The consequence of global instability: to what extent does conflict impact human development?

Beatrice Wood

Professional Economist BSc and Apprenticeship Level 6

School of Economics

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Abstract

This study examines the relationship between armed conflict and human development, employing panel data analysis of 139 countries from 1995 to 2018. Inspired by growing global geopolitical instability, demonstrated by conflicts such as the Russia-Ukraine war and tensions in the Middle East, the study uses the Human Development Index (HDI) as a composite measure of health, education, and living standards, with conflict-related fatalities from the Uppsala Conflict Data Programme as the primary independent variable. A fixed-effects regression model with a three-year lagged conflict variable reveals a statistically significant negative relationship between armed conflict and HDI. Control variables, including real GDP per capita and total unemployment align with economic theory, showing positive and negative associations with HDI, respectively. Regional analyses reveal varied impacts, with the Middle East demonstrating a significant negative effect of conflict on HDI, whilst Europe shows no long-term effect, and Asia and the Americas showing counterintuitive positive relationships, potentially due to limited sample sizes. This research provides a broad overview of this relationship to the literature, offering policymakers evidence to inform strategies that mitigate the adverse effects of conflict on human development.

AI Statement

I acknowledge the use of generative AI in early stage drafting and literature search in this paper. However, the work reported remains my own.

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1. Introduction

1.a. Definition of conflict

Armed conflict has been defined by the Uppsala Conflict Data Program as "A contested incompatibility that concerns government and/or territory where the use of armed force between two parties, results in at least 25 battle-related deaths in a calendar year." (UCDP, 2024). The measurability of conflict is not perfect, nor is the data collection for other metrics whilst conflict is taking place, but best estimates can be used to indicate the intensity of a conflict and understand the impacts that come from it.

1.b. Purpose of dissertation

This research aims to explore the relationship between armed conflict (also recognised as organised violence) and human development. The ambition of this research is to cover a broad overview of the relationship between these two variables that are so critical to society and the human experience.

This research has been inspired by the current (and everchanging) geopolitical climate, growing in instability across the world in the 2020s. Global fragmentation is becoming more prevalent, seen through conflict between Russia and Ukraine, Israel and the State of Palestine, and deteriorating West-East relations, such as that of the US and China. There has been changing political sentiment within countries, following the UK and US elections both leading to a change in government. The change in political direction from these key economies could have global impacts as new governments reassess their priorities for international collaboration and engagement. Therefore, whilst instability is not directly measured in this analysis, its critical consequence – conflict – will be assessed against human development to understand some of the societal impacts that global and political change can have.

1.c. Roadmap for the document

This dissertation has been structured as follows: Section 2 provides background into the geopolitical climate that is useful context to this work. Section 3 outlines the relation to economic theory and literature. Section 4 discusses the empirical framework, including data sources, variables that have been considered for this analysis, and the model specification selection process. Section 5 reports the results from the panel analysis and recommendations for future policy work, including limitations that should be considered when interpreting these findings. Finally, Section 6 concludes the research.

2. Background

2.a. Current trends in conflict

A critical indicator that geopolitical instability has reached its peak, is conflict, which acts as both a symptom and a catalyst of divisions in global order. One of the most defining conflicts of the current geopolitical landscape is Russia's invasion of Ukraine, which began in February 2022. What initially appeared to be a calculated power move by Russia (Bugayova, et al., 2023) – an attempt to take Ukraine's sovereignty to reaffirm Russia's position as a force of global power – has since evolved into a symbol of the widening split between the West and the East. The war is no longer just about territorial control, but has instead become the frontline of a broader strategic struggle. The West, previously considered an unchallenged coalition of superpowers, now faces mounting pressure from an emerging Eastern bloc, sometimes rebranded as 'CRINK' (China, Russia, Iran, North Korea), a coalition of authoritarian-led economies with fast growing influence (Marsden, 2024).

While Ukraine has received significant support from the West – both militarily and financially – Russia finds itself backed by China, further cementing the world's geopolitical divide. A localised war between two nations has transformed into a global power struggle, with consequences far beyond Eastern Europe. Russia remains firm in its belief that, without Western military aid, Ukraine would have collapsed long ago, validating Russia's ability to challenge Western power. However, the prolonged nature of the war, combined with economic sanctions and shifting alliances, has only deepened fractures within the international political system, ensuring that the conflict remains at the heart of global instability. The prolonged conflict will impact Ukraine through multiple channels – this analysis aims to understand what that impact could be from a human development perspective.

Similarly, ongoing tensions in the Middle East underscore that conflict is not confined to Europe – it is deeply embedded in regional struggles as well. The long-standing conflict between Israel and the State of Palestine serves as yet another hot spot of political unrest, one that has shaped the region's geopolitics for decades. Cycles of violence, failed peace initiatives, and shifting diplomatic strategies have only reinforced instability, with external powers leveraging the conflict to advance their own geopolitical interests. The situation reflects the broader instability of the Middle East, where power struggles and external interventions fuel a continuous state of turmoil. As alliances shift and actors assert new-found support and influence, the region remains volatile, further contributing to the ever-growing sense of geopolitical fragmentation. Whilst the primary goal of this analysis is to understand the broad

relationship between conflict and HDI, this work will also aim to unpick some of these regional differences as well.

These conflicts are prime examples that global instability is very prevalent in today's global landscape. They indicate clear fragmentation between the West, the East, and regionally within the Middle East. With everchanging power dynamics (IIED , 2025), and shrinking aid and stabilisation budgets (Chatham House, 2025), there are expectations of further economic fractures and development implications in the future.

Beyond the overwhelming themes of fragmentation between regions in the geopolitical landscape, the concept of cultural instability should not be overlooked as a driver of both inter- and intra- state conflict. Politically charged violence, extremism and terrorism are all examples of conflict that arises due to cultural instability, which can be driven through multiple channels. In particular, the media can be responsible for cultural changes, particularly with the accessibility of social media, from disinformation to more serious issues such as radicalisation (Binder & Kenyon, 2022). The government also plays a role, with strategic moves towards protectionist policies (such as the US blanket 10% tariff, introduced in April 2025[1]) and nationalism that promotes isolation. Cultural stability is closely linked to human development too, as culture shapes many of the social factors that influence development outcomes (Valsiner, 2000).

In a modern world, human rights and well-being considerations are becoming a key concern for a growing part of the world's population. With growing instability, there is a greater likelihood of conflict arising where it may not have been considered before. Therefore, it is becoming more important to understand the social (and economic) cost of armed conflict on human development for those in the region.

[1] These tariffs were announced on 2nd April 2025, to be imposed on 5th April 2025. However, a 90 day pause for import tariffs was announced on 9th April 2025 (BBC, 2025).

3. Theoretical framework and relation to literature

3.a. Economic theory: instability, uncertainty, and development consequences

Literature suggests that the absence of violent conflict since 1970 could have led to a 12% increase in global GDP to 2014 (de Groot, et al., 2022). Conflict takes resources away from productive uses, damages infrastructure, and leads to capital stock / human capital depletion, all of which constrain economic growth. The effects are not only immediate but also long-term, as war-torn economies can struggle to recover due to labour market distortions and lost human capital.

"Conflict can exacerbate instability but is more usually the manifestation of it" (Tickner, 2020). From instability, economic uncertainty can disrupt multiple economic mechanisms, which creates poor economic conditions overall. This uncertainty and its impact on the economy can be visualised through measures such as the Economic Policy Uncertainty Index. During times of significant uncertainty – conflict, political changes and financial crashes being prime causes – the index spikes, signalling widespread apprehension among investors and policymakers. This can be seen in figure 1 below.

Figure 1 Policy Uncertainty Index (1997-2017)

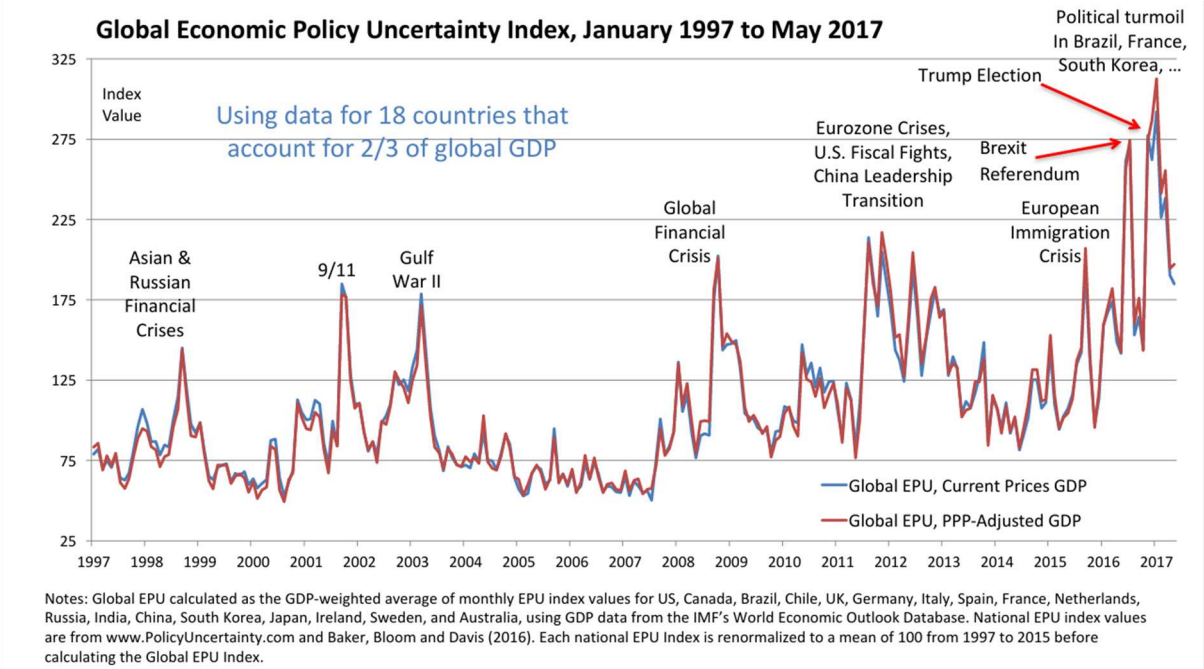

Figure 1 shows how uncertainty can be associated with conflict. For example, the 2nd Gulf War in 2003 caused a spike in uncertainty. Literature suggests that the impacts of economic instability on the economy can be large, with some studies estimating that the post-Financial

Crisis increase in uncertainty reduced US GDP as much as 3% (Bloom, 2014). Literature shows uncertainty can affect the economy through multiple channels (Economics Observatory, 2020):

- Increase stock market volatility (Liu & Zhang, 2015)
- Less investment, more household saving, higher borrowing costs
- Labour market impacts - reduced firm hiring activity and total employment (Jo & Lee, 2019)
- Reduce productivity (e.g. longer wait time for patents)

Core economic theory supports these channels of impact. The IS-LM model highlights the importance of investment confidence, as more market volatility and uncertainty lead to reduced investment and economic stagnation. This can happen at a household level (McMahon & Giavazzi, 2012) where households save more as a precautionary action, or at a firm level (Dixit & Pindyck, 1994), where the value of waiting out uncertainty is higher than the risk of investing amid uncertainty. Reduced investment, in turn, reduces technological progress and industrial development, which will impact long-term growth potential. Productivity also declines as labour markets are disrupted, human capital is lost as skilled workers are displaced, and infrastructure is destroyed (Egert & Maisonneuve, 2023). Households and firms in regions experiencing conflict also face higher borrowing costs as banks become more risk-averse, tightening credit availability and limiting economic resilience. Governments engaged in prolonged conflicts often run large deficits, leading to inflation and devaluation of national currencies, which further erodes savings and financial stability.

The conditions in which economic contraction and uncertainty reinforce each other, create a negative feedback loop which is supported by Keynesian multiplier theory. This makes recovery increasingly difficult. Lower consumer spending and investment reduce aggregate demand, leading to declining output and widespread layoffs. Theory shows the AD-AS model further illustrates the damage, as conflict both reduces aggregate demand through declining consumption and investment, and limits aggregate supply by disrupting production capacity.

There is also economic theory within the human development impacts from armed conflict. Human capital theory suggests that war disrupts education and healthcare systems, leading to a decline in skills, knowledge, and overall productivity. Conflict can lower educational outcomes (Bertoni, et al., 2019), and reduces access to medical care (Jawad, et al., 2021), which diminish long-term economic potential. The destruction of infrastructure and displacement of

people only worsen these effects, creating generational setbacks due to lost human capital. Wars often result in political instability, weakening governance structures and allowing corruption to thrive. Post-conflict societies often struggle to rebuild these institutions, prolonging the adverse effects of war (Collier, et al., 2003).

Conflict disrupts innovation, research, and overall productivity, which are essential for sustained economic development, supported by endogenous growth theory (Romer, 1986). Increase in military spending leads to the reallocation of public spending away from healthcare and essential services, undermines economic stability and growth (Garry & Checchi, 2020). This diversion of resources away from productive sectors slows technological progress and reduces investment in human capital. As a result, economies become trapped in cycles of stagnation, with diminished opportunities for long-term growth.

3.b. Related literature

War is "development in reverse" (Collier, et al., 2003). Across literature, the above economic theory is supported through research and analysis that shows human development is integral to better social outcomes and a thriving economy. However, this analysis often takes place within specific, compartmentalised areas of study, without consideration of human development as a whole (Vesco, 2025). Therefore, this section looks at the three elements of the Human Development Index – education, health and standard of living, to understand how these three components are affected by conflict individually.

There are both short-term and long-term education impacts due to conflict. In the short term, conflict is often linked to reduced school enrolment, poor attendance, and declines in literacy rates (Bertoni, et al., 2019). Looking at specific examples, research finds exposure to the Israel-Palestine conflict correlates with a lower likelihood of students passing their final year exams or getting into university (Bruck & Maio M, 2019), and exposure to the Sri Lankan civil war finds that exposure to violence when a child is school-aged reduces educational attainment by 3.49 years in worst-case scenarios (Ito, et al., 2024). This research also highlights that these impacts are also physical, as destruction of school property can limit educational outcomes too (Ito, et al., 2024).

Poor educational attainment can lead to long-term disruptions in labour markets and economic stability (Shemyakina, 2015). These educational setbacks extend to key economic sectors; for example, lower education levels correlate with slower economic growth, as education plays a crucial role in boosting GDP (Li, et al., 2024). There are also wider factors that should be

considered in the long-term – conflict can lead to changes in political regime, and weak states show higher risk of negative impacts on education following a war (Unfried & Kis-Katos, 2023).

Looking at health, armed conflict significantly impacts public health by increasing the risk of disease, injury, death, and limiting access to healthcare services (Garry & Checchi, 2020). Widespread communicable diseases become more likely, and overall poor health contributes to higher rates of malnutrition in affected populations (Connolly, et al., 2004). Beyond the impact on the health of individuals, poor health also impacts the wider economy. An unhealthy population reduces labour productivity and economic output (Siddique, et al., 2020). Mental health issues also weaken social capital (Haer, et al., 2020), and compromised health can limit an individual's ability to engage with political and institutional processes, reducing social inclusion and democratic participation (Gidengil & Wass, 2023).

The intensity of conflict has shown to be the most important determinant of mortality rates across the literature (Jawad, et al., 2021). These deaths can be both direct (from the conflict itself) or indirect (from the consequences of conflict), such as through malnutrition because of on-going conflict (Wagner, et al., 2018).

Finally, the standard of living element to HDI encapsulates so many elements of human development, as it refers to the way in which life is experienced by an individual. The HDI measures this through gross national income per capita, using money and income as a proxy for lived experience. Some analysis takes a forward look at the impact of income as a factor affected by conflict, showing that if intrastate conflict was eliminated in 2022, by 2030, 148.2 million people would be lifted from extreme poverty (Moyer, 2023). Looking at GDP per capita to support this, studies show conflict can reduce annual GDP per capita on average of 17.5% (Costalli, 2017).

There are examples of empirical analysis throughout this literature, which can be used to support the development of an empirical framework for this analysis. Two prominent approaches to conflict analysis have emerged across the literature, each taking different approaches to their methodology in order to assess the impacts of conflict on various human development indicators.

The first approach is to look at two time periods, and run comparative analysis, to understand how the dependent variable is affected during the conflict, and how this compares to pre or post conflict. In one instance, a Difference in Difference approach is used to quantify the

impact of the conflict on educational outcomes in North-East Nigeria, combining data from the Nigeria General Household Survey Panel with geo-localised conflict event data (Bertoni, et al., 2019). Similarly, the International Futures (IFs) model is used to forecast the long-term impacts of conflict on poverty, creating current and future scenarios to estimate how conflict disrupts economic development (Moyer, 2023).

The second approach involves cross-country analysis, which compares the effects of conflict across different nations to identify patterns and impacts on human development. Studies that have used this method have typically employed regression modelling to control for country-specific factors and isolate the effects of conflict. For instance, a study looking at the economic and social impacts of conflict, uses a dynamic fixed effects estimator with a distributed lag model to assess how conflict influences GDP growth, inequality, and social welfare across multiple countries (Le, et al., 2022). That analysis built upon the specification of an earlier study, which also used the same dynamic fixed effect specification to understand the macroeconomic costs of conflict (Novta & Pugacheva, 2021). A couple of studies looking at the impact of armed conflict on child mortality and education use a fixed effects model for cross country panel analysis, one looking at each year between 2000-2019 with a 1 year time lag (Jawad, et al., 2021) and the other looking at multiple 5 year periods between 1970-2009 (Gates & Hegre, 2012).

3.d. Hypothesis

Following a review of the empirical literature in this area, the hypothesis for this study will be steered from core economic theory: Armed conflict is likely to have a negative impact on a country's human development. However, conclusions in this analysis will be drawn with considerations to the limited data in this area of study, and considering empirical evidence has provided both supporting and contradictory/ insignificant conclusions from statistical analysis.

H_0 = Armed conflict has no impact on human development

H_1 = Armed conflict has a negative impact on human development

4. Empirical Framework

4.a. Data

The data used for this research is from publicly accessible secondary data sources, published online. Using these sources, a panel dataset was compiled at a country level, covering a period of 1995 to 2018 with annual data points, for all countries that had available data for this period. The dataset used in the final specification included 139 countries. This refinement is based on availability of data.

The period between 1995-2018 was determined to be the most useful period to provide a long time series of data overview of the relationship, whilst still incorporating a broad group of countries. The initial ambition was to include data from 1990-2018, but by including these additional 5 years, multiple countries needed to be removed due to incomplete data, which reduced the sample notably. Some of these countries were experiencing intense conflict, so removing these from the sample may inadvertently skew the results.

4.b. Variables

4.b.1. Dependent Variable

The Human Development Index (HDI) is a composite measure developed by the United Nations Development Programme (UCDP, 2025) to assess human well-being and lived experience, beyond just economic growth. While this metric does not consider all elements of human development, it is able to provide a broad overview based on key influences on human development – which is why it was chosen for this research.

The index captures three key dimensions of human development:

1. Health – measured by life expectancy at birth
2. Education – measured by mean years of schooling for adults over 25, and expected years of schooling for children entering school years
3. Standard of Living – measured by Gross National Income per capita, adjusted for purchasing power parity

Each of these dimension indices are then combined by taking the geometric mean to create the composite index (UNDP, 2024). This data is presented on a scale from 0 to 1, with a higher score indicating better human development.

Descriptive Statistic	***HDI***
Mean	0.68

Median	0.69
Standard Deviation	0.17
Kurtosis	-0.83
Skewness	-0.32
Range	0.72
Minimum	0.24
Maximum	0.96
Count	3336

Figure 2 Descriptive Statistics for HDI

The summary statistics in Figure 2 reveal a mean of 0.68 and a standard deviation of 0.17, suggesting moderate variation in development levels across countries in the sample. The distribution is relatively symmetrical, with a skewness score of -0.32 suggesting a slight left skew and low kurtosis score of -0.83, which suggests an even spread of HDI values. The median of 0.69 is slightly higher than the mean of 0.68, which suggests marginally more high development countries than low development countries in the sample. This sample from the HDI dataset includes values ranging from 0.24 to 0.96, showing this dataset includes a broad range of both low and high development countries.

4.b.2 Independent Variable

To understand the physical impact and consequence of global instability, the independent variable in this analysis is armed conflict – also referred to as organised violence – which presents data challenges as a concept. Unsurprisingly, war zones are not optimal data collection environments. As a result, conflict data is often scarce, inconsistent, or based on best estimates or event-level records, such as individual conflict start and end dates. The unpredictable nature of conflict — which may stop and restart, sometimes within the same year — combined with multiple overlapping conflicts within the same country, creates challenges when structuring data. This level of granularity is not well-suited for panel data analysis, which limited options for dataset.

The independent variable in this analysis is *best estimate of total deaths in organised violence,* reported by the Uppsala Conflict Data Program (UCDP). Organised violence is defined by the UCDP as the use of armed force leading to at least 25 battle related deaths in a country-year (Davies, et al., 2023). This data is presented in country-year format, at a more aggregated level

than other conflict datasets, which lends itself for interpretation alongside multiple explanatory variables.

Organised violence includes three types of conflict (Davies, et al., 2023):

1. State-based violence, involving at least one governmental actor
2. Non-state violence between two organised but non-governmental groups
3. One-sided violence, or the deliberate use of armed force against civilians

Figure 3 below shows the total number of fatalities from organised violence between 1989 to 2023 (Davies, et al., 2023). There are multiple rises in fatalities in this data that can be correlated to specific instances of conflict. The spike in one-sided violence in 1995 can be attributed to the Rwandan genocide, and the peak in 1999 – 2000 is aligned with the Ethiopian-Eritrean war. The period of 2011-2021 accounts for the gradual increase in tension in the Middle East, and the 2021 to 2023 increase can be explained by the intense Russia-Ukraine war. Alongside these, there are smaller, but still devastating conflicts that have appeared alongside the more significant conflicts that are picked up in the media.

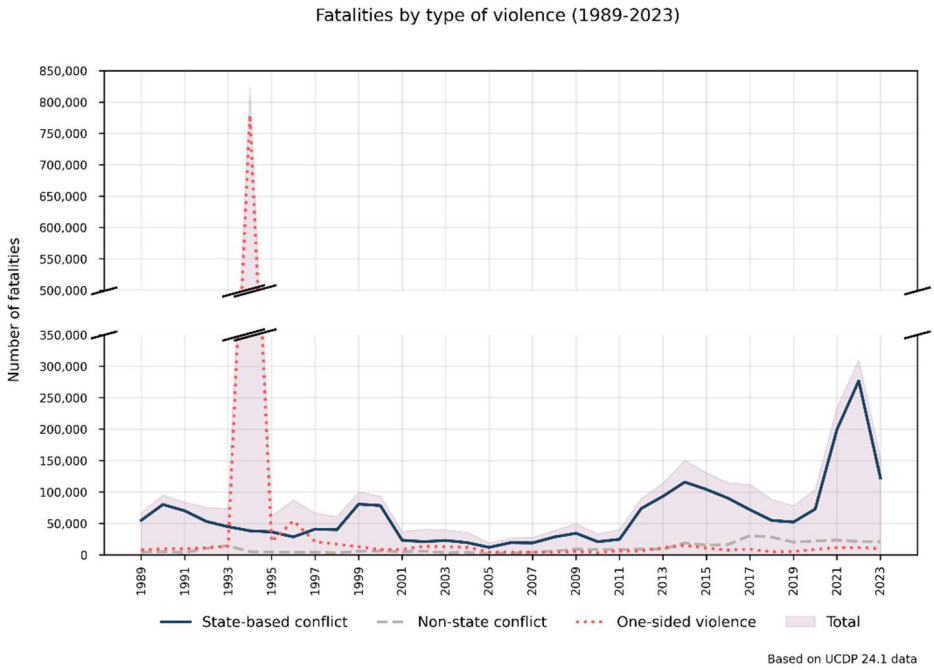

Figure 3 Fatalities by type of violence (1989-2023), UCDP

Figure 3 shows that the period between 1995 to 2018 had lower fatalities than the time periods before and after – however, this does not mean that this period does not include intense conflict. From this full conflict dataset, countries were removed where there was incomplete Human

Development Index data (given it is the independent variable in this analysis). Through the process of preparing this data for statistical analysis, this included removing some countries that had experienced intense conflict. Chad, Ethiopia and Eritrea were missing HDI data in periods that they also experienced notable conflict. Ethiopia and Eritrea did not have available HDI data for 1999, where they recorded 30,786 and 17,203 organised violence fatalities respectively.

Across the dataset, 57 countries were removed due to a lack of HDI data, sourced from the World Bank (World Bank, 2025). The countries that were removed from the data were experiencing varying levels of conflict, and it is key to note that the lack of data may be a direct result of the conflict itself. In several instances, the absence of data on the Human Development Index coincides with periods of active conflict, which may have hindered data collection and reporting efforts. This missing data may skew the results, as countries experiencing the most severe impacts of conflict have been excluded from the final regression analysis. Consequently, the estimates may not fully represent the true effect of conflict on human development, and this limitation should be considered when drawing conclusions from this analysis.

The overall sample size remains robust, covering 139 countries over 24 years, and includes data from both conflict-affected and non-conflict-affected countries. Therefore, the analysis should still capture meaningful impacts around the relationship between conflict and human development.

Descriptive Statistic	***Total Deaths***
Mean	427.10
Standard Deviation	3023.82
Sample Variance	9143505.82
Skewness	17.44
Minimum	0
Maximum	78680
Count	3336

Figure 4 Descriptive Statistics for Total Deaths in Organised Violence (UCDP)

The summary statistics in Figure 4 provide insight into the characteristics of the data across 3336 observations. In particular, the large variance within the sample and skewness value of

17.44 suggests a highly skewed and uneven distribution of violence across countries and years. This indicates there is a range of conflict intensity in this sample, including such intense conflict that could be considered an outlier – for example the maximum value of 78,690 deaths in 2014, in Syria. However, the contextual data in Figure 3 indicates this is not a huge outlier when compared to the wider data series. Therefore, the more intense conflict in this series will be included in the dataset for this analysis.

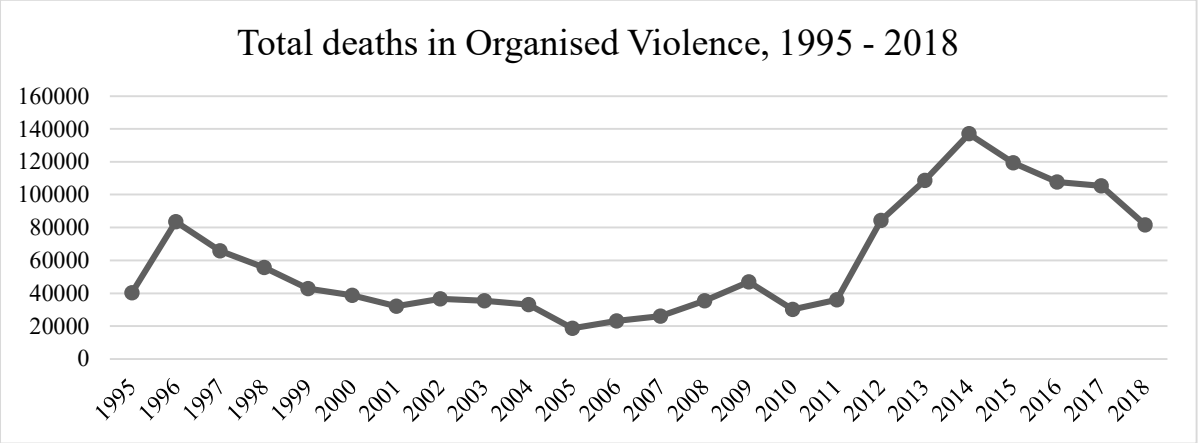

Figure 5 Total Deaths in Organised Violence (1995-2018)

Figure 5 shows the distribution of organised violence fatalities from the final sample of 139 countries. As shown, there is a period of consistency between 1999 and 2011 where conflict and civil unrest has continued in countries such as Afghanistan, Algeria, Burundi, Colombia, DRC, India, Iraq, and Sudan. The period between 2013 and 2017 sees a clear rise in organised violence fatalities, which is can likely be attributed to rising tension in the Middle East – the 2014 Gazan war and the declaration of an Islamic Caliphate by ISIS, being particularly of note.

4.b.3 Explanatory Variables

The inclusion of multiple explanatory variables will be considered and explored in this analysis, to account for additional factors that may impact HDI and explain some of the variation in the relationship with armed conflict fatalities. The following explanatory variables will be considered in this research, all sourced from the World Bank databank:

- **Real GDP per Capita**: average income per individual, adjusted for inflation. Considered for this analysis as a proxy for overall economic development, where higher levels of income are typically associated with improved living standards, stronger institutional capacity, and a reduced risk of conflict.

- **FDI, Net Inflows (% of GDP)**: volume of foreign direct investment relative to the size of the economy. Increased FDI can stimulate economic growth, enhance employment opportunities, and improve infrastructure, therefore improving conditions that support human development.
- **Life Expectancy at Birth (Years)**: average number of years a newborn is expected to live at the time of their birth. Higher life expectancy is indicative of better healthcare systems and overall welfare, both of which contribute positively to human development. However, this measure is also an element of the dependent variable, therefore is likely to present multicollinearity if used in the final specification.
- **Urban Population (% of Total Population)**: the proportion of a country's population residing in urban areas. Urbanisation is often associated with improved access to services and economic opportunities; however, it can also intensify socio-economic inequalities or be more susceptible as a target during conflict.
- **Unemployment, Total (% of Total Labour Force)**: share of the total labour force that is actively seeking but unable to find employment. High levels of unemployment are indicative of economic distress which can contribute to negative social and development outcomes.
- **Youth Unemployment (% of Labour Force Aged 15–24)**: measures the unemployment rate among individuals aged 15–24 within the labour force. Elevated youth unemployment is particularly concerning, as it may contribute to heightened social frustration, increase the risk of political mobilisation or violent conflict, and undermine future prospects for human development.

Descriptive Statistics	Real GDP per Capita	FDI, net inflows	Life expectancy (at birth)	Urban pop (% of total pop)	Unemp, total (%)	Unemp, youth total (%)
Mean	15640.63	4.96	69.16	58.67	7.81	15.94
Standard Error	314.11	0.29	0.16	0.44	0.10	0.21
Standard Deviation	17679.95	16.61	9.39	22.65	5.80	10.93
Kurtosis	11.27	330.60	-0.17	-0.86	2.91	0.56
Skewness	2.49	15.88	-0.72	-0.27	1.52	1.02
Range	155895.4	506.61	44.24	92.79	37.83	57.78
Minimum	403.6	-57.53	39.97	7.21	0.11	0.38
Maximum	156299	449.08	84.21	100	37.94	58.16
Count	3168	3272	3336	2592	3312	2592

Figure 6 Descriptive Statistics for control variables

The summary statistics in Figure 6 show variation across the explanatory variables, providing context to the relationship between armed conflict and human development. Real GDP per capita has a mean of approximately $15,641, but a large standard deviation of $17,680 and a maximum value of $156,299 which suggest a highly skewed distribution, further confirmed by positive skewness and high kurtosis scores suggesting there are a few very wealthy countries in the sample. FDI net inflows have a mean of 4.96% of GDP but a high standard deviation of 16.61 which suggests that international investment is concentrated in a few countries. Life expectancy at birth is more normally distributed, with a mean of 69.16 years. Urbanisation levels have a mean of 58.67%, but also high variation, with both highly urbanised and predominantly rural countries represented in the sample. Unemployment rates (both total and youth) show moderate positive skewness, with youth unemployment (mean 15.94%) higher than general unemployment (7.81%), which can be used to help understand the state of the labour market amongst countries in the sample.

These explanatory variables will be considered to demonstrate where important variation should be accounted for and not explained through conflict. A range of these variables will be applied within the selection of model specification to find the model that explains the relationship between the independent and dependent variables in the most coherent way, whilst remaining conscious of econometric challenges that may require testing, transformations, and robustness checks, to ensure accuracy within the model.

4.c. Selection of Specification

To assess the impact of organised violence on human development, a panel data regression model is employed, taking observations from 139 countries over 24 years. Given the possibility of time-invariant unobservable heterogeneity — such as contextual factors unique to each country — a fixed effects (FE) model is applied to control for these factors. This approach isolates within-country variation over time, allowing for a more precise estimation of the relationship between organised violence and human development. This is supported by literature, where similar analysis into conflict also uses fixed effects for panel analysis (Jawad, et al., 2021). To test for the adequacy of Fixed Effects for this analysis in particular, the Fixed Effects model was compared with a Random Effects model. A Hausman test was conducted, indicating a statistically significant result ($p < 0.05$), suggesting that the unique errors are correlated with the regressors. Therefore, the null hypothesis was rejected, and the fixed-effects model was chosen for this analysis.

Moving forward with the fixed effects model, statistical tests were carried out to assess the reliability of this model. The Wooldridge test for autocorrelation strongly rejected the null hypothesis of no first-order autocorrelation, suggesting there is some correlation within the panel data. The distribution-free Wald test for heteroskedasticity also rejected the null hypothesis, suggesting heteroskedasticity is present in the model. To address these findings, HAC Arellano robust standard errors will be applied to the model represented in equation 1 below.

The baseline model is specified by equation 1:

$$HDI_{it} = \beta_0 + \beta_1 Conflict_{it} + \mu_i + \lambda_t + \epsilon_{it}$$

where:

- HDI_{it} = Human Development Index for country i in year t
- $Conflict_{it}$ = the number of fatalities from organised violence per country-year, sourced from the Uppsala Conflict Data Program (UCDP)
- μ_i = unobserved, time-invariant country-specific effects
- λ_t = year-specific effects that controls for common global effects
- ε_{it} = error term.

The results from the base model show a statistically significant negative relationship between fatalities from organised violence and HDI, with a coefficient of −8.06e−07 ($p = 0.046$). Although the effect size is small, this relationship aligns with theory and literature that suggest increased violence is associated with reduced human development. The F-test on the regressor confirms that violence contributes explanatory power to the model ($p \approx 0.048$). A robust Welch test strongly rejects the null hypothesis of homogenous country intercepts ($p < 0.001$), which further supports the use of a fixed effects approach.

A consideration for this panel analysis is whether there is a lagged effect from conflict on human development. Similar literature has explored the need for a data lag, with some literature using a time lag of 1 year (Jawad, et al., 2021) and other literature using a time lag of 3 years (Ammons, 1996). There is a strong rationale behind both these time lags – the shorter, 1 year lag captures more direct and short-term consequences of conflict, whereas the longer, 3 year shows the impact conflict can have on the social and economic recovery, or lack of recovery, for a country too. When tested within this analysis, these models showed that both the 1 year and 3 year lags had statistically significant negative coefficients, indicating a negative effect of conflict on human development in both the short and longer term, which remains consistent with the economic theory. The model with the 1 year lag showed that the coefficient for conflict was statistically significant at the 1% level, and it provided a strong fit to the data with a higher log-likelihood and lower AIC compared to the model with a 3 year lag. The 3 year lag model

had a slightly higher within R^2, reflecting a better fit in terms of explained variance over time. Therefore, this analysis will take forward the 3-year lag into the final model specification.

From this, additional explanatory variables are introduced to further understand how each variable influences, and can be used to explain, changes in Human Development. Supported by economic theory, a variety of explanatory variables have been considered in this analysis, covering a broad range of economic, social and geographic factors that can impact development (as outlined in the data section above). Of these factors, life expectancy was considered as a variable to control for the impact of health on human development, however when included in the model specification showed strong multicollinearity with HDI (given it is a component of the index) and absorbed a lot of variance within the model which reduced the significance of conflict. Based on this, life expectancy was excluded as an independent regressor to ensure that the model remained theoretically valid and statistically stable. Both FDI net inflows and urbanisation were also modelled at this stage but were both found to have statistically insignificant relationships with HDI and therefore were also not taken forward with this analysis despite the theoretical links.

The final model specification for this analysis is outlined in equation 2 below:

$$HDI_{it} = \beta_0 + \beta_1 Conflict_{it-3} + \beta_2 RealGDPperCapita_{it} + \beta_3 Unemployment_{it} + \mu_i + \lambda_t + \epsilon_{it}$$

Equation 2 builds upon equation 1, by introducing a lagged conflict variable (lag of 3 years) and the inclusion of two explanatory variables – real GDP per capita, and total unemployment. These are both economy-facing metrics that can have significant impact on an individual social and economic outcomes, contributing to a country's overall human development. This model uses Arellano robust standard error and includes a constant term to capture the baseline HDI level, adjusted for country- and year-specific fixed effects.

For this approach to effectively test the hypothesis, there will be several assumptions. The model assumes a causal relationship between human development and organised violence, free from omitted variable bias, where other unobserved factors do not significantly influence the results. The error term must be uncorrelated with the explanatory variables to avoid endogeneity.

5. Results

In most models ran as part of this analysis, conflict proved to have a negative impact on human development. Across the models produced in this analysis, this relationship was generally statistically significant.

5.a. Final Specification Results

The final specification, outlined in equation 2 above, models conflict fatalities with a 3 year lag against human development. The results for this regression are in Figure 7 below.

	Conflict best estimate		***Conflict high estimate***		***Conflict low estimate***	
Variable	**Coefficient**	**St. Error**	***Coefficient***	***Standard Error***	***Coefficient***	***Standard Error***
Constant	0.659031 ***	0.026	*0.659204 ****	*0.026*	*0.659072 ****	*0.026*
Deaths in Organised Violence (3 year lag)	−1.00131e-06 ***	0.000	*−9.86220e-07 ****	*0.000*	*−1.00010e-06 ****	*0.000*
Real GDP per Capita	0.00000267754 **	0.000	*0.00000267454 **	*0.000*	*0.00000267736 **	*0.000*
Total Unemployment	−0.00228112 **	0.001	*−0.00228126 **	*0.001*	*−0.00228136 **	*0.001*
Observations	*2772*		*2772*		*2771*	

Figure 7 Final model specification output

The final model specification in Figure 7 shows a statistically significant negative relationship between Human Development Index (HDI), and armed conflict, proxied by the total number of deaths from organised violence, lagged by three years. This model uses a fixed-effects panel approach with robust (HAC) Arellano standard errors, whilst controlling for economic performance and labour market conditions through GDP per capita and unemployment variables. By including additional control variables and a lagged element to the independent variable, the sample size has reduced from the original baseline model sample size but remains robust with 2772 observations across 132 countries, over a 21-year period (1998-2018).

This model shows that **each additional fatality in conflict-related deaths is associated with a 0.000001 decrease in HDI** (with a 3 year lag). Whilst this coefficient appears numerically

small, given that HDI is measured on a 0–1 scale and considering the number of deaths that a conflict can cause, the overall effect is more meaningful. To contextualise this, this equation can be applied to the Russia-Ukraine war as a rough visualisation of the impact of conflict (assuming perfect consistency across other factors that impact HDI). Based on the same UCDP dataset used in this analysis, Ukraine recorded approximately 92,821 conflict-related deaths in 2022 and 70,915 in 2023. Given the 3 year lag structure of the model, this model would show the impact of these conflict deaths in 2025 and 2026 respectively. Applying a critical assumption that all other factors remain constant, Ukraine's HDI could drop by roughly 0.093 in 2025 due to the 2022 conflict alone, and another 0.071 in 2026 due to 2023 conflict. Ukraine's HDI stood at 0.734 in 2022, so these reductions could bring it down to approximately 0.570 by 2026 – moving it from the "high human development" category to well within the "medium" range.

This model also shows the relationship between human development and explanatory variables. Real GDP per capita has a positive and statistically significant relationship with HDI ($\beta = 2.68 \times 10^{-6}$, $p = 0.0427$), supporting theory that economic growth contributes positively to human development outcomes. Similarly, economic theory also supports the impact shown by total unemployment, which is negatively associated with HDI and is also statistically significant ($\beta = -0.00228$, $p = 0.0185$).

Various tests were conducted to understand the reliability of the model. The model explains a high proportion of the overall variation in HDI, with an LSDV R^2 of 0.96. However, the within-country variation explained is smaller (within $R^2 = 0.187$). The joint F-test on the regressors is statistically significant ($F(3, 131) = 10.05$, $p < 0.001$), confirming that the included variables jointly explain variation in HDI. The Welch F-test strongly rejects the null hypothesis of a common intercept across countries ($F(131, 893.3) = 275.34$, $p < 0.001$), confirming that fixed effects is the best approach for this model. An F-test on year dummies confirmed their joint significance ($p < 0.01$), supporting the inclusion of λ_t. Additional testing shows the presence of heteroskedasticity through the Wald test ($\chi^2(132) = 114586$, $p < 0.001$) and first-order autocorrelation with the Wooldridge test ($F(1, 131) = 165.04$, $p < 0.001$), despite the use of HAC robust standard errors. This is a limitation of the model and therefore should be considered when interpreting these results.

The use of 'best estimate' data is a limitation of this analysis, as there is a higher chance of inaccuracy within the data. Therefore, as a robustness check, the main model was re-

estimated using both the high and low estimates of conflict-related fatalities in place of the best estimate measure. In both alternative specifications, the lagged conflict deaths variable retained its negative sign and remained statistically significant at conventional levels (p = 0.0016 for high estimate data; p = 0.0032 for low estimate data). The coefficients for real GDP per capita and total unemployment also remained statistically significant and nearly identical across the models. This consistency in direction and significance of the relationship across all three models reinforces the reliability and robustness of these main findings, indicating that the observed negative relationship between conflict and human development is not sensitive to variation in estimates that conflict is measured with.

5.b. Additional findings

The use of a time lag in the final model, naturally provokes thoughts about the time scale of impact of conflict on human development. The regression output below models the relationship between conflict with no lag and HDI, with the same control variables as the final model specification above, to understand what the impact the 3 year time lag has.

Variable	Coefficient	Standard error	p-value
Constant	0.650676 ***	0.026	<0.0001
Deaths in Organised Violence	−6.28362e-07 *	0.000	0.0988
Real GDP per Capita	0.00000282459 **	0.000	0.0321
Total Unemployment	−0.00234429 **	0.001	0.0218

Figure 8 Final model output, with no time lag for the conflict variable

The results in Figure 8 suggest that while conflict still exerts a negative effect on HDI in the short term, the size and statistical significance of this effect are smaller than that of the lagged model. The coefficient for deaths in organised violence remains negative (0.000000628) but is only marginally significant at the 10% level (p = 0.0988), whereas the lagged model shows a stronger and more robust effect (−0.00000100131, p = 0.0044). This suggests that the more notable consequences of conflict on human development may not be felt immediately but rather accumulate and impact development over time. The control variables (GDP per capita and

unemployment) remain significant in this model, reinforcing the established theoretical relationship with human development.

Whilst the primary ambition of this work to get a broad view of the relationship between conflict and human development, there is also value in understanding this relationship at a more granular level. Therefore, the final model specification was applied to each region, to see how conflict affects human development in each regional context – where culture, society and economic structures can differ hugely. These regional results should be interpreted with caution due to the few observations within each sample.

	Europe		Middle East		Asia		Americas	
Variable	**Coefficient**	**St Err**	**Coefficient**	**St Err**	**Coefficient**	**St Err**	**Coefficient**	**St Err**
Constant	0.669116 ***	0.037	0.683069 ***	0.041	0.595706 ***	0.044	0.587324 ***	0.027
Deaths in Organised Violence (3 year lag)	1.09E-06	0.000	−7.19845e-07 ***	0.000	1.60E-06	0.000	3.28E-07	0.000
Real GDP per Capita	0.00000574934 ***	0.000	0.00000096421 *	0.000	0.00000716977 ***	0.000	0.0000102238 ***	0.000
Total Unemployment	0.00107	0.001	0.0030843	0.005	−0.00412973	0.004	−0.000406211	0.001
Observations	693		273		504		525	

Figure 9 Final model specification applied to each region

The regression outputs in Figure 9 shows how the relationship varies across regions. In Europe, the coefficient for conflict deaths (still with the three year time lag) is small and statistically insignificant ($p = 0.7088$), indicating no observable long-term effect of conflict on HDI. This differs to the results in the Middle Eastern sample, where the results are statistically significant, showing a negative effect of conflict on HDI ($p < 0.001$). However, in the Asia and Americas models, there appears to be a statistically insignificant but positive relationship between

conflict and HDI, which counteracts with both economic theory, and the other findings in this analysis.

Looking beyond the dependent and independent variables, Real GDP per capita is positively and significantly associated with HDI in all four models, with the strongest effect observed in the Americas. These aligns with theory that economic growth is a key driver of human development, although the size of this effect differs by region. Unemployment does not show this same consistency and does not reach statistical significance in any of the regional models. This might indicate limited sensitivity of HDI to labour market changes which is less obvious in the main model.

5.c. Limitations

There are limitations within this analysis that should be acknowledged when interpreting results. Using best estimates for the independent variable (organised violence deaths) introduces potential measurement error. These figures may not fully capture the scale or variation of violence, especially in regions with restricted access or contested narratives. The impact of this has been mitigated by modelling the high and low estimates of the dataset too. Missing data – particularly from countries experiencing intense or prolonged conflict – required the exclusion of some observations, which may bias the sample toward more stable regions and underrepresent the most affected populations. This reflects the challenge of data collection in conflict zones, where data collection is deprioritised amid violence. Finally, although heteroskedasticity- and autocorrelation-consistent (HAC) standard errors were used to mitigate violations of assumptions, the Wooldridge and Wald tests showed residual heteroskedasticity and correlation remained, which is a limitation of the robustness of the model.

5.d. Policy Recommendations

The policy implications of this work will be within the international economic policy area. By understanding how armed conflict effects human development, it will provide policymakers with insights into the following:

1. A rounded view of the social impacts of conflict, and the challenges that could arise for war-torn countries.
2. An understanding of how political turmoil induced conflict could impact a country's human development, which differs across regions.

With the backdrop to economic security currently facing significant conflict such as Russia-Ukraine, Israel-Palestine, and other growing tension, understanding the wider impacts of conflict is essential for informed policy decision making.

6. Conclusion

This research provides policymakers with a better understanding of the relationship between armed conflict and human development. This analysis used a fixed effects model to test causality between these variables, whilst considering additional economic variables to contextualise the relationship.

This research builds on existing literature in this area, as previous work has looked at specific elements of development, and its relationship with armed conflict. This work takes a broader view of the relationship, to create a more comprehensive view of how conflict impacts human development overall.

This analysis found that each additional fatality in conflict-related deaths is associated with a 0.000001 decrease in HDI (with a 3 year lag). Whilst each singular fatality appears to have a small impact, the cumulative impact of a significant conflict would have a notable effect on HDI – for example, 100,000 conflict fatalities could have a 0.1 impact on HDI.

The additional findings also yield interesting outputs. Understanding the impact of the inclusion of a time lag in the model shows that whilst there are longer term impacts of conflict (with the 3 year lag), there are also immediate effects that will impact HDI. Additionally, insight into the regional analysis showed each region has different developmental consequences from conflict which suggests that there are social and economic institutional structures that can affect how conflict impacts are felt, and how able a country is to recover.

Unlike prior studies focusing on specific development indicators, this research offers a holistic HDI-based analysis, revealing conflict's cumulative toll on development. Further in-depth regional analysis could provide interesting findings and help policymakers fully understand the relationship between these variables (especially due to the limitations around available data).

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