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Abstract

This study examines the role of foreign direct investment (FDI) in advancing peacebuilding in Sudan via promoting youth employability using the autoregressive distributed lag (ARDL) model and time series data from 1992 to 2023. The findings indicate that both FDI and financial development substantially decrease youth unemployment rates over the long run. Conversely, the findings reveal that elevated inflation rates lead to higher youth unemployment over time. Furthermore, we find that the prevalent rates of youth unemployment considerably hamper peacebuilding efforts both in the short and long run. The primary conclusion is that augmenting FDI inflows can facilitate peacebuilding initiatives within the Sudanese setting by broadening employment prospects for unemployed youth. Accordingly, by harnessing FDI inflows strategically, Sudan can create a more inclusive labor market that not only provides employment opportunities but also fosters stability and peace.

Keywords: Youth employment, FDI, ARDL, Peacebuilding, Sudan
JEL Classifications: E24, F21, J14.

ملخص

تهدف هذه الدراسة إلى اختبار دور الاستثمار الأجنبي المباشر في تعزيز بناء السلام في السودان من خلال الحد من البطالة وسط الشباب السودانيين وذلك باستخدام نموذج الانحدار الذاتي للفجوات الموزعة وبيانات سلاسل زمنية تمتد من 1992 إلى 2023. تشير نتائج الدراسة إلى أن الاستثمار الأجنبي المباشر والتنمية المالية يقللان بشكل كبير من معدلات البطالة وسط الشباب في المدى الطويل. على النقيض من ذلك، أثبتت النتائج أن معدلات التضخم العالية تزيد من معدلات بطالة الشباب في المدى الطويل. بالإضافة إلى ذلك، تشير النتائج إلى أن تزايد معدلات البطالة وسط الشباب يثبط جهود بناء السلام في البلاد على المديين القصير والطويل. الاستنتاج الأساسي لهذا التحليل هو أن زيادة تدفقات الاستثمار الأجنبي المباشر يمكن أن تعزز مبادرات بناء السلام داخل البيئة السودانية وذلك من خلال خلق فرص العمل للشباب العاطلين. عليه، من خلال صياغة استراتيجية قومية للاستفادة من تدفقات الاستثمار الأجنبي المباشر، يمكن خلق سوق عمل أكثر شمولاً لا يقتصر دوره في توفير فرص العمل للشباب فحسب، بل أيضًا يعزز الاستقرار والسلام في السودان.

1. Introduction

Youth unemployment represented one of the significant drivers of the socioeconomic tensions engulfing Sudan before the 15 April 2023 war. The link between the current war—which has taken thousands of lives and devastated economic infrastructures—and high youth unemployment rates is straightforward. Observations from battlefields suggest that youth make up the vast majority of warriors and leaders in the war. According to official data, youth aged 15 to 24 account for more than 40 percent of Sudan's total population (World Bank, 2024). In the context of the Sudanese economy, where there is a lack of capital and limited job opportunities, 39 percent of this cohort remain permanently unemployed (ILO, 2022). This proportion of youth outside the circle of economic activities—along with prevailing ethnic and tribal fragmentations—heightens their susceptibility to warfare and violence, thereby jeopardizing peacebuilding among communities. Apart from UN Security Council Resolution 2250 (2015), which emphasizes the synergy between youth, peace, and security, previous literature has consistently demonstrated that the deficiency of job opportunities predisposes youth to engage in warfare, violence, and criminality (UNOWA, 2005; Baron, 2008; McCarthy, 2010; Blattman and Ralston, 2015; Dasgupta et al., 2017). In theory, employment can prevent communities from slipping into violence by enriching the interaction between individuals and communities (Allport, 1954), reducing inequality and inequity across individuals and societies (Collier and Hoeffler, 2004), increasing the opportunity cost of engaging in aggressions and wars (Becker, 1968), and decreasing competition for resources (Fehr et al., 2013).

With this linkage between the peacebuilding process and youth employment in mind, policymakers in Sudan need to devote efforts and manage resources to engage unemployed youth in productive activities. One of the strategies that can be adopted to lift youth employability and, hence, promote and sustain peacebuilding is the attraction of large amounts of FDI inflows. Several studies have confirmed the positive relationship between employment, particularly among youth, and hosting FDI (Liu, 2024; Weaich et al., 2024; Tanaya and Suyanto, 2023; Ahmad and Khan, 2018; Haddad, 2018; Sam, 2016; Ali, 2018). Evidence has highlighted that FDI presence promotes employment in host countries through several channels. For instance, FDI could contribute to lessening unemployment by directly creating fresh job opportunities. Moreover, local firms can boost employment in host countries by expanding their activities in response to increased demand from foreign enterprises or by providing inputs that they would otherwise import from abroad at higher costs (Ali, 2018; Alabi et al., 2018). Additionally, FDI can also add to employment in host countries by equipping national workers with advanced and refined skills and assisting them in picking jobs (Gereffi, 2006).

Given that Sudan, according to statistics, attracts a substantial amount of FDI—accounting for an average of three percent of the GDP between 2011 and 2020—and simultaneously houses a large portion of unemployed youth, the contribution of these investments to youth employability and,

consequently, the peacebuilding process, represents a cause for concern. It is worth noting that when the current violent war ends, the country will need capital to restore the destroyed infrastructure, especially in vital sectors such as water, electricity, education, and transportation. Under such circumstances, it becomes challenging for policymakers to address the issue of youth unemployment. In other words, policymakers will allocate the limited resources to rebuild the damage caused by the war, leaving unemployed youth as "a ticking time bomb" that could explode at any moment, potentially leading the country into even more intense violence and conflict. Therefore, given the persistent failure to employ youth due to resource scarcity, FDI emerges as a viable and achievable solution.

Given this background, two questions can be raised: (1) Does FDI contribute to peacebuilding in Sudan by lessening unemployment among youth? (2) Does youth unemployment undermine the peacebuilding process in Sudan? With those inquiries in mind, this study utilizes the autoregressive distributed lag (ARDL) method by Pesaran and Shin (1998) and Pesaran et al. (2001) to examine the long-term connections between FDI and youth unemployment, as well as the relationship between youth unemployment and the peacebuilding process in Sudan. The study relies on time series data from 1991 to 2023 sourced from reputable institutions such as the World Bank, the International Labour Organization, Barro and Lee, the United Nations Conference on Trade and Development (UNCTAD), and the Sudan Central Bureau of Statistics.

This study makes a significant contribution in multiple ways. The first is timeliness, as this study aligns with the ongoing catastrophic war that is wreaking havoc in Sudan. Specifically, the end of the conflict will necessitate the reintegration of youth—primarily recruited as combatants or victims—into the labor market. This is because the hands that will be released from guns may possibly reclaim them if they are left idle. Second, establishing a connection between the peacebuilding process, youth employment, and FDI can enlighten policymakers about the role of FDI in reducing the unemployment rate, particularly by considering youth employment as a criterion for allocating incentive packages to foreign investors. Finally, interventions to reduce youth unemployment through locally- and foreign-funded projects face a variety of challenges that include insufficient funds, unsustainable funds, and incompatibility with national macroeconomic policies (Lindsay and McQuaid, 2005; Izzi, 2013). Thus, this study provides further insight into the role of FDI as a prominent alternative in addressing the issue of youth unemployment in economically fragile contexts like Sudan.

The rest of this paper is organized as follows. Section 2 reviews the relevant literature and establishes the econometric framework. Section 3 provides some context and specifics on the relationship between youth unemployment, FDI, and the peacebuilding process in Sudan. Section 4 outlines the empirical econometric strategy, and section 5 summarizes the findings of the investigation. Finally, section 6 presents the findings and draws conclusions.

2. Literature review

The current trend of connecting youth unemployment and FDI is driven by two main motives. First, the large influx of FDI raises concerns about how it may improve the overall economic performance of the receiving countries. Second, the rise in young populations, known as "youth bulges," and its impact on a country's stability have led to the perception of FDI as a source of employment for this demographic group. These motives have prompted numerous studies to delve into and analyze the correlation between FDI and youth unemployment across various contexts, enriching the understanding of this relationship. For instance, Weaich et al. (2024), Tanaya and Suyanto (2023), Michael and Geetha (2020), Baskot (2020), Sever and İědeli (2018), Ahmad and Khan (2018), Kannaiah and Selvam (2014), Sam (2016), and Ali (2018) examine the correlation between FDI and unemployment in a single country. Others, such as Liu (2024), Mkombe et al. (2021), Almula-Dhanoon (2014), Hasan and Sasana (2020), Setyanti and Wahyudi (2021), Ebaidalla (2016), Anyanwu (2014), and Anyanwu (2013) examine a group of countries.

Studies conducted in a single country vary widely in their findings. Some have documented that FDI reduces youth unemployment rates, while others have found the opposite. For instance, Tanaya and Suyanto (2023) use the ARDL to examine the relationship between youth unemployment and FDI in Indonesia over the period 1991-2017. Their results indicate that FDI significantly reduces youth unemployment. Among a set of macroeconomic variables, Sam (2016) tests the impact of FDI on youth unemployment in Kenya using the same regression technique and data from 1979 to 2012. His findings indicate that FDI significantly decreases Kenyan youth unemployment. Quite relevant to the current study, Ali (2018) investigates the causes of urban youth unemployment in Sudan, applying VECM to time series data spanning the period 1981-2011. His analysis reveals that the interaction between FDI and average years of schooling has a positive long-run impact on urban youth unemployment. However, this impact turned out to be negative in the short run. Ahmad and Khan (2018) investigate the causes of youth unemployment in Pakistan using time series data from 1991 to 2016. Their findings indicate that FDI greatly reduces unemployment. Kannaiah and Selvam (2014) examine the association between FDI and youth unemployment in the Indian retailing sector. Using microeconomic data collected via questionnaires and interviews, the authors conclude that FDI increases youth employability in retail sectors.

In contrast, some studies find that FDI presence either elevates youth unemployment or generates an insignificant impact. For instance, using the VECM method and annual data from 1988 to 2016, Sever and Igdeli (2018) demonstrate that FDI significantly reduces youth unemployment among Turkish youth. In the same way, Michael and Geetha (2020) use VECM to examine the role of FDI in addressing youth unemployment in Malaysia. Their findings show that the contribution of FDI to youth unemployment reduction in the Malaysian economy is insignificant. Weaich et al. (2024) come to the same conclusion, emphasizing the significance of the entry mode in

determining the likely impact of FDI on youth unemployment. Using time series data over the period 2006-22 and the appropriate methods of analysis, they find that greenfield FDI has an insignificant impact on youth unemployment in South Africa.

The above-reviewed literature highlights the significant variation in the results of studies examining the relationship between youth unemployment and FDI. This variation may stem primarily from the fact that the majority of these studies were conducted in contexts with diversified socioeconomic characteristics. This makes it difficult to make a generalization regarding the role of FDI in addressing youth unemployment. However, the main conclusion that can be drawn from the literature is that most of these studies were conducted in developing countries. This could be attributed to the fact that youth unemployment is a pressing issue in these countries. In other words, FDI is considered one of the levers that can help address youth unemployment and its potential consequences, such as violence and a lack of peace. In fact, many studies have attempted to link the lack of economic opportunities, particularly the opportunity for employment, with the growth of violence and crime in society (Ruth et al., 2024; Egbewole and Lamidi, 2021; Adekoya and Abdul Razak, 2018; Mude, 2014; Caruso and Schneider, 2011; Soares and Naritomi, 2010; Ajaegbu, 2012; Sayre, 2009; Honaker, 2008; Baron, 2008; Barakat and Urdal, 2009; Cohen and Rubio, 2007; Urdal, 2006; Weinstein, 2005; Blomberg et al., 2007; Goldstone, 2001).

A substantial part of these studies emphasize the critical role of unemployment in fueling crime and violence across communities and social groups. For instance, Adekoya and Abdul Razak (2018) investigate the link between unemployment and violence in Nigeria. Their results show that the presence of unemployment significantly triggers violence. Caruso and Schneider (2011) investigate the socioeconomic underpinnings of terrorism and political violence using a sample of 12 Western European nations. According to their findings, a one percent increase in youth unemployment rates leads to a 0.5 percent increase in terrorist activities. Sayre (2009) examines the association between Palestinian suicide bombings and changes in the economic and political environment, particularly in labor market circumstances, applying a regression model to data from 1993 to 2004. His findings indicate that economic conditions, as represented by the labor market deterioration that accompanied the Al-Aqsa Intifada, accounted for roughly half of the increase in suicide bombs. Using data on 400 homeless youths, Boron (2008) examines the relationship between unemployment and criminal behavior within this group. His results reveal a significant association between unemployment and crime, mediated by financial dissatisfaction and a lack of job search. Honaker (2010) challenges White (1993) and Thompson (1989), employing time series data to investigate economic factors as drivers of violence in Northern Ireland. He asserts that the defect in these studies lies in their use of aggregate unemployment rates as a gauge of the economic conditions that fuel Republican paramilitary violence. According to Honaker, the Catholic unemployment rate, rather than the total unemployment rate, should account for the majority of violence in Ireland. Thus, he analyzes unemployment data disaggregated by religion to investigate

the relationship between economic conditions and the prevalence of violent deaths. His findings indicate that Catholic unemployment is an important trigger for Republican factions in Northern Ireland to engage in violent actions (Honaker, 2010). In the African context, a study by Oyefusi (2010) finds that unemployment increases the willingness of educated youth to participate in civil violence in the Delta region of Nigeria. In the same way, a study by Mude (2014) suggests that high youth unemployment is a major driver of political violence in Zimbabwe, particularly in urban settings.

Some studies have attempted to examine the effect of economic conditions on the state of violence in a country without referring directly to unemployment. Undoubtedly, one manifestation of these economic conditions is the effect of unemployment. For instance, Blomberg et al. (2007) use the ITERATE database and the bivariate Markov methodology to study the relationship between economic conditions and terrorist activities in 127 countries over the period 1968-91. Interestingly, their findings indicate that shrinkages in a country's economic performance increase the frequency of terrorist activities. In the same vein, Soares and Naritomi (2010) discover that rising youth unemployment rates, together with inequality, were among the most critical causes of crime in Latin America. In a similar vein, Cohen and Rubio (2007) conclude that high unemployment is one of the main causes of youth joining gangs in Latin America.

3. The trajectory of peacebuilding and youth unemployment

Since becoming a sovereign state in 1956, Sudan has experienced a continuous cycle of conflicts, violence, and a lack of comprehensive peace. One year before its independence, violence began in the southern region and later developed into a long, comprehensive war that ended in 1972 with the signing of the Addis Ababa Agreement. The peace resulting from that agreement did not last long, as bloody fighting resumed in the south in 1983. This second wave of war ended with the Comprehensive Peace Agreement, which resulted in the secession of Sudan into two states in 2011. These conflicts extended beyond the southern region to other areas, affecting communities and the economy on a larger scale. In 2003, a fierce war broke out in the Darfur region, resulting in over 300,000 deaths and 2.7 million displacements (Samy and Joseph, 2019). The war also included the Blue Nile region, South Kordofan, and the Eastern region. These ongoing wars have left no opportunities for political and economic stability that would enable real economic development in the country. This happened because most of the resources were directed to fulfilling war needs, leaving development needs unmet. Moreover, the strikes and wars damaged the business environment and discouraged both domestic investment as well as FDI. Investors remain wary, fearing the instability and unpredictability associated with conflicts. Thus, the potential for economic growth and development continued to diminish, perpetuating a cycle of poverty and underdevelopment. This explains why the country's economy remained stuck in poor performance in all its indicators. Specifically, the nation's economic performance, except for the oil era (i.e., 1999-2011), was characterized at best by stagnation or decline. This prolonged stagnation has

hindered investment and innovation, leading to increased unemployment rates and a decline in living standards for the majority of the population. This poor performance was evident in the human development indicators. According to the Human Development Index reports, Sudan has ranked among countries with lower development indices, with an average score of 0.44 during 1980-2022. This score reflects significant challenges in health, education, and living standards faced by the population.

On a humanitarian level, these wars resulted in a significant number of deaths and a deterioration of social peace, which, in turn, sparked further violence and instability. Table 1 shows that, despite the endorsement of several peace agreements, battle-related fatalities have persisted and escalated over the last 30 years, indicating ineffectiveness or lack of peace-building efforts. This accumulation of waves of violence and conflict led to the April 2023 war, which is considered one of the most horrific in human history. This is due to the catastrophic impact that this war had on both the population and the economy. Covering most of the Sudanese states, this war caused a wave of internal and external displacement described as the largest in the world, according to international organizations. As towns and villages became completely ruined, millions found themselves without shelter or basic necessities, forcing them to seek refuge in neighboring countries or become displaced within their national borders. Statistics indicate that 40,000 Sudanese lost their lives as a result of this fighting, while hundreds of thousands became permanently disabled (Sudan's Doctor Union, 2024). The International Organization for Migration reports that the war resulted in the internal displacement of eight million Sudanese and forced three million others to cross borders to the neighboring countries (UNHCR, 2024).

Economically, this war has devastated the Sudanese economy in an unprecedented manner. The impacts are felt across all sectors, leading to skyrocketing inflation rates and crippling unemployment. Additionally, essential services have deteriorated, leaving many citizens struggling to meet their basic needs. According to statistics, the economy has lost about 48 percent of its total value, amounting to USD 15 billion by the end of 2023 (IFPRI, 2025). The national currency has also lost more than 50 percent of its value. The majority of the labor force has become unemployed, leading to increased social unrest and a growing sense of desperation among the population. Moreover, the escalation of the war in Khartoum, the country's economic center, has led to a complete paralysis of economic activities, and the lifelines feeding the less-developed regions have been cut. This disruption has resulted in severe shortages of essential goods and services in the rest of the Sudanese states, exacerbating an already precarious humanitarian situation.

At the macroeconomic level, the war has further deteriorated the already weak economic performance. Additionally, businesses face significant uncertainty, leading to reduced investment and stunted economic growth. Table 1 illustrates the sluggish performance of the Sudanese economy, as demonstrated by the GDP growth rate. This unsatisfactory performance is not

restricted to the period indicated in Table 1; rather, this performance symbolizes the economy's persistent condition since independence. According to World Bank data, Sudan's GDP and population have grown at an average rate of 2.5 percent over the last seven decades (i.e., 1961-2023).

Table 1. Battle-related deaths and some macroeconomic indicators in Sudan

Year	GDP Growth	FDI Stock (% GDP)	Total Unemployment Rate	Youth Unemployment Rate	Battle-related Deaths
1991-1995	5.13	00.79	14.90	26.31	454.2
1996-2000	7.59	06.08	14.72	26.06	1316.6
2001-2005	5.92	17.52	14.78	26.24	3108.2
2006-2010	2.8	20.04	17.98	26.28	1293
2011-2015	-1.6	28.74	18.96	32.31	1707.4
2016-2020	-0.86	54.73	12.80	33.25	781
2021-2023	-5.0	70.92	10.14	34.81	3301

Source: World Development Indicators (2023) and UNCTAD (2025).

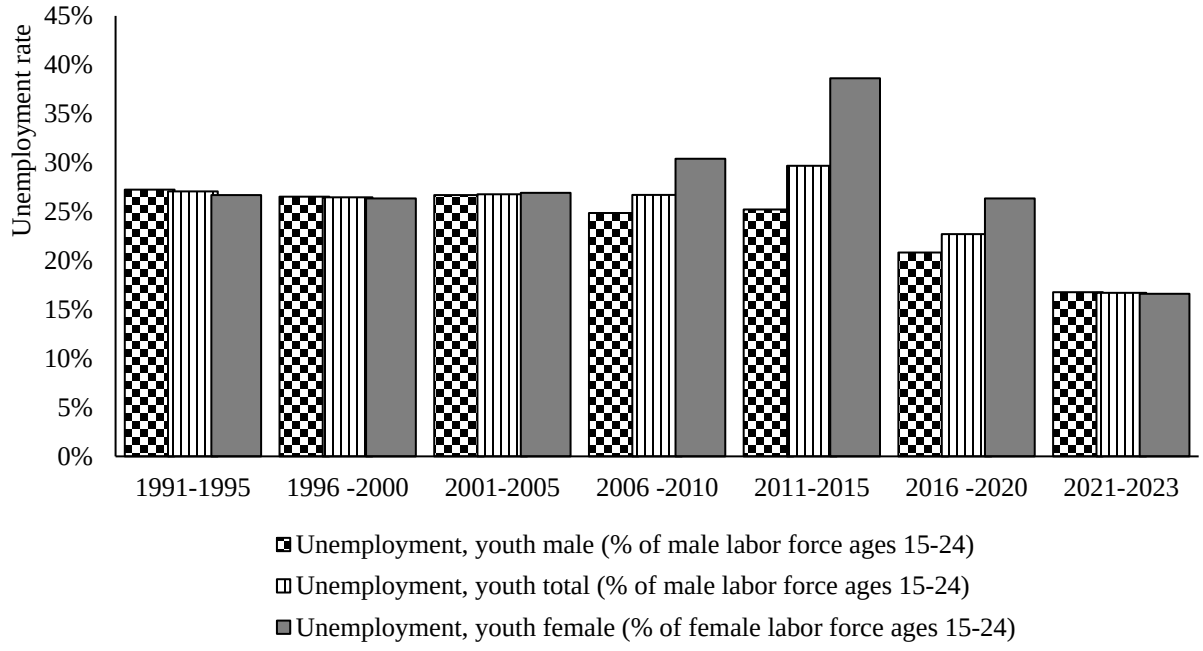
This ongoing stagnation in GDP growth has been influenced by various factors, including political instability, a lack of diversification in economic activities, and inadequate infrastructure development. Seen from a peacebuilding standpoint, the continuity of poor economic conditions experienced by the majority of the population may be a principal element sustaining the nation's cycle of bloodshed. This suggests that persistent poverty and the lack of economic opportunities can fuel discontent and conflict, making it difficult for communities to fulfill peace-building efforts. Moreover, the disparities in the Sudanese labor market also frustrate the nation’s peace-building process. Millions of Sudanese have become unemployed as a result of the shutdown of productive entities, exacerbating the already high national unemployment rates.

Alongside the elevated unemployment rate, some demographic groups, particularly the youth, experienced high unemployment rates. Figures 1 and 2 reveal that the youth category faces an unemployment rate that is twice as high as the national unemployment rate. In terms of employment, this group also has a low employment rate compared to the overall population. This disparity may highlight the challenges that Sudanese youth encounter in the labor market, often due to a lack of experience and skills that employers seek. This lack of equitable employment opportunities for all categories of the population not only perpetuates economic instability but also fuels social tensions among various groups. Such exclusion can lead to feelings of resentment and hopelessness, prompting youth groups to resort to violence or radicalization as a means of expressing their discontent. As a result, achieving lasting peace becomes increasingly challenging, as marginalized social groups feel disenfranchised and excluded from the nation's progress. Weak economic growth and low national savings will do little to absorb unemployed people, particularly those from the youth bulge. Smart and efficient economic measures, rather than peace negotiations, are essential for addressing the issue of youth unemployment. While peace negotiations are important, focusing on targeted economic strategies can create more immediate job opportunities

for young people. This approach prioritizes tangible solutions that can lead to sustainable employment and long-term peacebuilding. However, relying solely on domestic resources to tackle youth unemployment becomes inadequate given the long recovery path that the economy is likely to take from the conflict's devastation.

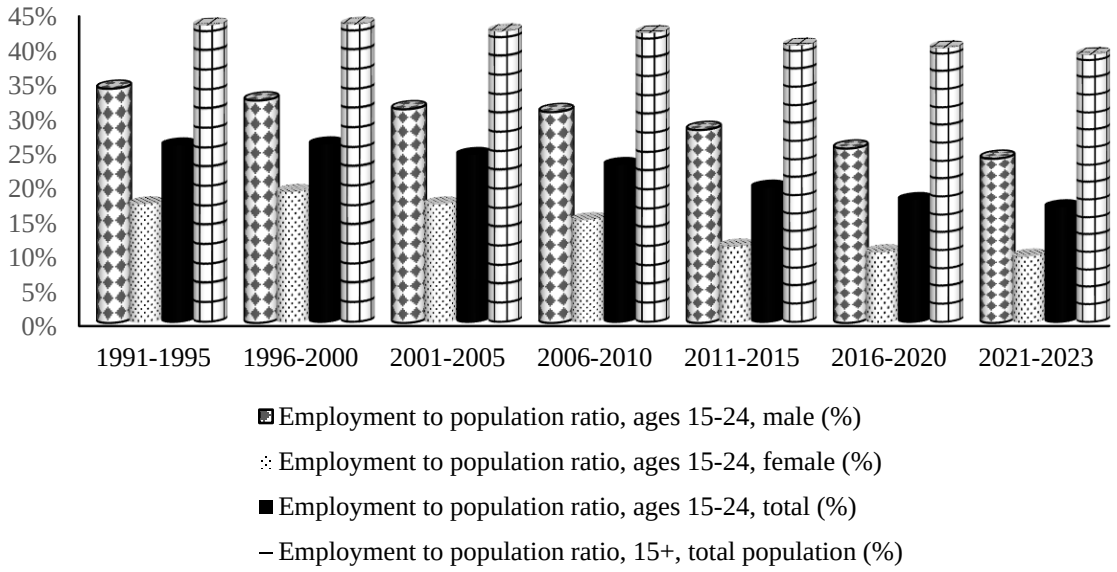
Previous literature has shown that FDI can help reduce unemployment rates in the host country. According to this literature, FDI can directly contribute to absorbing unemployed labor through a number of channels. These may include creating new job opportunities by launching new businesses. Additionally, FDI can indirectly contribute to job creation by boosting economic growth rates, which, in turn, increases the demand for products from local enterprises. Above all, FDI can contribute to creating a business environment full of hope and peace and thus creating a conducive environment for growth and employment. Table 1 shows that Sudan has hosted a significant amount of FDI over the past decades. Accordingly, despite its potential, Sudan's ability to attract and retain foreign capital remains limited. To effectively address this challenge, it is crucial to integrate FDI into national recovery plans.

Figure 1. Evolution of youth unemployment in Sudan (1991-2023)



Source: World Development Indicators (2023).

Figure 2. Employment to population ratio for some population groups in Sudan (1991-2023)



Source: World Development Indicators (2023).

Overall, the interconnection between peacebuilding and youth employability discloses a critical pathway toward sustainable development and stability. By fostering FDI inflows, Sudanese policymakers can create robust job opportunities that not only empower youth of both genders but also add to the overall economic resilience of communities. As youth unemployment remains a pressing issue, attracting the types of FDI that employ youth is likely to mitigate social unrest and promote peacebuilding. By creating job opportunities for youth, FDI not only alleviates the pressing issue of youth unemployment but also serves as a catalyst for peacebuilding in communities grappling with unrest. Furthermore, the benefit of raising youth employability via FDI would not only provide them with financial independence but also cultivate a sense of belonging and purpose, eventually leading to a more harmonious society. Thus, prioritizing FDI as a means to address youth unemployment is a vital strategy in the pursuit of lasting peacebuilding and prosperity.

4. Methodology

4.1. Data

To yield consistent and accurate findings, this paper relies on data from highly reliable sources. Data on youth unemployment rates, GDP growth rate, inflation rate, financial development measured by bank loans to the private sector as a percentage of GDP, and population growth rate were obtained from World Development Indicators, which are published by the World Bank. Data on annual battle-related deaths were obtained from Our World in Data. The data on education are

gathered from the Barrow and Lee database, which provides regular data on average years of schooling for a significant number of countries worldwide. However, this data was prepared every five years from 1950 to 2010. The data was processed by computing the missing years using a certain estimation technique. The data on FDI stock as a percentage of GDP is obtained from the UNCTAD. Finally, the data on democracy, which is represented by the electoral democracy index, are sourced from the Varieties of Democracy (V-Dem) project. Table 2 below provides a further explanation of the definitions of the variable abbreviations and their sources.

Table 2. Variable definitions and data sources

Variable	Description	Source
UNY	Youth unemployment rate	International Labour Organization
GDPG	Gross domestic product annual growth rate	World Development Indicators
FIND	Domestic credit to private sector by banks (% of GDP)	World Development Indicators
INF	Annual inflation rate	World Development Indicators
POPG	Total population growth	World Development Indicators
PEAB	Battle-related deaths	World Development Indicators
FDI	Foreign direct investment inflow (% of GDP)	UNCTAD
DK	Domestic capital formation (% of GDP)	World Development Indicators
EDU	Average years of schooling	Barro and Lee database
DM	Electoral democracy index	The Varieties of Democracy (V-Dem) project

4.2. Models specification

Consistent with the goal of this study, the proposed analysis is based on the construction of two models. The first model examines the effect of FDI on youth unemployment, while the second estimates the impact of youth unemployment on peacebuilding. Previous literature confirms that a set of factors is essential to include in models attempting to empirically examine the determinants of unemployment in economies, particularly when examined at the aggregate level. These variables include GDP (Farsio and Quade, 2003; Andrei et al., 2009; Kreishan, 2011; Levine, 2012; Soylu et. al., 2018), inflation (Archibald, 1969; Caporale and Skare, 2011), population (Ali, 2015), financial development (Epstein and Shapiro, 2019; Bayar, 2016; Raifu and Afolabi, 2023), FDI (Mucuk and Demirsel, 2013; Strat et. al., 2015; Grahovac and Softic, 2017), and educational attainment (Mpendulo and Mangunyi, 2018; Ali, 2015; Ali, 2018; Riddell and Song, 2011). Accordingly, the model to predict youth unemployment can be stated as follows:

$$lnUNY_t = \beta_0 + \beta_1 lnGDP_t + \beta_2 lnPOPG_t + \beta_3 lnINF_t + \beta_4 lnFIND_t + \beta_5 FDI_t + \beta_6 DK_t + \beta_7 lnEDU_t + \beta_8 (lnFDI_t * lnEDU_t) + \varepsilon_t \quad (1)$$

Where UNY denotes the youth annual unemployment rate, GDP denotes the real GDP; $POPG$ denotes total population growth; INF denotes the annual inflation rate; $FIND$ denotes financial development measured by credit provided by banks to the private sector; FDI denotes the stock of FDI as a percentage of GDP; DK denotes the domestic capital formation as a percentage of GDP; EDU denotes the average year of schooling; $(FDI * EDU)$ denotes the interaction between FDI and average years of schooling; ln is the natural logarithm; t denotes time; and ε_t denotes the error

term. As has been well established in the previous literature, the coefficients of GDP, $FIND$, EDU, and FDI, $(FDI * EDU)$ variables are expected to be negatively related to the dependent variable (i.e., UNY). The sign of the coefficient of the INF variable remains undecided and needs to be verified.

In the second model, the series of battle-related deaths is chosen as a proxy for the dependent variable. Specifically, this variable is chosen to measure the presence/absence of the peacebuilding process, given the lack of systematic quantitative data on the latter. The number of deaths caused by military operations is the best predictor of the status of peace in a country because it measures the direct threats to people's lives. An increase in battle-related deaths accurately indicates a deficit in the peacebuilding process, while a decrease in the number of battle-related deaths indicates the presence of peace as well as the strength of peacebuilding. Thus, this variable is used as a proxy for the presence/absence of peacebuilding in Sudan and is introduced in the second model as follows:

$$lnPEAB_t = \varphi_0 + \varphi_1 lnUNY_t + \varphi_2 lnGDP_t + \varphi_3 lnPOPG_t + \varphi_4 lnINF_t + \varphi_5 lnFDI_t + \varphi_6 lnDM + \varepsilon_t \quad (2)$$

Where $PEAB$ denotes the peacebuilding variable measured by battle-related deaths and DM denotes democratic progress measured by the electoral democracy index.[2] The rest of the variables (i.e., UNY, GDP, $POPG$, INF, FDI, ln, t and ε_t) remain as defined before.

In model 2, the coefficient φ_1, which indicates the effect of youth unemployment on the peacebuilding process, is the coefficient of interest. As highlighted above, numerous empirical studies support the assumption that there is a strong relationship between high unemployment rates and sliding into a cycle of violence and conflict. Thus, the sign of coefficient φ_1 is predicted to be positive.

For a variety of reasons, the link between economic expansion and peacebuilding in a country is quite close. High rates of GDP growth may bring socioeconomic stability and thus ease tensions that might otherwise lead to violence and conflicts. However, high economic growth may drag a country into violence if its fruits end up in the hands of a minority of the population. Put differently, the contraction in economic growth may worsen the standards of living of many sectors of the population, particularly among disadvantaged groups. This is likely to give birth to political tensions and uprisings. Thus, the sign of the coefficient of the GDP growth variable (i.e., φ_2) remains subject to empirical investigation.

[2] The electoral democracy index evaluates the extent to which free and fair elections elect political leaders, while simultaneously upholding freedoms of association and expression. The range is from 0 to 1, with 1 being the highest level of democracy.

Population growth may undermine peacebuilding efforts, especially in fragile contexts like Sudan. High population growth, if not accompanied by increases in economic growth, is likely to reduce per capita income, pushing a significant proportion of the population into poverty. This could trigger political mobilization, destabilize the country, and potentially lead to armed conflict. Moreover, population growth boosts the competition among communities for scarce resources such as water, land, and pastures. This, in turn, has the potential to escalate into clashes and accumulate to higher levels, ultimately leading to permanent armed tribal conflict. Therefore, since Sudan is plagued by tribal and national conflicts that arise from resource scarcity, it is plausible to include the population growth rate as one of the variables in Equation 2. The sign of the coefficient of this variable (i.e., φ_3) is expected to be positive.

Inflationary pressures usually hit low-income groups hardest as their purchasing power erodes. Politically, if the government does not interfere in reducing excessive inflation rates, these groups may protest and revolt to force policymakers to listen to their demands. In the case of countries endowed with poor governance and limited financial resources, such as Sudan, the government may intervene adversely by deploying disproportionate force to restore order and stability. In the end, high inflation rates become a source of instability and conflict. Accordingly, the coefficient of the INF variable in the above model (i.e., φ_4) is expected to have a positive sign.

The coefficient of the FDI variable (i.e., φ_5) is expected to be negative. Empirically, previous studies indicate that FDI flows increase in countries with hospitable business environments. These investments, in turn, accelerate economic growth and create a large number of job possibilities for the nation's workforce. Increasing economic growth and creating more opportunities for employment contribute to stability and conflict resolution in the country receiving the investment.

It has been well established that the consolidation of democratic principles is anticipated to enhance peacebuilding within societies. Current evidence unequivocally demonstrates that societies characterized by democratic governance have peace and political stability. Therefore, we anticipate a negative sign for the coefficient of the democracy variable (i.e., φ_6).

4.3. Econometric methodology

The econometric methodology adopted by this paper primarily aims to evaluate the impact of FDI on peacebuilding in Sudan by enhancing the employability of youth. To achieve this purpose, the paper uses the ARDL bound approach to run empirical investigation. The ARDL model developed by Pesaran et al. (2001) is well suited to estimate the cointegration relationship between the variables included in equations 1 and 2. This approach addresses the problem of non-stationarity that commonly plagues time series data and handles the issue of endogeneity by permitting the incorporation of lagged variables in the models (Pesaran Shin, 1998). In addition, this approach does not cause any econometric issues with small sample sizes and thus produces unbiased and

consistent coefficients (Johansen, 1990; Pesaran Shin, 1998). Furthermore, the ARDL offers a unique advantage in cointegration by assessing both the short- and long-run effects of independent variables on the dependent variable simultaneously.

The ARDL approach includes two stages of estimation. In the first stage, the cointegration relationship between the variables under consideration is tested using the bounds testing approach developed by Pesaran et al. (2001). This approach computes the F-statistic and compares it with critical values suggested by Pesaran et al. (2001) and Narayan (2005) to determine the existence of the cointegration relationship between the variables. In the second stage, if the variables are found to be cointegrated, the dynamic structure of the model can be estimated by the ARDL to obtain the long-run coefficients and the associated ECM.

The model designed to investigate the determinants of youth unemployment, as expressed by Equation 1, can be rewritten in the ARDL $(n, p, q, r, s, v, w, y, z)$ format as follows:

$$\begin{aligned}\Delta lnUNY_t = \beta_0 &+ \sum_{i=1}^{n} \beta_{1i} \Delta lnUNY_{t-1} \\ &+ \sum_{i=1}^{p} \beta_{2i} \Delta lnGDP_{t-1} + \sum_{i=1}^{q} \beta_{3i} \Delta lnPOPG_{t-1} + \sum_{i=1}^{r} \beta_{4i} \Delta lnINF_{t-1} \\ &+ \sum_{i=1}^{s} \beta_{5i} \Delta lnFIND_{t-1} + \sum_{i=1}^{v} \beta_{6i} \Delta lnFDI_{t-1} + \sum_{i=1}^{w} \beta_{7i} \Delta lnDK_{t-1} \\ &+ \sum_{i=1}^{y} \beta_{8i} \Delta lnEDU_{t-1} + \sum_{i=1}^{z} \beta_{9i} \left(\Delta lnFDI_t * \Delta lnEDU_t\right)_{t-1} + \alpha_1 lnUNY_{t-1} \\ &+ \alpha_2 lnGDP_{t-1} + \alpha_3 lnPOPG_{t-1} + \alpha_4 lnINF_{t-1} + \alpha_5 lnFIND_{t-1} + \alpha_6 lnFDI_{t-1} \\ &+ \beta_7 lnDK_{t-1} + \alpha_8 lnEDU_{t-1} + \alpha_9 (lnFDI_t * lnEDU_t)_{t-1} + \delta_1 ECT_{t-1} + \varepsilon_{1t} \quad (3)\end{aligned}$$

Where Δ denotes the first difference operator, n denotes the lag length of the dependent variable, p, q, r, s, v, w, y, and z denote the lag length of the explanatory variables, and ε_t denotes the random error term. The bound test can then be used to verify the existence of cointegration among the dependent and independent variables (to determine whether the long-run parameters α_i are equal to 0, as they appear in equation 2). Accordingly, the null (H_O) and the alternative (H_1) hypotheses can be formulated as follows:

$H_O: \alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = \alpha_6 = \alpha_7 = \alpha_8 = \alpha_9 = 0$ ⇔ rejecting the existence of cointegration among variables.

$H_1: \alpha_1 \neq \alpha_2 \neq \alpha_3 \neq \alpha_4 \neq \alpha_5 \neq \alpha_6 \neq \alpha_7 \neq \alpha_8 \neq \alpha_9 \neq 0$ ⇔ confirming the existence of cointegration among variables.

In the same way, the transformation of Equation 2 into the ARDL $(n, p, q, r, s, v \; and \; z)$ format can be stated as follows:

$$\begin{aligned}\Delta lnPEAB_t = \beta_0 &+ \sum_{i=1}^{n} \varphi_{1i} \Delta lnPEAB_{t-1} \\ &+ \sum_{i=1}^{p} \varphi_{2i} \Delta lnUNY_{t-1} + \sum_{i=1}^{q} \varphi_{3i} \Delta lnGDP_{t-1} + \sum_{i=1}^{r} \varphi_{4i} \Delta lnPOPG_{t-1} \\ &+ \sum_{i=1}^{s} \varphi_{5i} \Delta lnINF_{t-1} + \sum_{i=1}^{v} \varphi_{6i} \Delta lnFDI_{t-1} + \sum_{i=1}^{z} \varphi_{7i} \Delta lnDM_{t-1} + \gamma_1 lnPEAB_{t-1} \\ &+ \gamma_2 \Delta lnUNY_{t-1} + \gamma_3 lnGDP_{t-1} + \gamma_4 lnPOPG_{t-1} + \gamma_5 lnINF_{t-1} \\ &+ \gamma_6 lnFDI_{t-1} + \gamma_7 lnDM_t + \delta_2 ECT_{t-1} + \varepsilon_{2t} \quad \ldots (4)\end{aligned}$$

Where Δ represents the first difference operator, n denotes the lag length of the dependent variable, n, p, q, r, s, v, and z represents the lag length of the explanatory variables, and ε_{2t} represents the random error term. The bounds test can be used to validate the existence of cointegration among the dependents and the independent variables (to determine whether the long-run parameters γ_i are equal to 0, as they appear in equation 4). The null (H_O) and the alternative (H_1) hypotheses can be formulated as follows:

$H_O: \gamma_1 = \gamma_2 = \gamma_3 = \gamma_4 = \gamma_5 = \gamma_6 = \gamma_7 = 0 \Leftrightarrow$ rejecting the existence of cointegration among variables.

$H_1: \gamma_1 \neq \gamma_2 \neq \gamma_3 \neq \gamma_4 \neq \gamma_5 \neq \gamma_6 \neq \gamma_7 \neq 0 \Leftrightarrow$ confirming the existence of cointegration among variables.

These hypotheses are tested by comparing F-statistics derived from Equations 1 and 2 estimations to the tabular F of Pesaran et al. (2001) and Narayan (2005). If the estimated F-statistic surpasses the upper bound critical value, the null hypothesis is rejected, confirming the presence of cointegration among the variables. In contrast, the null hypothesis cannot be rejected if the F-statistic is less than the lower bound critical value, meaning that the variables are not cointegrated. The test will be inconclusive if the F-statistic is between the lower and upper bound critical value. It is worth noting that Pesaran (1997) provided acceptable tabular critical values categorized into two groups. The first category assumes that the variables under investigation are stationary at level I(1), while the second assumes that they are stationary at level I(0). Taking this into account, this paper employs three tests to confirm the stationarity of the series used: The Augmented Dickey and Fuller (1979), the Phillips and Peron (1988), and the Kwiatkowski, Phillips, Schmidt, and Shin (1992) (KPSS) tests.

After validating the presence of a cointegrating connection between the underlying variables, the second phase of the ARDL technique involves estimating the long-run coefficients. Thus, the vector error correction model will be evaluated to determine the causal relationship between the dependent variables and explanatory variables. The coefficients of the error term (ECT_{t-1}) in

Equations 3 and 4 (i.e., δ_1 and δ_2) are of great importance in interpreting the cointegration relationship between the variables. They represent the speed of adjustment that drives the variables back to their equilibrium values in the event of any deviation from them in the short run.

Finally, many diagnostic tests are run to check that the estimated models are free from econometric defects. These include serial correlation tests, a normality test, heteroscedasticity (ARCH), and the Ramsey RESET test for model misspecification. These tests are crucial in ensuring that the estimated models accurately represent the relationship between the variables in the data.

5. Empirical results

5.1. Testing for unit roots

As strictly stated in the methodology section, the ARDL approach requires performing stationarity and non-stationarity tests as a prerequisite for verifying cointegration between the variables. Therefore, this condition is tested for each variable included in the above two models. Table 3 presents the results of the ADF, PP, and KPSS stationarity tests. As can be seen in the second column of Table 3, with the lnUNY, lnGDP, lnINF, and lnPOPG series as exceptions, the remainder of the level series exhibit non-stationarity when examined using the ADF. This is also consistent with the results in column 4, which show the PP test for the variable levels. More specifically, except for lnGDP and lnEDU series, all the variables are non-stationary when evaluated at their levels. In the same way, the KPSS test results appearing in column 6 show that all variables, except lnINFand lnGDP, lnPEAB, and lnDM are not stationary in their levels. Performing the three tests on the first difference of the series yields findings that lack clear stationarity. For instance, the lnUNY, lnGDP, lnPOPG, lnFIND, lnFDI, and lnPEAB variables are shown to be stationary in their first differences in the ADF test. In contrast, the lnEDU and lnDM variables do not exhibit stationarity.

Table 3. Summary of ADF, PP, and KPSS unit roots tests

Variable	ADF		PP		KPSS	
	Level	1st Difference	Level	1st Difference	Level	1st Difference
lnUNY	-5.071(1)[a]	-4.464(3)[a]	-2.395(5)	-3.821(3)[a]	0.547(3)	0.133(4) [a]
lnGDP	-2.809(0)[c]	-2.421(0)[a]	-2.551(3)[b]	-2.216(2)	0.505(5)[c]	0.629(8) [c]
lnINF	-1.824(0) [a]	-5.028(1) [a]	-1.749(3)	-7.087(2)[a]	0.213(4)[a]	0.347(3)[C]
lnFIND	-0.991(0)	-4.784(0) [a]	-1.181(4)	-4.793(2)[a]	0.481(4)	0.164(4)[a]
lnPOPG	-5.070(1)[a]	-4.463(3)[a]	-2.395(5)	-3.821(3)[a]	0.546(3)	0.133(4)[a]
lnFDI	-2.405(0)	-4.964(0) [a]	-2.533(3)	-4.686(1) [a]	0.674(4)	0.383(3)[b]
lnEDU	2.635(1)c	-1.506(0)	4.077(3)a	-1.413(2)	0.658(4)	0.583(4)[c]
lnPEAB	-2.180(0)	-8.298(0)a	-1.974(4)	-8.2572(1)a	0.472(4) [C]	0.498(28) [b]
lnDM	-2.149(3)	-1.815(2)	-1.803(3)	-5.024(3)[a]	0.495(4) [C]	0.518(28) [b]

Notes: Lag order is shown in parenthesis based on SIC. [a, b, and c] represent the one percent, five percent, and 10 percent levels of significance, respectively.

As the fifth column shows, with the lnEDU as an exception, all variables become stationary when first differentiated according to the PP test. However, when the KPSS test is applied, all variables' first differences become stationary at the conventional significance levels, as shown in column 6.

In general, by scanning the results presented in Table 3, it can be concluded that each variable that fails to meet the condition of stationarity when applying one test succeeds in achieving it in another. Therefore, since each of the variables under examination possesses the property of stationarity, the analysis can proceed with the cointegration test within the framework of the ARDL approach.

After ensuring that none of the series under consideration become stationary in the second order, the next step is to test for cointegration with the bounds test. However, before proceeding with this step, the lag length for the series under investigation must be determined. According to previous research, both the Akiake information criterion and the Schwarz-Baysan information criterion for lag length determination are suitable for this task. Given that the sample used in this study is quite short, the choice of the lag length must be taken with caution. On the one hand, a lag length that is too short will produce errors with serial correlation (Jung and Marshal, 1985). On the other hand, implementing an overly lengthy lag length will result in a huge number of coefficients that are unlikely to be significant (Canova, 1995). Taking these difficulties into account, this study employs a set of criteria to determine the lag length in the models, with a stronger emphasis on the Akaike Information criterion. Tables 4 and 5 show the results of six criteria used to calculate the lag length in the two models being estimated, with asterisks indicating the significance of the choice of lag length by each criterion. Table 4 demonstrates that the majority of the criteria point to picking a single lag for the first model. However, the estimated criteria reported in Table 5 choose two lag lengths for the second model. It is worth mentioning that the length that produces more stable findings and is free of econometric issues was reached by running each test at different lag lengths.

Table 4. Lag selection criteria - model 1

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-580.70	NA	15314	39.25	39.62	39.36
1	-317.37	368.67*	30.18*	25.96*	29.32*	27.03*

*Notes: * indicates lag order selected by the criterion; LR: sequential modified LR test statistic (each test at the five percent level); FPE: Final prediction error; AIC: Akaike information criterion; SC: Schwarz information criterion, HQ: Hannan-Quinn information criterion.*

Table 5. Lag selection criteria - model 2

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-393.42	NA	889181.4	30.72	31.01	30.81
1	-316.51	112.41*	41455.5	27.59	29.61*	28.16
2	-267.46	49.05	25302.6*	26.57*	30.35	27.66*

*Notes: * indicates lag order selected by the criterion; LR: sequential modified LR test statistic (each test at the five percent level); FPE: Final prediction error; AIC: Akaike information criterion; SC: Schwarz information criterion, HQ: Hannan-Quinn information criterion.*

After determining the appropriate lag lengths for the variables in each of the two models, the analysis proceeds to execute the cointegration test using Pesaran's bounds tests. Table 6 presents the results of testing for a cointegration relationship between the variables in Model 1 and Model 2. Model 1 examines the natural logarithm of the youth unemployment variable (lnYNU) as a dependent variable at distributed lags of 0 and 1. In other words, the first lag number (1) represents the lag of the dependent variable (n), and the rest of the other lag numbers (i.e., 0, 0, 1, 0, 0, 1, 0, 0) represent the lag length of each of the independent variables in the model. The upper part of the table shows that the critical values of the F-statistics for stationary (I(0)) and nonstationary (I(1)) series are 3.864 and 5.694, 2.730 and 4.163, and 2.277 and 3.498, respectively, at the one percent, five percent, and 10 percent significance levels. This outcome indicates that the computed F-statistic (i.e., 8.51) exceeds the crucial value bound of F-statistics at the one percent level of significance. Thus, a final decision about the cointegrating relationship between the variables can be reached regardless of whether the series are stationary, I(0), or nonstationary, I(1).

Similarly, Model 2 examines the natural logarithm of the peacebuilding variable (lnPEAB) as a dependent variable at distributed lags of 0 and 2. The first lag number (1) signifies the lag of the dependent variable, while the remaining lag numbers (0, 0, 2, 2, 0, 1) correspond to the lag lengths of each variable on the right-hand side of the model. The results in the bottom part of Table 6 show that the F-statistics critical values are 3.864, 2.730, and 2.277 when the series is stationary (I(0)) and 5.691, 4.148, and 2 when the series is nonstationary (I(1)). These values correspond to significance levels of one percent, five percent, and 10 percent, respectively. As with the case of Model 1, a final decision about the cointegrating relationship between the variables can be reached regardless of whether the series are stationary, I(0), or nonstationary, I(1). This can be indicated by the value of computed F-statistic (i.e., 5.5), which exceeds the upper bound value of F-statistics at the one percent level of significance. Therefore, regardless of whether the variables are stationary at order (0)1 or (1)I, the null hypothesis that there is no long-term relationship between the variables in Models 1 and 2 is rejected.

Table 6. Results of bounds test

Model 1 (Selected model: ARDL (1, 0, 0, 0, 0, 1, 0, 1)						
Computed F-statistic: 8.51						
Sample Size	10%		5%		1%	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
30	2.277	3.498	2.730	4.163	3.864	5.694
Asymptotic	1.920	2.890	2.170	3.210	2.730	3.900
Model 2 (Selected model: ARDL (1, 0, 0, 2, 2, 0, 1)						
Computed F-statistic: 5.50						
Sample Size	10%		5%		1%	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
30	2.334	3.515	2.749	4.148	3.976	5.691
Asymptotic	1.99	2.94	2.27	3.28	2.88	3.99

*Notes: * I(0) and I(1) are, respectively, the stationary and non-stationary bounds.*

5.2. Empirical results

After confirming that there is a cointegration relationship between the variables, the second step involves estimating and interpreting the long- and short-run coefficients in the two models using the ARDL model. Table 7 presents the estimates of the long and short run for the first model, which links the youth unemployment rate to a set of explanatory variables. A closer look at the table reveals that the coefficients of the explanation variables differ in both their projected effects on youth unemployment and their level of significance. For instance, the coefficient of the GDP variable is positive, but it is not significant. This suggests that GDP expansion does not have a long-run impact on youth unemployment rates. One can cite numerous explanations for the failure of GDP expansion to reduce youth unemployment. First, the economic expansion that happened in Sudan over the last three decades was primarily attributable to the oil boom that began in the late 1990s and faded following the secession of South Sudan in 2011 (Ali and Ebaidalla, 2023). This oil-driven growth was inevitably dependent on production techniques that used more capital and less labor. Furthermore, the oil industry had relied extensively on foreign labor, particularly in the early years, due to a lack of local expertise in this field.

Interestingly, the population growth variable appears to have a favorable effect on youth unemployment. The variable's coefficient is negative and statistically significant, showing that youth unemployment rates are falling as the population expands. This result can be explained by the high dependency burden among the Sudanese population. More precisely, the high dependency ratio, estimated at four percent, may force youths to enter the labor market and take any available jobs in order to meet their dependents' needs. Conversely, the inflation rate variable picks a positive and statistically significant coefficient. This outcome is fairly consistent with the earlier literature, which was divided between accepting and denying inflation's positive influence on unemployment rates, backed up by the Phillips curve. In contrast to the outcomes that emerge with these two variables, the coefficient of the financial development variable appears negative and significant. Since this variable is proxied by the loans provided by banks to the private sector as a percentage of GDP, the interpretation of this significant effect is straightforward. Specifically, this outcome may indicate that loans granted to businesses provide job opportunities for a significant proportion of the population. Moreover, this outcome makes sense when considering the greater openness of the microfinance trend that both international and local organizations have celebrated over the last three decades.

Table 7. Estimates of the long- and short-run coefficients, ARDL (1, 0, 0, 1, 0, 0, 1, 0, 0)

Dependent Variable: Youth Unemployment Rate (UNY)				
Variable	**Coefficient**	**S.E**	**t-statistic**	**P-value**
Long Run				
lnGDP	0.049	0.132	0.368	0.718
lnPOPG	-0.164***	0.049	-3.361	0.003
lnINF(-1)	0.061***	0.0145	4.176	0.000
lnFIND	-0.064**	0.027	-2.390	0.028
lnFDI	-0.028**	0.013	-2.086	0.052
lnEDU(-1)	0.274***	0.089	3.087	0.006
lnDK	0.041**	0.014	2.817	0.011
lnEDU* lnFDI	-0.022	0.018	-1.261	0.223
Constant	0.739	3.537	0.209	0.837
Short Run				
Δ lnEDU	1.176***	0.111	10.600	0.000
Δ lnINF	-0.001	0.006	-0.260	0.769
ECT(t-1)	-0.604***	0.053	-11.29	0.000
Statistics Test				
Adjusted R-Squared	0.81			
F-Statistic	65.720***			0.000
S.E. of Regression	0.022			
Diagnostic Tests				
Breusch-Godfrey Serial Correlation LM Test				0.249
Breusch-Pagan-Godfrey Heteroscedasticity Test				0.754
Ramsey RESET Test				0.419
Normality Test				0.955

*Notes: ***, **, and *indicate statistical significance at the one percent, five percent, and 10 percent significance levels, respectively.*

Contrary to predictions, the findings reveal that education increases unemployment among youth. The variable's coefficient is positive and highly significant, indicating that the increases in the average years of schooling among youth increase their chances of slipping into the unemployment trap. One possible explanation for this unanticipated outcome is the significant increase in average years of schooling over the last three decades. The establishment of dozens of universities and colleges during the 1990s, known as the higher education revolution, has led to an extraordinary increase in average years of schooling. At the same time, economic growth was significantly slower than growth in years of schooling, perhaps limiting the latter's impact on unemployment. Furthermore, fresh graduates from these institutions might fail to meet the labor market's requirements. It is worth noting that Sudanese colleges predominantly offer specializations that do not align with the current stage of development in both local and international labor markets. Thus, instead of serving as a tool to combat unemployment, these institutions increase the number of jobless individuals, particularly among youth. This discrepancy between workforce supply and labor market demand may indicate the presence of structural unemployment in Sudan's labor market.

The coefficient of the domestic capital formation variable is positively signified and maintains a very high level of significance. This suggests that the expansion of domestic capital increases youth unemployment rates in the long run. One explanation for this unexpected outcome may be that businesses and industries tend to use capital-intensive production techniques. This outcome could also be attributed to Sudan's stagnant manufacturing sector. This stagnation may limit job creation opportunities, leading to higher youth unemployment as the economy fails to absorb the

growing youth labor force. Furthermore, this outcome could be attributed to the existence of a mismatch between youth experience and the requirements of the labor market. This outcome also lends support to the previously discussed findings that emerged with the education variable.

The sign of the coefficient of the FDI—which is the variable of interest—is, as expected, negative and statistically significant. This indicates that increasing FDI stock as a percentage of GDP leads to significant reductions in the youth unemployment rate. Specifically, increasing FDI stock as a percentage of GDP by one percent leads to a reduction in the youth unemployment rate by 0.03. This percentage highlights the importance of FDI in boosting youth employability. This positive role of FDI, which outperforms other key variables such as GDP and education, could be attributed to Sudan's serious capital scarcity. In other words, the national economy is facing a capital shortfall while at the same time being overwhelmed with an army of unemployed youth. Given the logic of economic theory, which presupposes substitution between factors of production, the foreign investor's production technique is likely to involve employing fewer units of capital due to their high cost and more units of labor. In the end, adopting such a technique will result in increased capital productivity while lowering unemployment rates. These findings are consistent with numerous earlier studies that have demonstrated the benefits of FDI in reducing unemployment.

It is widely acknowledged that FDI's impact extends beyond just transferring capital from one country to another in order to increase profits. Transnational companies transfer expertise and skills from the countries of origin to the recipient countries. The diffusion of these skills and expertise into national economies will undoubtedly have a significant positive impact on all sectors, bringing more opportunities for employment. This favorable impact of FDI-derived expertise and skills can be further enhanced by expanding education to satisfy the needs of international investors. This conclusion can be drawn based on the sign associated with the coefficient of the lagged interacting term variable, which reflects the impact of combining education with FDI in combatting unemployment. The variable coefficient is negative but statistically significant, demonstrating that education could play an important role in boosting the contribution of FDI to youth employability.

The error correction term's coefficient is negative (-0.604) and significant at the one percent level, as shown in the bottom part of the table. This proves that the variables included in Model 1 have a long-term equilibrium relationship. More specifically, the value of the error correction term coefficient indicates that in the event of any imbalance or shock in the determinants of youth unemployment included in the model, they will move toward long-run equilibrium by a correction rate approximately equal to -0.60 of the imbalance value. Finally, the statistical and diagnostic tests stated in the table illustrate that the model under consideration is suitable and free of econometric issues. For example, the value of the adjusted R-squared is reasonable, indicating that independent variables possess a significant explanatory power over the dependent variable. Furthermore, the F-statistics value is quite high and significant. Furthermore, the reported results

indicate that the model passes the diagnostic residual tests, including serial correlation, heteroscedasticity, normality, and the Ramsey test for model formulation.

Table 8 presents the findings of Model 2, which examines the correlation between peacebuilding, measured by battle-related fatalities, and a range of explanatory variables, with particular emphasis on youth unemployment. The long-run results displayed in the upper part of the table show that the coefficients of the variables vary in terms of signs and level of significance. For example, the GDP variable appears to have no effect on the peacebuilding process in Sudan. This conclusion can be drawn from the variable's failure to convey any significance even at a moderate level. This result is puzzling in light of the steady growth in GDP rates over the last three decades. This era witnessed oil production and export, as well as economic transformation that resulted in a doubling of per capita GDP between 1999 and 2007. Moreover, these findings contradict a number of studies that emphasize the positive influence of accelerated economic growth and development on maintaining peace and stability (McDonald, 2009; Gartzke, 2007; Portland, 2007). These findings are, however, consistent with some previous research claiming that economic expansion has failed to bring peace and stability to many countries and areas (Parks et al., 2013; Burke, 2013; Ghani and Iyer, 2010; Holt, 2011; Burke and Mulakala, 2011). This neutral contribution of economic growth to peacebuilding in Sudan can be explained based on the theory of impoverished modernization initiated by Olson (1963). According to this theory, high economic growth leads to shifts in the distribution of benefits among social classes, which, in turn, leads to the stimulation of grievances and violence (Olson, 1963). Therefore, large-scale violence and wars can result from the grievances of those who lose out on the leaps in economic growth.

The coefficient of the total population growth variable was negative and significant. This outcome indicates that population growth increases the peacebuilding process in Sudan. Interestingly, the null hypothesis that FDI has no impact on peacebuilding is strongly rejected. The coefficient of the lagged FDI variable is negative and significant at the 10 percent level, demonstrating that FDI promotes peacebuilding. This conclusion, combined with the favorable influence of FDI in reducing youth unemployment, demonstrates its enormous potential contribution to the country's overall peacebuilding.

The coefficient associated with the lagged inflation variable is negative and significant, implying that high inflation rates promote peace. This result can be explained by the fact that government spending, although it was at a low level and primarily absorbed by military equipment, contributed greatly to the consolidation of peacebuilding. However, the impact of inflationary pressures in cementing the peace-building process should be viewed with caution. This is because a considerable portion of public spending was directed either at appeasing groups of people who took up arms against the government by inducing them to sign temporary peace agreements or integrating them into the government apparatus, both of which increased spending. Therefore, the resulting peace becomes a temporary state that may fade away over time. The ongoing conflict

serves as the clearest proof that the substantial government spending in recent decades hasn't aided in establishing peace within communities. Directing government expenditure toward the development of soft infrastructure, like health and education, could enhance its performance and effectiveness in peacebuilding.

Table 8. Estimates of the long- and short-run coefficients, ARDL (1, 0, 0, 2, 2, 0, 1)

Dependent Variable: Peacebuilding (log (PEAB))				
Variable	**Coefficient**	**S.E**	**t-statistic**	**P-value**
Long Run				
lnUNY	7.855**	3.501	2.243	0.0394
lnGDP	-0.314	1.864	-0.171	0.8663
lnPOPG(-1)	-2.715*	1.535	-1.768	0.0961
lnINF(-1)	-1.543***	0.448	-3.449	0.0033
lnFDI	0.803***	0.269	2.982	0.0088
lnDM	-3.889 *	2.016	-1.929	0.0716
Constant	-13.507	50.564	-0.267	0.7928
Short Run				
ΔlnPOPG	1.399	1.174	1.192	0.246
ΔlnPOPG(-1)	2.388*	1.230	1.940	0.065
ΔlnINF	-0.163	0.154	-1.056	0.302
ΔlnINF(-1)	0.724***	0.163	4.437	0.000
ΔlnDM	-0.806	0.935	-0.862	0.398
ECT(t-1)	-0. 974***	0.1225	-7.954	0.000
Statistics Tests				
Adjusted R-squared	0.68			
F-statistic	12.94			0.0000
S.E. of Regression	0.554			
Diagnostic Tests				
Breusch-Godfrey Serial Correlation LM Test				0.288
Breusch-Pagan-Godfrey Heteroscedasticity Test				0.472
Ramsey RESET Test				0.843
Normality Test				0.314

Notes: ⋆⋆⋆, ⋆⋆, and ⋆ indicate statistical significance at the one percent, five percent, and 10 percent significance levels, respectively.

The effect of the youth unemployment rate (i.e., the variable of interest) is completely consistent with the a priori expectations. The variable's coefficient is negative and statistically significant, suggesting that rising youth unemployment rates have a negative impact on peacebuilding. This result is in line with previous literature that frequently highlights the role of unemployment rates in increasing violence and crime (Adekoya and Abdul Razak, 2018; Mude, 2014; Caruso and Schneider, 2012; Soares and Naritomi, 2010; Oyefusi, 2010; Honaker, 2010; Sayre, 2009; Boron, 2008; Cohen and Rubio, 2007; Blomberg et al., 2007). These results are also acceptable in the Sudanese context, which already suffers from fragmentation, tribal and ethnic polarization, and is completely dominated by conflicts. This outcome also serves as a warning against overlooking the high rate of unemployment among this particular population segment. These findings underscore the importance of addressing economic disparities and providing job opportunities as a means of reducing violence and conflicts in Sudan.

The coefficient for the FDI variable was positive and highly significant, indicating a direct correlation between the weaknesses in peacebuilding and the presence of FDI. This implies that an increase in FDI typically leads to a corresponding decrease in peacebuilding, indicating a

potential link between FDI and increased conflict or instability in the country. In contrast, the coefficient of the democracy variable is both negative and statistically significant. This outcome suggests that the advancement of democratic institutions fosters an environment conducive to peacebuilding.

The bottom part of the table illustrates the short-run results, which show no deviation from the long-run outcome. The coefficients of the lagging variables of population growth and inflation rate appear to be significant and accompanied by positive signs. This outcome indicates that increases in both population growth and inflation rates worsen the process of peacebuilding in the short run.

As expected, the error correction term coefficient is negative and significant at the one percent level. This also serves as evidence of a long-run equilibrium relationship between the variables included in the model. The value of the coefficient reflects the movement of the peacebuilding variable toward its original equilibrium point in the event of any imbalance in the explanatory variables appearing on the right-hand side of the equation. A coefficient value of 0.974 suggests that if there is a significant deviation from the equilibrium, approximately 97 percent of that imbalance will be corrected in the subsequent period. Consequently, this high coefficient value reflects a strong tendency for the system to self-adjust and return to its long-term stable state efficiently.

Finally, the statistical tests show that the model performed successfully. The adjusted R-squared value as shown is high, indicating that the model explains the reality of youth unemployment in Sudan. In addition, the value of the statistical F test is high and significant, indicating that the explanatory variables explain the variances in the dependent variable. The model also passes diagnostic residual tests such as serial correlation and heteroscedasticity, normality, and the Ramsey Reset test for functional form misspecification.

In summary, the findings of Model 1 indicate that FDI reduces unemployment rates among Sudanese youth. Model 2 results, on the other hand, demonstrate a strong correlation between rising youth unemployment rates and poor Sudanese peacebuilding. Combining the results of the two models, it is reasonable to conclude that FDI aids Sudan's peacebuilding by increasing youth employment. This suggests that addressing youth unemployment through FDI can be a key strategy for promoting stability and peace in Sudan. By providing job opportunities for youth, FDI not only helps to reduce poverty and improve living standards but also contributes to building a more peaceful and prosperous society. Moving forward, policymakers should consider the potential of FDI in addressing youth unemployment as a means of fostering peace and stability in Sudan.

6. Conclusion

Youth unemployment has been one of the factors threatening Sudan's socioeconomic stability for decades. The current war, in which young people are extensively involved, may be the greatest representation of the catastrophic repercussions of widespread youth unemployment. Given the failure of the national economy to absorb these young people in well-rewarding job prospects, FDI emerges as a viable alternative. With this concern in mind, this study seeks to investigate the role of FDI in reducing youth unemployment rates in Sudan and tying it to the country's peacebuilding efforts. To accomplish this purpose, the study employs the ARDL bound test developed by Pesaran et al. (2001). This model has been used due to the shortage of the data period, as there was no data on youth unemployment before 1991. In line with the purpose of this study, two models have been estimated, utilizing time series data from 1991 to 2023. The first model aims to examine the relationship between youth unemployment and FDI, while the second attempts to investigate the impact of youth unemployment on peacebuilding. Both models provide valuable insights into the complicated dynamics at play, offering a clearer understanding of how FDI influences youth unemployment and how this unemployment challenge can affect broader societal stability in Sudan. Specifically, the findings of the bound tests confirm the existence of the long-run relationship between the variables in these two models. Specifically, the findings pertaining to the first model show that FDI plays a significant role in diminishing youth unemployment rates in the long run. Interestingly, the findings of the second model, which regresses the deficient peacebuilding on youth unemployment, reveal a causal link between the absence of peacebuilding and youth unemployment. As hypothesized, this outcome demonstrates the positive contribution of youth employment in preventing violence and conflict.

Based on the findings of this study, several recommendations can be drawn. First, the country's environment should be made conducive to FDI to maximize its role in reducing the high unemployment rates among the youth. This means that creating a more favorable environment for FDI can enable the country to attract more businesses and opportunities. In turn, this influx of FDI is expected to help decrease the youth unemployment crisis by generating new jobs. Second, since Sudan faces an abundance of labor and a scarcity of capital, larger incentive packages should be allocated to investments that use labor-intensive production techniques. This can be achieved by implementing policies that simplify the investment process, provide tax incentives for foreign companies, and enhance infrastructure development. Additionally, fostering a skilled workforce through targeted education and vocational training programs would further attract FDI and sustain long-term economic growth. Thirdly, incentive packages and exemptions should be allocated to foreign investors so that they serve to achieve balanced development in the country and thus extinguish potential conflict hotbeds. This can be done by giving these incentive packages and exemptions to investments that operate in less developed states. Directing FDI toward these states can significantly aid in creating job opportunities, improving infrastructure, and stimulating local economies. Ultimately, this approach not only benefits the investors but also fosters a sense of inclusion and development among underserved populations, contributing to overall national

stability and peacebuilding. Finally, policymakers need to formulate educational policies that promote the kind of education necessary for development. Specifically, investing in education and vocational training programs is essential to equip young people with the necessary skills to meet the demands of the job market. Additionally, by fostering a culture of innovation and entrepreneurship, the country can further enhance its attractiveness to foreign investors and create sustainable employment opportunities.

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