22	0.43	0.01
Macroeconomic Recovery (average of postconflict period)						
Real GDP Growth	24.5	9.5	4.5	8.3	7.2	8.4
Real GDP per capita Growth	21.1	7.7	3.7	6.0	6.4	5.9
Macroeconomic Stabilization (difference of postconflict period relative to conflict period)						
Inflation rate	.	-61.8	2.7	-4.9	-4.7	-1.8
Inflation volatility (percentage point)	.	-65.3	0.6	-14.4	-3.3	-1.8
GDP growth volatility (percentage point)	9.9	0.4	-0.5	-15.9	0.1	-7.1
REER appreciation	1.1	-9.5	2.3	-0.6	0.1	0.9
REER volatility (percentage point)	.	-0.2	0.0	0.0	0.0	0.0
Debt-to-GDP	.	-3.2	19.2	4.2	8.4	20.3
External debt-to-GDP	.	-5.5	16.8	0.8	1.7	19.7
Financing and International Assistance (average during postconflict, unless noted otherwise)						
Aid-to-GDP	23.4	8.6	4.7	18.5	0.7	3.1
Remittances-to-GDP	.	2.6	20.6	0.4	8.0	0.8
Number of debt restructurings (count)	2	1	0	2	1	1
Years in IMF programs (count)	3	5	1	5	3	5
Institutions (percentage change, final year of postconflict period relative to last conflict year)						
Institutional quality	.	13.7	2.8	60.8	62.0	41.6
Public sector corruption	0.0	0.0	-1.2	0.0	34.5	-3.7
State ownership of the economy	101.5	13.0	4.8	0.0	19.1	4.4
Statistical capacity score	.	222.0	117.4	164.0	220.8	111.8
Property rights	146.6	-5.6	11.3	-14.6	4.0	0.6
Rule of law (contract enforcement)	.	2.2	-26.2	77.8	-9.6	50.6
Inclusive policies (percentage change, final year of postconflict period relative to last conflict year)						
Military spending-to-GDP	4.5	-31.5	13.0	-45.0	-26.9	6.2
Non-military spending-to-GDP	.	18.8	31.0	17.3	-14.7	18.5
Social spending-to-GDP	2.2	3.9	50.6	6.5	13.3	20.3
Security (years count during postconflict)						
UN peacekeeping (years in)	5	0	0	0	0	5
Peacebuilding strategies						
Justice provisions	1	.	1	.	.	.
Political provisions	1	.	1	.	.	.

Sources: Enhanced Central Bank Independence Index; Horn Reinhart and Trebesch; Organization for Economic Co-operation and Development; SIPRI Military Expenditure Database; Uppsala Conflict Data Program; United Nations Peace Mission Mandates; V-Dem Institute; World Development Indicators; and IMF staff calculations.
Note: Postconflict is defined as the first five years following conflict termination.

Online Annex 3.6. Project Outcome Analysis

Panels 1 and 2 of Figure 3.11 in the main text compare outcome ratings of aid-funded development projects implemented during post-conflict periods with those implemented in peacetime. Project-level performance ratings data are drawn from a cross-country database compiled by Honig, Lall, and Parks (2023), in which project outcomes are rated on a Likert-type scale from one (highly unsatisfactory) to six (highly satisfactory). These ratings follow widely accepted international evaluation standards and assess two key dimensions of project performance: (1) the extent to which a project achieves its stated objectives, as outlined in formal agreements between donors and recipients, and (2) the efficiency with which project inputs are converted into outputs. The dataset covers 20,451 projects approved between 1956 and 2017 and evaluated between 1972 and 2019, spanning nearly all emerging market and

developing economies at the time of approval, and covering all sectors of government activity. Projects are financed and evaluated by 12 bilateral and multilateral donor agencies.⁵

The analysis proceeds in two steps. First, for each project, the number of years spent in conflict and in post-conflict periods over the implementation cycle—from project start to completion—is computed. Projects that experienced a conflict at any point during implementation are then excluded from the sample. This restriction allows the analysis to focus on projects implemented in post-conflict settings relative to projects implemented in countries at peace. Second, it estimates the following difference-in-differences specification:

$$Outcome_{p,r,d,t} = \beta_1 PostConflict_{p,r,d,t} + \beta_2 Project_{p,r,d,t} + \beta_3 Macro_{p,r,d,t} + \gamma_r + \phi_d + \varphi_t + \varepsilon_{p,r,d,t}$$

where $Outcome_{p,r,d,t}$ is the 1-6 Likert-scale outcome rating for project p in recipient country r financed by donor d and approved at time t .

$PostConflict_{p,r,d,t}$ is the post-conflict dummy variable equals one if the project has been implemented during the post-conflict period, zero otherwise.

$Project_{p,r,d,t}$ are control variables for project-specific covariables and include the project size, whether the donor has a local office presence, whether the project has been externally evaluated, ex-post evaluated, and whether it was a repeated project.

$Macro_{p,r,d,t}$ are macro-level covariates averaged over the length of the project, and include the recipient country GDP per capita, GDP growth, population, inflation, aid-to-GNI, FDI-to-GDP and an index of aid fragmentation. The latter three macro-level variables control for potential confounders from other capital inflows or donor fragmentation. γ_r , ϕ_d , and φ_t are the recipient, donor, and approval-year fixed effects.

Column (1) of Online Annex Table 3.6.1 reports the baseline estimate shown in Panel 1 of Figure 3.11 in the main text. Columns (2)–(4)

Online Annex Table 3.6.1. Project Outcome after Conflicts

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Baseline	0.101** (0.046)				0.094** (0.046)	0.105** (0.047)	0.089* (0.050)
Supervision		0.332*** (0.070)					
Productive			-0.180** (0.074)				
Education and Health			0.134* (0.081)				
Infrastructure			0.231*** (0.051)				
High Scale-Up				0.206 (0.131)			
Low Scale-Up				0.101** (0.047)			
Number of Observations	8,760	3,761	8,760	8,760	8,628	8,576	8,345
R ²	0.169	0.153	0.172	0.169	0.191	0.230	0.275
Outcome Mean	4.277	4.045	4.277	4.277	4.275	4.277	4.277

Source: IMF staff calculations.

Note: The table reports the effect of postconflict peace on project outcomes using a difference-in-differences approach. The dependent variable is the project outcome rating at evaluation, measured on a 1–6 Likert scale. Control variables include macroeconomic indicators (logarithm of GDP per capita, GDP growth, logarithm of population, inflation, net ODA received-to-GNI, net FDI inflows-to-GDP, and an index of aid fragmentation), averaged over the project duration; and project-level characteristics (logarithm of project size and indicators for donor office presence, external evaluation, ex post evaluation, and repeated projects). Regressions include country, year, and donor fixed effects. Column (1) reports the baseline estimate; column (2) reports the estimate for projects with satisfactory supervision quality; column (3) examines sectoral heterogeneity; and column (4) distinguishes episodes of high and low investment scale-up. Columns (5)–(7) report robustness checks that sequentially include sector, sector-by-approval-year, and sector-by-completion-year fixed effects. High (low) public investment scale-up is defined as episodes in which the difference between the actual public investment-to-GDP ratio and its average over the preceding five years exceeds (falls below) two standard deviations of the sample distribution. Robust standard errors, clustered at the country-by-approval-year level, are reported in parentheses. FDI = foreign direct investment; GNI = gross national income; ODA = official development assistance.

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Online Annex Table 3.6.2. Time-Varying Effects on Project Outcome

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Time-varying effect	-0.067 (0.189)	-0.008 (0.148)	0.096 (0.095)	0.105 (0.072)	0.082 (0.067)	0.113* (0.060)	0.150*** (0.056)	0.126** (0.050)	0.089* (0.048)	0.101** (0.046)
Observations	8,760	8,760	8,760	8,760	8,760	8,760	8,760	8,760	8,760	8,760
R ²	0.168	0.168	0.168	0.169	0.168	0.169	0.169	0.169	0.169	0.169
Outcome Mean	4.277	4.277	4.277	4.277	4.277	4.277	4.277	4.277	4.277	4.277

Source: IMF staff calculations.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

⁵ This includes seven multilateral institutions—the Asian Development Bank, African Development Bank, Caribbean Development Bank, Global Environment Facility, Global Fund to Fight AIDS, Tuberculosis, and Malaria, International Fund for Agricultural Development, and the World Bank—and five bilateral agencies: Australia’s Department of Foreign Affairs and Trade, the former United Kingdom’s Department for International Development, Germany’s GIZ and KfW, and the Japan International Cooperation Agency.

report heterogeneity analyses corresponding to the same figure. Columns (5)–(7) present robustness checks that sequentially add sector fixed effects, sector-by-approval-year fixed effects, and sector-by-completion-year fixed effects. Online Annex Table 3.6.2 further reports the time-varying effect of post-conflict peace on project outcome, as plotted in Panel 2 of Figure 3.11.

Online Annex 3.7. Subnational Analysis

Online Annex Table 3.7.1 reports the regression results shown in panel 3 of Figure 3.11 in the main text. The analysis draws on four main data sources. The first is yearly geocoded aid data for administrative regions at the second subnational levels (ADM2), covering the monetary value of project aid disbursements from 22 bilateral and multilateral donors over the period 1992–2023 (Bomprezzi and others 2025). The dataset spans 35,432 ADM2 across 125 aid-recipient countries. These data are complemented by a geocoded GED, aggregated at the ADM2; nightlights intensity at the same geographic level, used as a proxy for subnational economic activity (Li and others 2020); and a subnational corruption dataset (Crombach and Smits 2024). The analysis focuses on countries that have received aid at least once during the sample period to attenuate potential selection biases, and excludes observations affected by conflicts. The baseline regression analysis is based on the following specification:

$$\begin{aligned}
 Z_{r,i,t} - Z_{r,i,t-1} = & \beta_1 Z_{r,i,t-1} + \beta_2 Aid_{r,i,t-1} \\
 & + \beta_3 PostConflict_{r,i,t} + \beta_4 Aid_{r,i,t-1} \\
 & * PostConflict_{r,i,t} + \beta_5 X_{r,i,t} + \delta_r + \tau_{i,t} \\
 & + \varepsilon_{r,i,t}
 \end{aligned}$$

where $Z_{r,i,t}$ denotes the logarithm of mean nightlights intensity in ADM2 region r of country i in year t . Nightlights are constructed as the sum of pixel-level emissions within each ADM2 region, weighted by the share of each pixel that falls within the region’s polygon. $Aid_{r,i,t-1}$ denotes the logarithm of aid disbursement in constant 2014 US dollar received by region r of country i .⁶ Aid is measured as the cumulative amount received over three years and enters the regression with a one-year lag. $PostConflict_{r,i,t}$ is a dummy variable equal to one if the region is in a post-conflict setting and zero otherwise, and the interaction term $Aid_{r,i,t-1} * PostConflict_{r,i,t}$ captures the conditional effect of aid in post-conflict regions. $X_{r,i,t}$ includes control variables, measured here by population density in region r . The specification includes region fixed effects (δ_r), and country–year fixed effects ($\tau_{i,t}$), to control for time-invariant regional characteristics and for country-level shocks and macroeconomic conditions in a given

Online Annex Table 3.7.1. Subnational Growth, Aid, and Local Governance in Postconflict

	(1)	(2)	(3)
Nighttime Light (lagged)	-0.163*** (0.002)	-0.164*** (0.002)	-0.164*** (0.002)
Aid	0.011*** (0.000)	0.011*** (0.000)	0.011*** (0.000)
Postconflict	0.064*** (0.019)	0.213*** (0.079)	0.057*** (0.019)
Aid × Postconflict	0.005*** (0.002)	0.015 (0.010)	0.005*** (0.002)
Number of Observations	976,308	956,555	974,934
R ²	0.18	0.18	0.18
ADM2 Fixed Effects	Yes	Yes	Yes
Country-Year Fixed Effect	Yes	Yes	Yes
ADM2 Population Density	Yes	Yes	Yes

Source: IMF staff calculations

Note: The table reports regression estimates of the effects of postconflict peace and aid on nighttime light intensity for administrative regions at the second subnational levels (ADM2). The dependent variable is the change in log nighttime light intensity for ADM2. Controls include lagged nightlights, population density, and country-year and state fixed effects. Column (1) reports the baseline result. Columns (2) and (3) report results for high and low improvement in governance, respectively. High (low) improvement is defined as episodes with (without) major governance reforms, defined as state-year increases in the governance index exceeding two standard deviations of the distribution of annual changes. Robust standard errors are reported in parentheses. FDI = foreign direct investment; GNI = gross national income; ODA = official development assistance.

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

⁶ The analysis added 0.01 to nightlight intensity before taking logs, and one to aid in order to not lose zero observations (as in Bomprezzi and others 2025).

year. Column (1) of Online Annex Table 3.7.1 reports the baseline estimate shown in panel 3 of Figure 3.11 in the main text. Columns (2) and (3) present subsample estimates for regions experiencing high and low improvements in local governance quality, where high (low) governance improvement is defined as state-year increases in the governance index exceeding (not exceeding) two standard deviations of the distribution of annual changes.

Online Annex 3.8. Firm-level Analysis

This section presents the regression specification underlying the empirical analysis of firm dynamics during post-conflict periods reported in Figure 3.12 in the main text. To attenuate selection biases, the analysis focuses on countries that experienced at least one conflict episode over the period 1989–2024, based on data from the UCDP Georeferenced Event Database (GED), and for which firm-level data are available in the Orbis database.

Firms operating in conflict-affected countries are geolocated using postcode and city information reported in Orbis. For each firm with valid location information, city and postcode data—together with the country identifier—are input into the Photon geocoder to obtain latitude and longitude coordinates for each unique city–postcode combination. These coordinates are then cross-checked against World Bank country shapefiles to ensure consistency with the intended country; observations that fail this validation are excluded. Firm locations are subsequently assigned using a hierarchical matching procedure, first by postcode, then by city, and finally by combined city and postcode. For countries with low matching rates, the procedure is supplemented using alternative geolocators, including Nominatim, and any additional validated coordinates are added to the location directory prior to merging.

Online Annex Table 3.8.1. Firm Dynamics during Postconflict: Baseline Estimates and Heterogeneity by Factors Intensity

Variables	Baseline			Factor Intensity		
	(1) Capital	(2) Labor	(3) TFP	(4) Capital	(5) Labor	(6) TFP
Postconflict	-0.046*	0.059**	-0.016			
	(0.027)	(0.022)	(0.025)			
Capital Intensive				-0.005	0.075**	0.048***
				(0.031)	(0.036)	(0.016)
Labor Intensive				-0.046*	0.080***	-0.061*
				(0.024)	(0.008)	(0.030)
Number of Observations	16,577,311	21,140,632	4,923,758	16,577,311	21,140,632	4,923,758
R ²	0.96	0.96	0.86	0.96	0.96	0.86
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country-Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Sector-Year	Yes	Yes	Yes	Yes	Yes	Yes

Source: IMF staff calculations.

Note: The table reports the estimated impact of postconflict peace on firm dynamics. The dependent variables are the logarithms of firm-level capital, labor, and total factor productivity (TFP, measured as quantity-based TFP or TFPQ). The key independent variable is a postconflict peace dummy, which equals 1 during the five years following a conflict episode occurring within a 20-kilometer radius of the firm’s location. Regressions control for firm age, size, leverage, and export status, and include firm, country-year, and sector-year fixed effects. Columns (1)–(3) report the baseline results. Columns (4)–(6) report heterogeneity by factor intensity. Robust standard errors are reported in parentheses.

*** p<0.01; ** p<0.05; * p<0.1

Online Annex Table 3.8.2. Firm Dynamics during Postconflict: Heterogeneity by Firm Characteristics

Variables	Net Worth			Export Status		
	(1) Capital	(2) Labor	(3) TFP	(4) Capital	(5) Labor	(6) TFP
Low Net Worth	-0.104**	-0.038***	-0.080***			
	(0.042)	(0.011)	(0.029)			
High Net Worth	-0.023	0.101***	0.050**			
	(0.045)	(0.014)	(0.018)			
Exporter				-0.019	0.060***	0.221***
				(0.026)	(0.015)	(0.023)
Non-Exporter				-0.047*	0.059**	-0.030
				(0.028)	(0.022)	(0.033)
Observations	16,577,311	21,140,632	4,923,758	16,577,311	21,140,632	4,923,758
R ²	0.96	0.96	0.86	0.96	0.96	0.86
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country-Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Sector-Year	Yes	Yes	Yes	Yes	Yes	Yes

Source: IMF staff calculations.

Note: The table reports the heterogeneity of the estimated impact of postconflict peace on firm dynamics. The dependent variables are the logarithms of firm-level capital, labor, and total factor productivity (TFP, measured as quantity-based TFP or TFPQ). The key independent variable is a postconflict peace dummy, which equals 1 during the five years following a conflict episode occurring within a 20-kilometer radius of the firm’s location. Results are reported by firm net worth, columns (1)–(3), and export status, columns (4)–(6). Depending on the specification, regressions control for firm age, size, leverage, and export status. All regressions include firm, country-year, and sector-year fixed effects. Robust standard errors are reported in parentheses.

*** p<0.01; ** p<0.05; * p<0.1

Geolocated firms are then matched to the GED using conflict events' latitude and longitude. For each firm-year observation, all conflict events—and associated battle-related deaths—occurring within a 20-kilometer radius of the firm's location are identified and aggregated.⁷ This procedure allows the construction of firm-level measures of conflict exposure that vary over time and space, which form the basis of the empirical analysis. The regression analysis then excludes conflict episodes and is based on the following specification:

$$\ln Y_{f,i,s,t} = \beta_1 \text{PostConflict}_{f,i,s,t} + \beta_2 X_{f,i,s,t} + \delta_f + \varphi_{s,t} + \omega_{i,t} + \varepsilon_{f,i,s,t}$$

where $\ln Y_{f,i,s,t}$ is the logarithm of the dependent variable—capital, labor or productivity (TFPQ, total factor productivity quantity-based) computed following Hsieh and Klenow (2009)—for firm f in country i , sector s and year t . $\text{PostConflict}_{f,i,s,t}$ is the post-conflict dummy, taking the value one during the five years following a conflict episode within a 20-kilometer radius of the firm's location, and zero otherwise. $X_{f,i,s,t}$ includes firm-level controls, which in the baseline specification comprise firm age, size, leverage, and export status. The specification further includes firm fixed effects (δ_f), sector-by-year fixed effects ($\varphi_{s,t}$) and country-by-year fixed effects ($\omega_{i,t}$) and therefore exploits within-firm variation as identification strategy.

Columns (1)–(3) of Online Annex Table 3.8.1 report the baseline estimates shown in panel 1 of Figure 3.12, columns (4)–(6) report sectoral heterogeneity corresponding to panel 2. Online Annex Table 3.8.2 reports heterogeneity by firm characteristics, shown in panel 3 of Figure 3.12.

Online Annex 3.9. Model-Based Simulations

This model analyzes the economic impact of conflicts in a small open economy using an overlapping generations framework with heterogeneous households.

Environment, Demographics, and Government Budget Constraint. The economy consists of a population N_t that equals the sum across all ages j of individuals $N_{j,t}$, growing at rate $1 + n_t$. Each individual faces an exogenous survival probability of surviving from age j to age $j+1$. The maximum lifespan is $J = 96$ periods. The household problems and production technology are standard and follow Auclert and others (2024). Agents born in specific year choose sequences of consumption and asset holdings for all ages to maximize their expected lifetime utility. The economy produces a single good used for private consumption, government consumption, and investment. Final output is produced competitively according to an aggregate production function with constant returns to scale and labor-augmenting technological progress. Effective labor input aggregates labor across all age groups and household types. Public investment efficiency governs the quality of public investment management and the effectiveness with

⁷ The analysis further excludes China and Spain from the sample, given the highly localized nature of their conflict episodes and the disproportionately large share of geolocated firms in the dataset for both countries.

which public investment translates into higher productivity for the capital stock. The net rental rate of capital r_t equals the marginal product of capital minus the depreciation rate δ .

Government Budget Constraint. The government purchases goods, provides transfers, finances itself through labor taxation and debt issuance, and faces a flow budget constraint. Government spending consists of both consumption and public investment.

Asset Market Clearing with Financial Frictions. The model features frictional financial accounts that allows to consider all possible situations ranging from the polar cases of a closed economy, where all domestic investments must be self-financed, to a fully open small economy, where the return on capital is entirely determined by global conditions. The degree of financial openness is controlled by the elasticity of foreign demand for domestic assets. The asset market clearing condition requires that households' asset demand relative to output equals the sum of government bonds relative to output B/Y , the capital-output ratio, and the net foreign asset position relative to output. The net foreign asset elasticity equals the negative of the partial derivative of (NFA/Y) with respect to r and is positive, reflecting how sensitive capital flows are to domestic interest rates.

Conflict Shocks and Transmission Mechanisms. The model incorporates three main categories of conflict shocks. *Capital destruction* shocks directly reduce physical capital stock, immediately affecting production capacity. *Population shocks* affect different age groups with distinct dynamic implications. Losses to the working-age population have effects that gradually subside over time as the affected cohorts age out of the labor force. In contrast, losses to young populations leave deeper and longer-lasting scars, with output effects that peak several years after the initial shock as the depleted cohorts enter working age. It is important to note that there is substantial heterogeneity across conflicts in terms of both casualties and outmigration. For the simulations, the population shock is calibrated to a three percent decline on impact, consistent with refugees accounting for the bulk of population losses. In some cases, however, losses can be larger (see Online Annex Table 3.5.2 for cases in which casualties alone amounted to as much as 11 percent of the population). *Confidence shocks* operate through two distinct channels affecting asset demand and risk premia. A domestic confidence shock represents a reduction in households' willingness to hold assets due to fear of conflict-related wealth destruction. This shock lowers the willingness to hold assets and creates an excess supply, pushing interest rates upward. The magnitude of this increase depends on the economy's ability to close the gap through increased savings, reduction in the capital stock or capital inflows.

Since output depends on the capital stock through the production function, the rise in interest rates is contractionary. The magnitude of the output decline depends on which share of the asset demand gap is filled by reduced investment versus increased savings or capital inflows. In a small open economy, changes in household asset holdings have negligible effects on output because foreign capital perfectly fills any gap. Conversely, in a closed economy the adjustment is entirely domestic and comes through disinvestment, substantially harming output.

A loss in foreign confidence operates through analogous mechanisms. When foreign investors demand a higher risk premium, the pressure in the clearing condition requires a higher domestic interest rate to achieve equilibrium, leading to the same crowding out of physical capital

observed in domestic confidence shocks. Similarly, an increase in government debt acts like a negative asset demand shock, crowding out productive capital investment.

Recovery Policies. We consider a combination of recovery policies, initiated five years after the conflict onset, first simulated in isolation, then together. For macroeconomic stabilization, starting from the scenario combining all the shocks, we shrink the wedges generated by the external and domestic confidence shocks gradually to their pre-conflict levels over eight years. The financing package is modeled by a linear increase of the tax-to-GDP ratio by three percentage points over 15 years of post-conflict, fully used for public investment. Together with public investment efficiency improvements, this recovery package translates into higher marginal product of capital and labor and crowds in private investment. Public investment efficiency increases by 10 percentage points relative to the average level reported in the October 2025 *Fiscal Monitor*, boosting the output return of the tax-funded recovery by about 1.4 percentage points, consistent with estimates in the October 2025 *Fiscal Monitor*. In addition, government has access to grant support amounting to about 0.5 percent of GDP per year during the first five years of post-conflict recovery. Finally, population is assumed to recover gradually with the return of displaced populations net of natural mortality four years after the end of the conflict, in line with the evidence presented in Box 3.3.

Any model is a simplification of reality and, as such, carries limitations. In this model, simulations are run in perfect foresight which preclude a more detailed analysis of the role of expectations. Relatedly, the model focuses on real variables and does not capture potentially inflationary dynamics. Instead, the model highlights how the degree of financial openness fundamentally shapes an economy's vulnerability to conflict shocks. In economies with limited access to international capital markets, confidence shocks force painful adjustment through domestic disinvestment and capital stock reduction, amplifying output losses. The framework demonstrates that government debt increases and confidence shocks operate through equivalent mechanisms, both acting as negative asset demand shocks that crowd out productive investment. Understanding these transmission channels is essential for designing effective policy responses to conflict-related disruptions.

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