A TDM STUDIO CASE STUDY

An Index for Climate-Induced Migration Uncertainty

Measuring the Global Impact of Climate Change on Migration and Economic Stability Through Global Newspaper Analysis

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Professor Afees Salisu is currently affiliated with three universities. He is an Extraordinary Professor at the University of Pretoria, Department of Economics; a University Professor and Doctoral Advisor at the Global Humanistic University, Curacao; and a Research Fellow at the University of Economics Ho Chi Minh City, Vietnam. He is also the current Director of the Centre for Econometrics and Applied Research, Ibadan, Nigeria.

This case study, authored by Afees Salisu, outlines the research process and key findings from the study titled "A New Index for Climate-Induced Migration Uncertainty." This research is a collaboration between Professor Afees Salisu and Sulaiman A. Salisu, a Research Fellow at READT International Resources.

Introduction

Climate change, as a global phenomenon, has increasingly become a major concern among world leaders and policymakers. Addressing climate-related hazards has become a central focus of agencies such as the UNHCR, which has responded to a range of climate-induced crises, including floods (38%) and earthquakes (26%) (UNHCR, 2017). Their efforts have spanned across continents, including Asia, Europe, Latin America, and Africa. The intersection of climate threats with population dynamics and temporary displacements is a growing global challenge. According to the World Bank, by 2050, regions such as Asia, Latin America, and Africa may collectively produce up to 143 million internal climate migrants. Migration, in this context, has emerged as a vital adaptive strategy, serving as a response to the risks associated with climate change. This includes both voluntary movements—whether temporary, such as seasonal or circular migration, or long-term—and involuntary displacements triggered by extreme weather events (see McLeman et al., 2021).

Although numerous efforts have been made to quantify migration uncertainty (see Fraser and Ungor, 2019; International Organisation for Migration, 2023) and climate uncertainty (see Faccini, Matin, & Skiadopoulos, 2021; Gavriilidis, 2021), no study to date has specifically addressed the uncertainty surrounding climate-induced migration. We initiated this project to address this critical gap, recognizing the increasing relevance of this issue and the growing academic and policy interest in understanding the complexities of climate-induced migration uncertainty.

The Project

To address the existing gap in research, we constructed a new index that establishes a clear link between climate change and migration. Given the increasing frequency of forced and abrupt migrations driven by climate-related events, we recognized the need for a global index that connects climate-induced migration studies with broader economic fundamentals. Our aim is to foster greater synergy between academic research and migration-related policymaking.

As part of our project, we developed a news-based global quantitative indicator to measure the intensity of climate-induced migration uncertainty from Q1 1984 to Q3 2023. Drawing inspiration from Narayan et al. (2021), we employed multiple international newspapers with global reach and readership, curated from the ProQuest Database on Text and Data Mining Studio (TDM). This approach allowed us to create a comprehensive and reliable indicator that captures long-term trends and uncertainties surrounding climate-induced migration across nearly four decades.

Process

There are countless international newspapers available, but our focus was on selecting those that could best represent a truly global news readership. To ensure this, we adopted the list of 45 major international newspapers used by Narayan et al. (2021). This selection helped us ensure that the data we collected reflected a globally representative sample, drawn from reputable and authoritative sources. This approach added an essential layer of validity and trustworthiness to our analysis.

Using TDM Studio, we conducted a database search through the 'publication titles' option. For each newspaper, we refined the search results using a predetermined set of keywords specifically developed for the study. This process enabled us to build a dataset for each newspaper, ready for analysis in the Jupyter Notebook Workbench dashboard.

In line with ProQuest TDM Studio's search guidelines (2022), we used the following search terms:

> *FULLTEXT(("carbon dioxide" OR climate OR "climate risk" OR "greenhouse gas emissions" OR greenhouse OR co2 OR emission OR "global warming" OR "climate change" OR "green energy" OR "renewable energy" OR environment OR environmental OR "carbon footprint" OR "climate adaptation" OR "climate mitigation" OR "extreme weather event" OR "adaptation strategies" OR "mitigation effort" OR drought OR desertification OR flood OR "sea level rise") AND ("border control" OR Schengen OR "open borders" OR migrant OR migration OR asylum OR refugee OR immigrant OR immigration OR immigration OR "human trafficking" OR emigration OR displacement OR resettlement OR integration OR "migrant workers" OR "border crossing" OR "displaced persons" OR deportation OR visa) AND (uncertainty OR uncertainty OR uncertain OR unstable OR fluctuation OR speculation OR complexity OR inconsistency OR unpredictability OR volatility))*

Once the search results were collected, we employed the ProQuest TDM platform's Jupyter Notebook to perform text preprocessing and conduct preliminary analyses on the news data.

Benefits of TDM Studio

Our research project required substantial computing power since we were working with 45 newspapers containing a combined total of approximately 75 million articles. This is where TDM Studio proved invaluable. The platform provided a means to efficiently manage and analyze vast amounts of unstructured text data, such as the newspaper articles used in our study, enabling us to extract meaningful insights. In many ways, TDM Studio served as an all-in-one solution for our research needs.

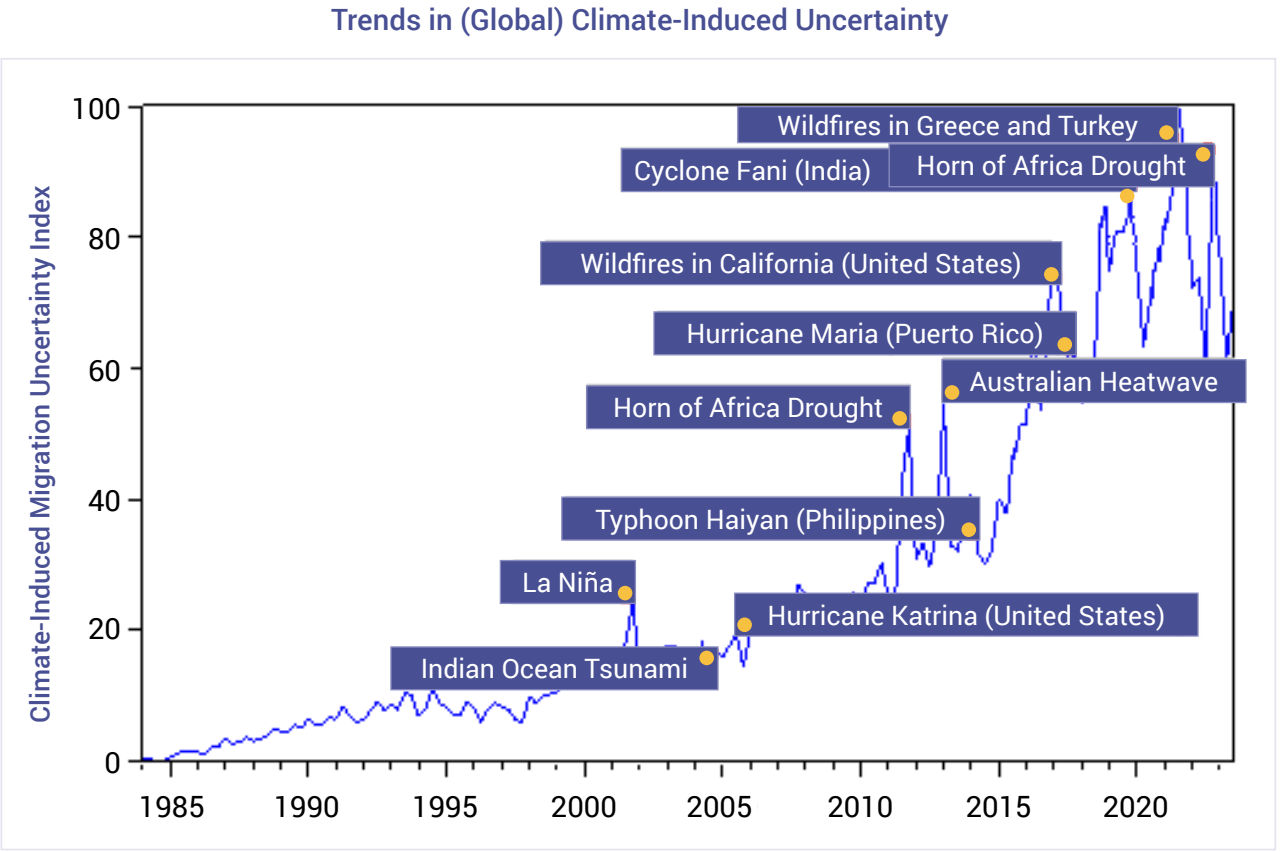
TDM Studio's comprehensive features, particularly the seamless integration of dataset creation and the Jupyter Notebook dashboard, allowed us to access an extensive archive of international newspapers. We were able to analyze content from various sources and across different time periods. From the automated data collection and refinement processes to the final analysis in a coding environment, TDM Studio significantly improved our workflow. Its ability to streamline these tasks saved us valuable time and effort, enhancing both the efficiency and depth of our research.

"The scale of our research, encompassing 45 newspapers with a combined total of approximately 75 million articles in their database, required substantial computing power to handle. This is where TDM Studio proved invaluable."

– Professor Afees Salisu

Results

Our index reveals that climate-induced migration uncertainty has surged in recent years, with the most significant spikes occurring in the past few decades. The index captures some of the most devastating climate disasters, which have not only caused loss of life and property but also led to mass migrations. For instance, the prolonged drought in the Horn of Africa between 2010 and 2011, which resulted in extreme food insecurity and the displacement of large populations in Kenya, Ethiopia, and Somalia, is prominently reflected in the index. Other major natural disasters, such as hurricanes, tornadoes, and wildfires, which generated widespread concern, particularly in international media, are also captured.



Graph highlighting significant climate-induced migration events, such as the 2021 wildfires in Greece and Turkey and Cyclone Fani in 2019, as reflected in the Climate-Induced Migration Uncertainty index. In the index reflected in the graph values range from 0 to 100, where higher values indicate greater uncertainty.

The 2021 wildfires in Greece and parts of Turkey, which forced evacuations, and Cyclone Fani in 2019, which left millions displaced in India and Bangladesh, are key examples of climate-induced migration events represented in the index. It is important to note that events in countries with stronger media coverage tend to have more prominent representation in our index, due to the text-mining methodology we employed.

We attribute the marked differences in spikes of climate change awareness, both now and in the past, to two key factors. First, the level of awareness surrounding climate change issues has significantly increased in recent years. Second, advances in technology, particularly the rise of social media, have accelerated the dissemination of information and globalized climate change discussions, contributing to the heightened visibility of these issues.

The increasing frequency of climate-related disasters and their impact on migration underscores the importance of having an index that measures climate-induced migration uncertainty. This index can serve as a valuable tool for analyzing housing markets, assessing stock market risks, and driving policy discussions on the broader ecological and economic effects of climate change.

About TDM Studio

ProQuest TDM Studio is a data science platform that enhances research capabilities across all skill levels with advanced coding options, user-friendly visualizations, and flexible data access, all within a secure, rights-cleared environment

Only TDM Studio:

- Offers extensive access to rights-cleared content
- Supports data science research across all levels and disciplines
- Helps libraries efficiently and securely manage large datasets

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