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# Refugee inflows and macroeconomic performance: evidence from a cross-country panel (2000–2023)

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The inflow of refugees has already become a stable feature of the world economy, with dire fiscal, social, and macroeconomic consequences for host nations. Even though the discourse on the effect of the arrival of refugees has been largely defined in the humanitarian context, over the years, the economic consequences of the given phenomena have been contested. This study analyzes the macroeconomic impacts of refugee inflows in 17 countries that received those between 2000 and 2023, in terms of growth performance measures and stability measures. Second-generation panel econometric methods consisting of a fixed-effects model and Driscoll-Kraay standard errors (DKSE) were used to undertake the analysis to deal with heteroskedasticity, autocorrelation, and cross-sectional dependence. The robustness measure was applied using Fully Modified Ordinary Least Squares (FMOLS), Canonical Cointegrating Regression (CCR), and Fixed-Effects Ordinary Least Squares (FE-OLS). The findings show that the impact of the inflow of refugees on the growth of GDP is statistically significant, negative, and mainly due to fiscal strains, unemployment influence, and increasing inflation. On the other hand, trade openness continuously increases economic performance, whereas inflation, unemployment, and excessive government expenditure are detrimental to performance. Causality analysis reveals that, instead of having a direct effect on GDP, refugee arrivals have an indirect effect on GDP via the labor market and fiscal effects. These findings highlight that refugee inflows are structural processes with long-term economic impact. The implications of the policy are the necessity to enhance the integration of the labor market, shift fiscal resources towards productive spheres, maintain macroeconomic stability, and foster the idea of burden sharing to reconcile humanitarian demands with economic sustainability.

## KEYWORDS

economic growth, inflation, refugee inflows, trade openness, unemployment

## 1 Introduction

Refugee mobility has become a consistent feature of the global economy, with far-reaching demographic, social, and macroeconomic impacts for host countries. Refugees have been one of the groups of people between 0.1 and 0.3% of the world's population since 1951, and their numbers have increased and decreased in line with periodic episodes of conflict and instability (Fransen and de Haas, 2022). Although in the international system, shielding people has been commonly viewed based on humanitarian protection, host states are increasingly interpreting refugee movements from an economic perspective as fiscal

and labor market strains instead of humanitarian claimants (Fassin, 2005). Restrictive asylum policies, however, have failed to reduce the flows; it has been demonstrated that an increase in rejection rates only diverts those flows to irregular operations, increasing fiscal and social burdens (Czaika and Hobolth, 2016). The unequal allocation of asylum seekers also increases economic strain because burden sharing at the international level is minimal, meaning that the few host nations have had to assume heavy fiscal burdens (Angeloni, 2019). These imbalances are part of increasing government spending, competition in the labor market, and the risks of inflation, which limit potential growth (Tufaner and Sözen, 2019). However, these effects are not one-way. Eventually, the assimilation of refugees into host economies can have a positive effect on output, provided labor markets are flexible and fiscal distribution is efficient. However, the benefits are usually delayed by long and uncertain asylum processes (Bakker et al., 2014; Dadush, 2018; Odhiambo, 2015). This duality points to the fact that inflows of refugees cannot be treated as temporary shocks, but, on the contrary, indicate structural forces, the macroeconomic effects of which are transmitted via fiscal mechanisms, unemployment, inflation, and external integration, which affect the long-term growth patterns of host countries.

The economic effects of refugee inflows are contested using varied and circumstantial data. Research on OECD membership suggests that refugee influx adversely affects GDP growth while increasing inflation and government expenditures, highlighting fiscal and price-related stressors in host countries (Tufaner and Sözen, 2019). Cross-country research shows that asylum claims are driven more by conditions in origin countries than by host countries' economic performance; thus, inflows are independent of host-country growth paths (Ruhe et al., 2021). Research indicates that refugees might reduce short-term growth due to fiscal resources diverted to welfare spending, but long-term outcomes could be positive, as labor markets accommodate newcomers (Bakker et al., 2014; Dadush, 2018). Sub-Saharan evidence shows that efficient government spending can sustain economic growth, whereas welfare-focused spending for inflows can slow growth (Odhiambo, 2015). Inflationary pressures increase in the short term when refugee inflows raise demand for housing, food, and services, causing consumption shocks and unstable prices (Aydin et al., 2016; Eggoh and Khan, 2014; Moreira, 2014; Musarat et al., 2020). The effect on labor markets is still a controversial issue: the influx of refugees can put pressure on labor competition in non-flexible markets and, at the same time, may reduce long-term demographic decline and structural unemployment (Bartolucci et al., 2018; Chen, 2022; Kukaj, 2018; Appiah et al., 2020; Kitov, 2021). These findings demonstrate that the effect of refugee inflows requires institutional capacity, fiscal policies, and flexibility in the labor market, which makes it difficult to assess macroeconomic outcomes.

Despite these insights, there are still important gaps in the literature regarding the inflow of refugees and macroeconomic outcomes. A significant part of the current evidence is country-specific and limits the possibility of obtaining generalized results in relation to different host economies (Tufaner and Sözen, 2019; Odhiambo, 2015). Additionally, most previous studies separate transmission channels, such as fiscal spending (Dao, 2012) and labor markets (Dustmann et al., 2017), without incorporating these dimensions into a single empirical analysis. This compartmentalized

view does not consider that the macroeconomic impacts of inflows of refugees are multidimensional in nature, and that they can simultaneously influence growth, inflation, unemployment, and government spending. However, several methodological limitations restrict the availability of research. The use of first-generation econometric tools usually overlooks key factors, including cross-sectional dependence, slope heterogeneity, and possible endogeneity among countries, thus limiting the strength and policy implications of the findings. A few more recent studies have used second-generation panel techniques, which can deal with these issues, and a few have tested these methods alongside detailed robustness tests. As a result, the empirical evidence is not clear about the presence of short-term shock-like and long-term structural characteristics of refugee inflows and the circumstances under which their economic impacts may turn into liabilities, or which factors may transform them into growth-promoting ones.

Based on these gaps, this study seeks to offer complete evidence on the macroeconomic impact of refugee inflows using a balanced panel of 17 host nations between the years 2000–2023. The main aim is to explore whether the arrival of refugees is a transient shock or the structural influence of its effects on long-term economic performance. To ascertain this, this study addresses four interrelated research questions: (i) to what extent does the influx of refugees affect GDP growth, inflation, unemployment, and government spending in host economies? (ii) Are the effects of the short-run transitory or long-run permanent? (iii) Are refugee inflows directly related to macroeconomic performance? (iv) Do the observed associations hold well with other long-run estimators, such as Fully Modified Ordinary Least Squares (FMOLS), Canonical Cointegrating Regression (CCR), and Fixed-Effects Ordinary Least Squares (FE-OLS)?

This study contributes to the literature on refugee inflows and macroeconomic performance in three ways. First, it offers systematic cross-country data by combining several macroeconomic channels, such as GDP growth, inflation, unemployment, and government expenditure, into one empirical hypothesis. In this process, it is no longer country-specific or single-channel focused, as has been the case in previous research. Second, this study enhances methodological rigor by using second-generation econometric tools, such as fixed effects with Driscoll-Kraay standard errors and robustness estimators, such as FMOLS, CCR, and FE-OLS, to overcome cross-sectional dependence, slope heterogeneity, and endogeneity. This ensures that the results are not model-specific but apply to a variety of sophisticated estimates. Third, the research increases policy relevance because it shows that refugee inflows are not temporary shocks but structural phenomena that have long-term economic effects, depending on the quality of institutions, fiscal distribution, and labor market inclusion. This study fills a gap in the balanced interpretation of the long-term challenges and opportunities of receiving refugees by providing a more balanced view of the issue of hosting refugees in the context of humanitarian considerations and economic sustainability.

The remainder of this paper is organized as follows. Section 2 reviews relevant literature on refugee inflows and macroeconomic performance. Section 3 describes the data set, variables, and econometric methodology. Section 4 presents the empirical results with discussion, including the diagnostic tests, baseline estimates, causality analysis, and robustness checks. Section 6 outlines the conclusion and policy recommendations.

## 2 Literature review and hypothesis development

### 2.1 Refugee inflow and economic growth

Studies examining the nexus between refugee inflows and GDP growth reveal highly contested outcomes, reflecting differences in institutional capacity, fiscal design, and labor market flexibility across host countries. Foundational research on migration and labor markets established much of the conceptual ground for these debates. Card's (1990) classic study of the Mariel boatlift—one of the earliest large-scale analyses of a sudden refugee inflow—found that the arrival of more than 120,000 Cuban refugees in Miami had minimal impact on local wages and employment. His results suggested that local economies, when flexible and open, can absorb sizable population inflows without major macroeconomic disruption. In contrast, Borjas (1995) and Borjas (2003) revisited these findings and argued that immigration's effects depend heavily on the degree of skill substitutability between refugees and native workers. He demonstrated that low-skilled inflows can place downward pressure on wages and labor demand in segments where the skills of refugees and domestic workers directly overlap. These seminal insights have shaped decades of analysis on migration shocks and host-country adjustment mechanisms. More recently, Ruist (2015) extended this line of inquiry to the fiscal domain, showing that while refugee inflows tend to raise welfare expenditures in the short run, their long-term fiscal costs are modest, as labor market participation and tax contributions increase over time. Such findings underscore that the macroeconomic consequences of refugee arrivals are not uniform: the initial burden can evolve into a net contribution, depending on integration efficiency, policy design, and institutional strength. These classical perspectives provide the theoretical foundation on which newer cross-country studies build.

Expanding from these early frameworks, recent empirical work explores the same dynamics across varied geographic and institutional contexts. Blouchoutzi et al. (2025), analyzing Greece through a labor-market allocation model, showed that refugee settlement in agriculture can revitalize rural areas and sustain GDP growth through higher productivity. Similarly, Charlotte (2024) finds that asylum inflows in 23 NATO countries indirectly stimulate GDP by increasing defense spending, while Forte et al. (2025) highlight that differences in asylum-recognition capacity reshape fiscal burdens and GDP performance across EU economies. At a global level, Gan (2025) argues that equitable burden-sharing arrangements stabilize GDP by diffusing fiscal and social pressures among host countries. Nevertheless, several studies continue to identify short-term constraints. Hierro and Maza (2024) demonstrate that unequal refugee reception during the Syrian and Ukrainian crises strained GDP sustainability in the EU, while Noorbakhsh and Teixeira (2023) find that inflows reduce entrepreneurial activity but increase self-employment, generating mixed effects on overall growth. Country-specific analyses echo this duality: Kayaoglu (2025) observes that refugee exposure in Türkiye depresses local service provision and GDP, and Kumar (2025) links protracted displacement in South Asia to long-term economic burdens.

Taken together, integrating the classic assessments of Card (1990), Borjas (1995), Borjas (2003), and Ruist (2015) with this newer empirical evidence suggests that refugee inflows often produce an initial drag on

GDP growth due to increased fiscal pressure, competition in low-skilled labor markets, and transitional inefficiencies in integration. Although these effects may moderate or even reverse over time, the early phases of refugee reception are typically characterized by negative or stagnant GDP growth, particularly in economies with limited institutional or absorptive capacity. Building on this comprehensive literature, the present study explicitly conceptualizes refugee inflows as macroeconomic shocks with measurable short-term negative effects on growth, transmitted through fiscal, labor, and consumption channels. Refugee arrivals are thus not viewed solely as humanitarian phenomena but as significant economic events influencing national income trajectories. Accordingly, the study proposes the following hypothesis:

*H1: Refugee inflows have a negative impact on GDP growth in host countries.*

### 2.2 Trade openness and economic growth

The literature on the relationship between trade openness and GDP growth presents mixed findings, reflecting differences in economic structures, institutional quality, and regional integration. Several studies emphasize positive contributions: in a multi-country analysis, R. L. et al. (2025) show that trade openness and GDP growth jointly improve food security outcomes in emerging economies, while Seti et al. (2025) demonstrate that financial and trade openness foster growth when supported by macroeconomic stability and political stability. Shahzad and Miao (2025), examining China and South Asian economies, also confirmed that openness strengthens intra-regional trade and synchronizes business cycles, thereby enhancing GDP growth. Similarly, Xuan (2025a), focusing on Japan, finds that trade openness and foreign direct investment (FDI) stimulate GDP expansion, albeit with environmental trade-offs. However, other studies have provided cautious evidence. Bajja et al. (2025) analyzed four African countries and revealed that openness drives energy-intensive growth, linking GDP expansion with rising CO<sub>2</sub> emissions. In South Africa, Sunde (2025) finds only marginal effects of openness on industrial growth, suggesting limited spillovers in resource-dependent economies. Likewise, Sharif et al. (2025) argue that, while openness may support GDP in the short term, it also degrades environmental quality and undermines sustainability when combined with rapid growth. Examining Germany, Xuan (2025b) shows that openness mainly influences short-term fluctuations, while innovation and renewable energy determine long-run gains. Pea-Assounga et al. (2025) also found that openness in Arab oil states has limited effects compared to oil prices and emissions, highlighting sectoral dependency. Synthesizing these findings, this study adopts one central line of reasoning: trade openness promotes economic growth primarily by expanding the scale of production through access to larger external markets. Greater exposure to international demand allows domestic industries to exploit economies of scale, increase export revenues, and enhance overall output. Even when short-term adjustment costs arise, the expansion of market size provides sustained stimuli to investment, employment, and income generation, which collectively strengthen GDP growth. Accordingly, the study formulates the following hypothesis:

*H2: Trade openness has a positive effect on GDP growth in host countries.*

## 2.3 Inflation and economic growth

The relationship between GDP growth and inflation has long been debated, with evidence suggesting both supportive and adverse effects, depending on the economic context and inflation thresholds. Beckworth and Horan (2024), applying a nominal GDP targeting framework for the United States, demonstrate that stabilizing nominal GDP after shocks promotes consistent long-term growth. Similarly, Pollin and Bouazza (2024) review global evidence and conclude that very low inflation does not improve growth, whereas moderate inflation is conducive to macroeconomic stability. Ndou and Gumata (2024), analyzing South Africa, reinforce this by showing that lower inflation targets reduce the pass-through of GDP to inflation, thereby stabilizing output. In contrast, other studies have highlighted the destabilizing effects of inflation. Using panel ARDL across SAARC economies, Dahal et al. (2024) find that rising GDP growth contributes to long-term inflationary pressures. For Pakistan, Mehmood et al. (2024) show that inflation hampers GDP-linked trade growth despite positive contributions from GDP and exchange rates. Similarly, Mohamed (2024) reveal that, for Somalia, GDP growth, inflation, and debt are negatively related, reflecting the fragility of fiscal and monetary systems. Ozili (2024), examining Nigeria, shows that monetary innovations, such as central bank digital currency issuance, can accelerate both GDP growth and inflation simultaneously, illustrating the delicate balance between innovation and stability. Combined with the above results, these findings indicate that moderate inflation can help growth through demand and investment, but the chronic and unstable kind of inflation can destroy the stability of the macroeconomy and hamper productive activity. Based on this literature and dominant empirical patterns, the study adopts a single underlying rationale—that inflation reduces economic growth by undermining price stability and deterring productive investment. Accordingly, the following hypothesis is proposed:

H3: Inflation has a negative impact on GDP growth in host countries.

## 2.4 Unemployment and economic growth

The nexus between GDP growth and unemployment is a central theme in macroeconomic theory, often framed through Okun's law, which posits an inverse relationship between these two variables. Evidence from EU economies supports this traditional view. Burger and Šlampiaková (2025), using cluster analysis, show that higher GDP per capita and innovation correspond to lower unemployment. Similarly, Ozili and Oladipo (2024), analyzing ECOWAS countries, demonstrated that GDP growth reduces unemployment, while credit contractions worsen labor market outcomes. Rahman et al. (2023) also found that in South Asia, GDP growth combined with renewable energy use contributes to reducing unemployment, although the magnitude of the effects varies across countries. Simultaneously, findings from different contexts reveal more nuanced or contradictory outcomes. Chen et al. (2025), applying deep learning models, confirm that unemployment and the consumer price index (CPI) are key drivers in GDP forecasting, but the direction of causality can shift depending on macroeconomic shocks. Lasisi et al. (2024), examining Japan, report that, while tourism and life expectancy boost GDP,

unemployment exerts only a weak negative influence. In fragile states, such as Somalia, Mohamed (2024) finds no significant GDP–unemployment relationship, rejecting Okun's law, whereas Mohamed (2024) and Mohamud et al. (2024) confirm a negative association in the same economy using different methodologies. Zhorzholiani (2024) further illustrates that in Georgia, persistently high unemployment constrains GDP growth, highlighting the importance of labor market alignment.

Taken together, these findings reinforce the general validity of Okun's law while acknowledging that its strength depends on structural and institutional factors. The core economic logic underlying this relationship is straightforward: higher unemployment weakens GDP growth by reducing the utilization of labor resources and diminishing aggregate demand. When a significant portion of the workforce remains idle, overall production declines, household income falls, and consumption slows, collectively restricting output expansion. Conversely, growth that successfully absorbs labor enhances both production capacity and spending, amplifying GDP performance. Hence, the present study posits that unemployment constrains economic growth through reduced labor efficiency and weaker demand transmission mechanisms. Accordingly, the following hypothesis is proposed:

H4: Unemployment has a negative impact on GDP growth in host countries.

## 2.5 Government expenditure and economic growth

The link between government expenditure and GDP growth has been one of the most contested issues in the macroeconomic literature, with findings often depending on the composition and efficiency of spending. Several studies support a positive relationship: Dahal et al. (2025), analyzing G7 countries, demonstrate that government expenditure enhances GDP growth, even when unemployment and inflation constrain it. Okunlola et al. (2024) likewise show that public spending fosters growth in ECOWAS economies, although its effectiveness is moderated by corruption and conflict. Evidence from Nigeria confirms that expenditure can indirectly raise GDP per capita by reducing poverty, although such effects materialize only gradually (Adebayo, 2025). A broader cross-country analysis also suggests that when allocated to sectors such as science, technology, and infrastructure, public investment strengthens sustainable growth prospects (Liu et al., 2023; Mawejje, 2024). However, other studies have pointed to the limited or even negative impacts of government spending. Duwal and Suwal (2024) find that expenditure on education and credit provision yields weak growth effects compared to capital formation in Nepal. Hanane et al. (2024) similarly show that for Tunisia, while agricultural and health spending support GDP, military and education expenditure dampen long-run performance. Donkor et al. (2025) also noted that in resource-rich African countries, increased government spending is often associated with higher carbon emissions, linking GDP growth to environmental costs. These findings echo the earlier concerns that welfare-intensive or distortionary spending may suppress productivity, reduce efficiency, and constrain fiscal sustainability. Taken together, the literature suggests that government expenditure can enhance growth when strategically allocated to productive sectors but may hinder

output when dominated by unproductive or welfare-intensive outlays. Building on this reasoning, the present study posits that in host countries where government budgets are dominated by welfare-related or non-productive expenditures, public spending may impede output growth by lowering capital accumulation and aggregate efficiency. Accordingly, the following hypothesis is proposed:

*H5: Government expenditure has a negative impact on GDP growth in host countries that are dominated by welfare-related spending.*

## 2.6 Literature gap

Although the literature on refugee inflows and macroeconomic outcomes has grown steadily, several key gaps remain—particularly in how the inflow of refugees is analyzed alongside broader economic determinants of growth. First, most existing studies are country-specific, limiting the extent to which findings can be generalized across diverse host economies. This reduces understanding of how the arrival of refugees influences GDP growth under different institutional and structural contexts.

Second, the majority of previous research tends to focus on single causal channels, such as fiscal expenditure, inflation, or labor market effects, rather than jointly assessing how refugee inflows operate within a broader macroeconomic framework. Yet, host-country economic performance is determined by multiple simultaneous influences. Therefore, it is necessary to examine refugee inflows together with other macroeconomic variables—including trade openness, inflation, unemployment, and government expenditure—to obtain a comprehensive view of the determinants of GDP growth, even if these variables do not explicitly interact. Third, many earlier studies continue to rely on first-generation econometric techniques, which overlook critical panel data characteristics such as cross-sectional dependence, slope heterogeneity, and endogeneity. These omissions weaken the robustness and comparability of results, leading to inconclusive evidence about the nature and persistence of refugee effects.

Conceptually, most prior research still treats refugee inflows as temporary shocks, focusing narrowly on humanitarian or short-run fiscal implications. This neglects their structural economic dimension and the possibility that sustained refugee presence shapes long-term macroeconomic trajectories through growth, employment, and fiscal channels. Responding to these shortcomings, the present study places refugee inflows at the center of analysis while simultaneously considering other core macroeconomic variables that co-determine GDP performance. By applying second-generation econometric methods to a large cross-country panel (2000–2023), this study provides more reliable evidence on how refugee arrivals and key economic conditions collectively influence host-country growth, thereby filling the empirical and methodological gaps identified in the literature (Figure 1).

## 3 Methods

### 3.1 Data and variables

This study employs a balanced panel dataset covering 2000 to 2023 to examine the macroeconomic impact of refugee inflows among the 17

selected countries. We selected these 17 countries because they are among the world's major recipients of annual asylum and refugee inflows reported consistently in the World Development Indicators (WDI) (World Development Indicators | DataBank, 2025). These countries represent all major regional displacement corridors: South Asia (Bangladesh, Pakistan), the Middle East (Turkey, Jordan, Lebanon), East Africa (Ethiopia, Kenya, Uganda, Rwanda, Tanzania), Europe (Germany, Greece, Italy, Sweden), and Latin America (Colombia, Peru, Ecuador). This cross-regional representation ensures variability in fiscal capacity, labor-market structures, and policy responses. The period 2000–2023 was chosen because WDI provides complete, comparable annual asylum/refugee inflow data for these countries only from 2000 onward. The dependent variable is the annual percentage increase in GDP, while the primary explanatory variable is the inflow of immigrants, specifically, annual asylum counts. The control variables include trade openness (TOP, % of GDP), inflation (INF, annual percentage change in consumer prices), unemployment (UNE, % of the labor force), and government final expenditure (GFE, % of GDP). Consistency and comparability are achieved primarily by utilizing data from the World Development Indicators and international asylum statistics reports. Table 1 presents variables, definitions, units, and sources.

### 3.2 Conceptual framework and model specification

The framework of this study combines macroeconomic and migration theories to explain how refugee inflows influence the economic performance of host countries. From a Keynesian perspective, population growth caused by refugee arrivals raises aggregate demand for food, housing, and services, potentially increasing short-term output but also generating higher inflation and government spending. This duality can limit long-term growth, supporting hypotheses *H1* and *H3*, which expect refugee inflows to depress GDP growth through fiscal and inflationary pressures (Tufaner and Sözen, 2019; Aydin et al., 2016). The Neoclassical (Solow-Swan) growth framework links refugee inflows to shifts in labor supply and capital accumulation. In the short run, growth may slow if labor expands faster than capital, but in the long run, successful labor market integration can raise productivity. This reasoning supports *H4*, which anticipates a negative association between unemployment and GDP growth, as seen in earlier empirical evidence (Burger and Šlapiaková, 2025; Zhorzholiani, 2024; Mohamed 2024).

The fiscal burden versus fiscal stimulus hypothesis provides further insight into the government expenditure channel. Refugee-related welfare spending may reduce funds available for productive investment, while capital and infrastructure spending can sustain growth. Studies on G7, ECOWAS, and African economies demonstrate that the growth effect of public spending depends on its composition (Dahal et al., 2025; Okunlola et al., 2024; Donkor et al., 2025), which underlies *H5*, predicting negative effects where welfare intensity is high. Likewise, endogenous growth and trade theories suggest that greater openness enhances efficiency, technology transfer, and productivity, justifying *H2*, which expects a positive link between trade openness and GDP growth (Shahzad and Miao, 2025; Seti et al., 2025; Xuan, 2025a).

Finally, the push-pull migration model views refugee movements primarily as exogenous shocks caused by conflict and instability in the country of origin, rather than domestic economic factors. This

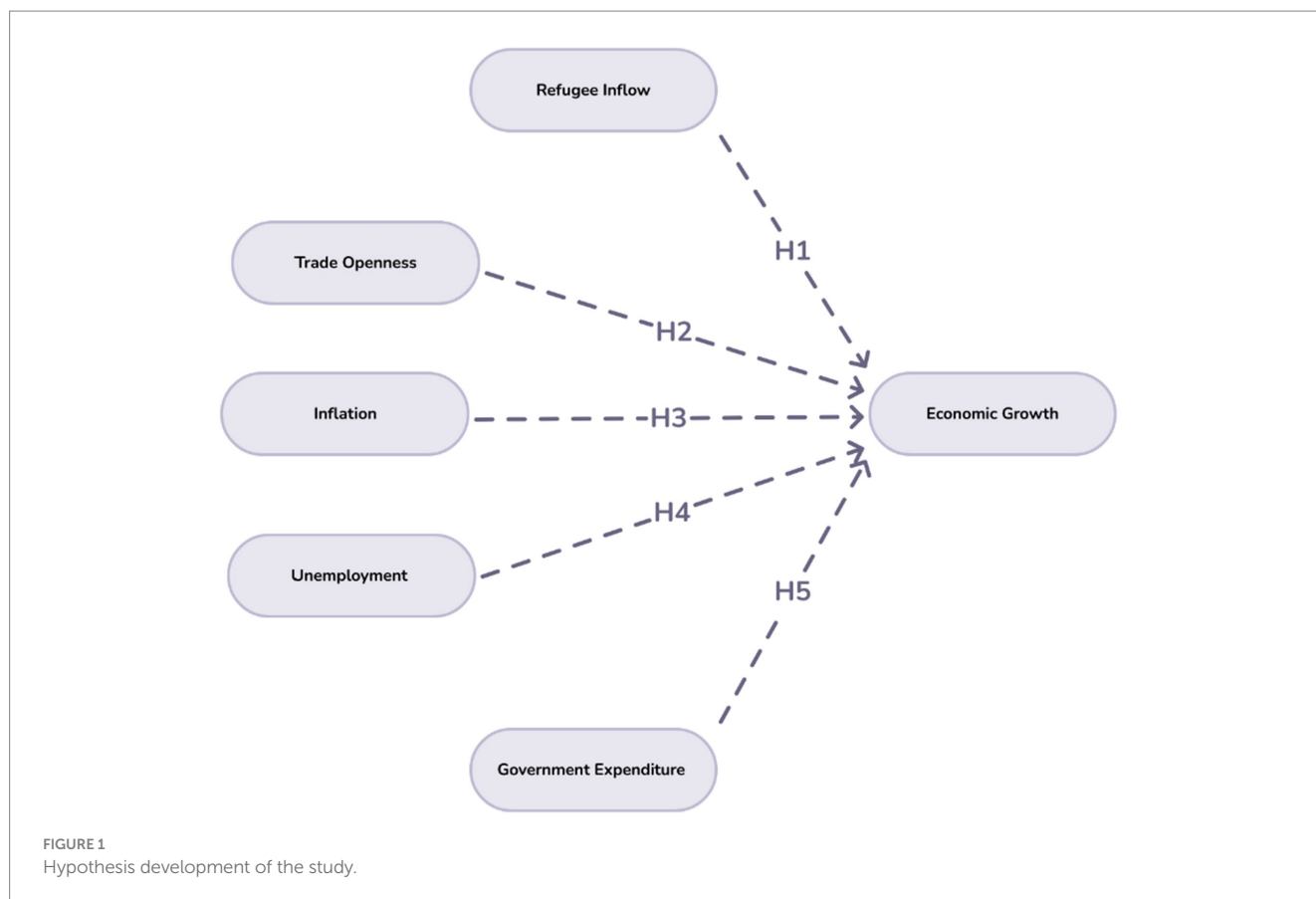


TABLE 1 Data description.

Variable	Description	Unit of measure	Source
GDP	Gross domestic product	(Annual % growth)	
RE	Refugees by country or Asylum	LN(Annual number)	Word
TOP	Trade openness	(% of GDP)	Development
INF	Inflation, consumer price	(Annual % growth)	Indicator
UNE	Unemployment	(% of total labor force)	
GFE	Govt. final expenditure	(% of GDP)	

supports conceptualizing refugee inflows as external forces influencing host-country economies (Fransen and de Haas, 2022; Ruhe et al., 2021). Together, these theoretical foundations form a holistic framework that links fiscal, labor, price, and trade channels to overall growth performance. Accordingly, the general model of analysis can be expressed as follows in Equation 1:

$$GDP_{it} = f(REF_{it}, TOP_{it}, INF_{it}, UNE_{it}, GFE_{it}) \quad (1)$$

Where GDP represents economic growth, REF denotes refugee inflows, TOP indicates trade openness, INF is inflation, UNE represents unemployment, and GFE stands for government expenditure. The functional form for estimation is given as follows in Equation 2:

$$GDP_{it} = \alpha_0 + \beta_1 REF_{it} + \beta_2 TOP_{it} + \beta_3 INF_{it} + \beta_4 UNE_{it} + \beta_5 GFE_{it} + \epsilon_{it} \quad (2)$$

Where  $\alpha_0$  is the intercept term and  $\beta_1$  to  $\beta_5$  are the coefficients of the variables.

### 3.3 Empirical strategy

To obtain reliable estimates of the relationship between refugee inflows and macroeconomic performance indicators—GDP growth, inflation, unemployment, trade openness, and government expenditure—this study follows a step-by-step econometric strategy aimed at addressing the main challenges of panel data analysis.

First, several diagnostic tests are conducted to ensure the data are suitable for estimation.

- Multicollinearity is checked using the Variance Inflation Factor (VIF) to verify that the independent variables do not overlap in their explanatory power.

- Cross-sectional dependence, which occurs when countries are affected by similar global or regional shocks, is tested using the method of Pesaran (2004).
- Slope heterogeneity, meaning that countries may respond differently to the same variables, is examined using the Hashem Pesaran and Yamagata (2008) test.
- To test whether the variables are stationary, both first- and second-generation unit root tests (LLC, CIPS, and CADF) are applied.
- Finally, cointegration tests (Westerlund and Edgerton, 2008; Pedroni, 2004; Kao, 1999) are used to determine whether there is a stable long-run relationship among the variables over time.

After these preliminary checks, the main estimation is carried out using a fixed-effects model with Driscoll–Kraay standard errors (Driscoll and Kraay, 1998). This method is well suited for macroeconomic panel data because it corrects for three common problems: heteroskedasticity (unequal variance across countries), serial correlation (correlation over time), and cross-sectional dependence (common shocks across countries). In cross-country studies like this one, where economies are often interconnected, using standard estimators could produce biased results. The Driscoll–Kraay approach corrects for this by adjusting the standard errors, making the results more robust and reliable.

The fixed-effects model can be expressed as follows in Equation 3:

$$y_{it} = \alpha_i + \beta' X_{it} + \varepsilon_{it} \quad \text{for } i = 1, \dots, N; t = 1, \dots, T \quad (3)$$

Where  $y_{it}$  is the GDP growth of country  $i$  at time  $t$ . The term  $\alpha_i$  signifies the unobserved country-specific effects,  $X_{it}$  refers to the explanatory factors (RE, TOP, INF, UNE, GFE),  $\beta'$  indicates the coefficients of the explanatory variables, and  $\varepsilon_{it}$  represents the error term.

To confirm that the results are stable, the study also applies three alternative estimation methods: Fully Modified OLS (FMOLS), Canonical Cointegrating Regression (CCR), and Fixed Effects OLS (FE-OLS) (Park, 1992). These estimators help to correct for potential endogeneity and serial correlation, providing further assurance that the results are not dependent on one specific model. Finally, the Dumitrescu and Hurlin (2012) panel causality test is used to explore the direction of influence among variables. This helps determine whether refugee inflows directly cause changes in GDP growth or instead impact it indirectly through fiscal, labor market, or inflationary channels. Overall, this stepwise empirical strategy combines strong econometric rigor with clarity and consistency, ensuring that the results are both statistically sound and easy to interpret (Figure 2).

## 4 Results and discussion

Table 2 presents the summary statistics of the key variables used in the analysis. On average, GDP growth across the 17 host countries is 4.04 percent, with large variation ranging from −21.4 percent to 13.57 percent, reflecting major fluctuations between countries and years. The average inflow of refugees (RE) is recorded at 11.28 (log values), showing moderate variation. Trade openness (TOP) averages 55.50 percent of GDP, with a wide range (20.6 to 146.9 percent), highlighting differences in external sector integration. Inflation (INF)

exhibits the highest variability, from −23.9 to 221.34 percent, indicating substantial price instability in some countries. Unemployment (UNE) averages 7.26 percent, while government final expenditure (GFE) stands at 14.75 percent of GDP. Each variable includes 408 observations, ensuring balance across the sample.

Table 3 shows the pairwise correlations between the variables. Refugee inflows (RE) show only a weak association with GDP growth, suggesting that their impact operates through more complex macroeconomic mechanisms rather than direct correlation. Trade openness (TOP) and government expenditure (GFE) exhibit small negative correlations with GDP, which may reflect structural rigidity or high welfare costs in refugee-hosting economies. Conversely, unemployment (UNE) correlates negatively with GDP, consistent with Okun's law. These correlations, however, are preliminary and do not account for endogeneity or national heterogeneity, which are further addressed in the regression analysis.

Table 4 reports the Variance Inflation Factor (VIF) results, confirming no multicollinearity among independent variables. All VIF values are below 2, far lower than the threshold of 10, meaning that each explanatory variable provides distinct information in the regression model.

Cross-sectional dependence (CSD) tests, presented in Table 5, indicate that GDP, refugee inflows, trade openness, inflation, and unemployment exhibit significant inter-country dependence ( $p < 0.01$ ). This suggests that shared shocks—such as regional crises or global economic events—affect multiple countries simultaneously. Only government expenditure (GFE) shows no significant dependence. Recognizing this interdependence, subsequent models incorporate econometric corrections for cross-sectional effects.

The slope homogeneity test results (Table 6) reject the null hypothesis of homogeneous coefficients ( $p < 0.01$ ). This means that the effects of refugee inflows and other explanatory variables on GDP growth differ between countries. This variation justifies the use of methods specifically designed for heterogeneous panels, such as the Driscoll–Kraay estimator.

Stationarity tests (Table 7) reveal that GDP and unemployment are stationary at level [I(0)], while refugee inflows, trade openness, inflation, and government expenditure become stationary after first differencing [I(1)]. This mix of integration orders supports using cointegration techniques to identify stable long-run relationships among variables.

The cointegration tests in Table 8 confirm a strong long-run relationship among all variables. The null hypothesis of no cointegration is rejected at the 1 percent level across most tests, meaning the set of variables moves together in the long term. This finding supports the subsequent regression analysis focused on both short-run and long-run relationships.

Table 9 presents the baseline model results estimated using fixed effects with Driscoll–Kraay standard errors. This method is suitable for this study because it corrects for common statistical problems such as unequal variances across countries, time-related correlations, and interconnections among countries that are typical in long-term macroeconomic data. Given that the sample covers 17 host countries between 2000 and 2023, these adjustments ensure that the results are robust and the statistical conclusions reliable. The model captures how refugee inflows, trade openness, inflation, unemployment, and government expenditure affect GDP growth, in line with the hypotheses introduced earlier. Each variable's impact is discussed

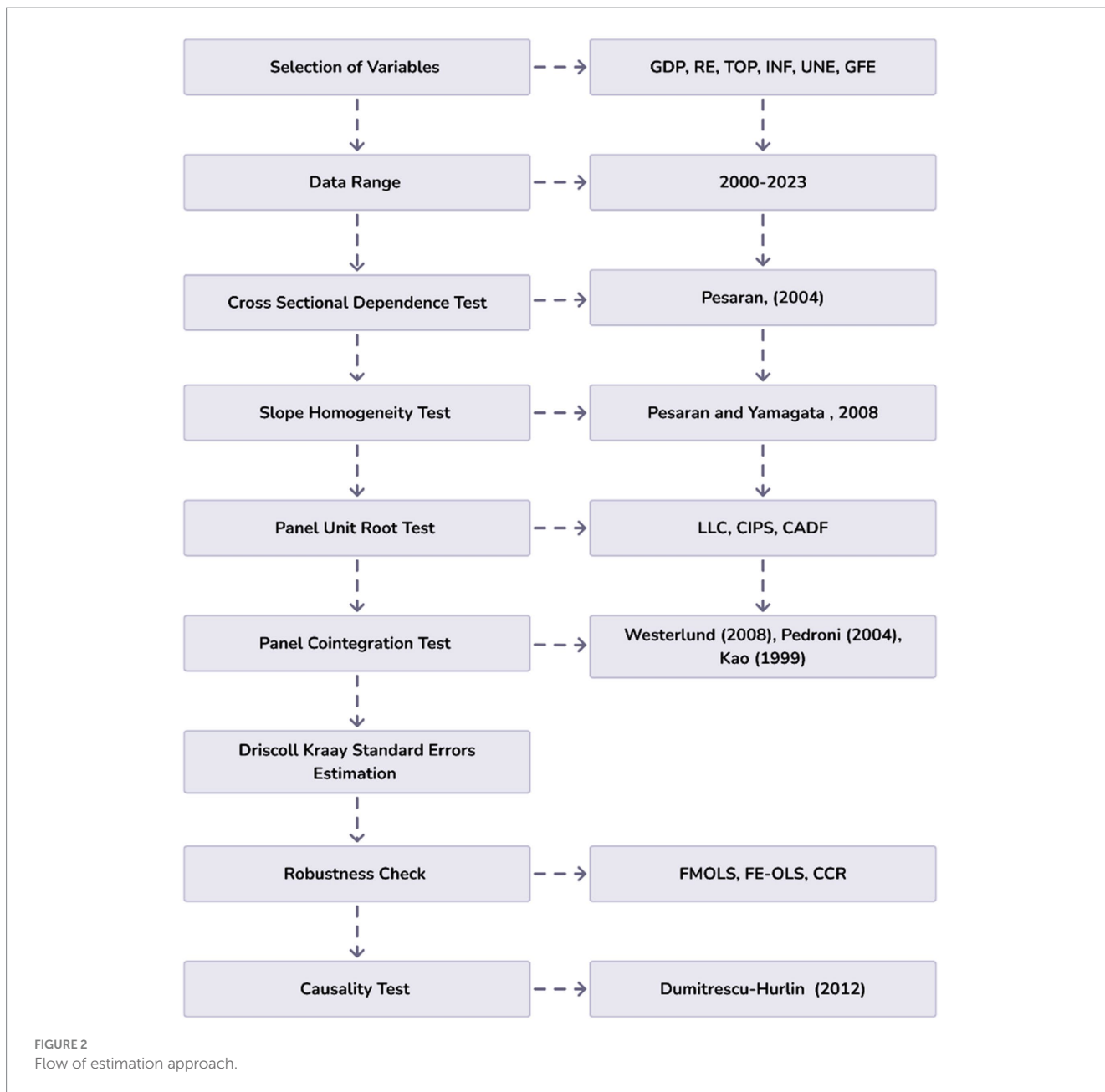


TABLE 2 Descriptive statistics of the variables.

Variable	Obs	Mean	Std. Dev.	Min	Max
GDP	408	4.035	4.052	-21.4	13.573
RE	408	11.281	2.574	4.92	15.14
TOP	408	55.502	23.633	20.598	146.909
INF	408	7.655	18.508	-23.9	221.342
UNE	408	7.264	4.791	0.398	27.686
GFE	408	14.759	5.38	2.36	32.495

TABLE 3 Pairwise correlation.

Variables	(1)	(2)	(3)	(4)	(5)	(6)
(1) GDP	1.000					
(2) RE	0.019	1.000				
(3) TOP	-0.137	0.047	1.000			
(4) INF	-0.108	0.128	0.057	1.000		
(5) UNE	-0.276	-0.279	0.389	0.011	1.000	
(6) GFE	-0.279	-0.121	0.581	-0.292	0.400	1.000

below, considering both statistical significance and theoretical interpretation.

The results show that refugee inflows have a negative and statistically significant effect on GDP growth, confirming Hypothesis

1. A 1 percent increase in refugee inflows is associated with an average 0.23 percentage-point decline in economic growth. This finding supports the fiscal burden argument: when governments spend more on welfare, healthcare, and security to accommodate refugees, fewer

TABLE 4 VIF test for multicollinearity.

Variable	VIF	1/VIF
GFE	1.924	0.52
TOP	1.759	0.569
UNE	1.38	0.725
INF	1.214	0.824
RE	1.143	0.875
Mean VIF	1.484	.

TABLE 5 Cross sectional dependence test.

Variable	CD- stat	p-value
GDP	21.545	0.000***
RE	26.821	0.000***
TOP	13.943	0.000***
INF	18.712	0.000***
UNE	7.879	0.000***
GFE	0.462	0.644

\*\*\*p < 0.01.

TABLE 6 Slope homogeneity test.

Test	Delta	p-value
	5.498***	0.000
adj.	6.533***	0.000

\*\*\*p < 0.01.

resources are left for productive investment. This outcome aligns with existing evidence from OECD and EU countries, which found short-term strains on budgets and labor markets from refugee inflows (Tufaner and Sözen, 2019; Hierro and Maza, 2024). However, it contrasts with studies showing that well-managed refugee integration can enhance productivity in the long run, as seen in agricultural revitalization in Greece (Blouchoutzi et al., 2025) and in targeted settlement programs elsewhere (Renner and Schmid, 2025). Overall, the short-term costs appear to outweigh potential long-term gains when institutional capacity and labor-market absorption are limited.

These results fall between two major perspectives from migration research. Card (1990) found little negative labor-market effect from the sudden arrival of Cuban refugees in Miami, whereas Borjas (1995) and Borjas (2003) argued that large low-skilled inflows can depress wages and employment opportunities for natives. The present findings align more closely with Borjas’s view, suggesting that when labor markets and institutions are rigid, refugee inflows cause adjustment frictions. The outcome also agrees with Ruist (2015), who found that refugee immigration can impose short-term fiscal costs before integration benefits appear.

Trade openness has a positive and significant relationship with GDP growth, supporting Hypothesis 2. A 1 percent increase in trade openness (measured by the ratio of exports and imports to GDP) raises economic growth by roughly 0.15 percentage points. This result supports the idea that open trade enhances efficiency and allows countries to benefit from technology transfer and larger markets. Similar findings have been reported for Asian and emerging economies (Shahzad and Miao, 2025;

Seti et al., 2025; Xuan, 2025a). Although some studies from South Africa and the Arab oil economies have found weaker effects due to resource dependency (Sunde, 2025; Pea-Assounga et al., 2025), the present findings indicate that open trade generally strengthens growth, even when fiscal pressures from refugee inflows are present.

Inflation is found to have a negative and significant effect on GDP growth, in line with Hypothesis 3. A one-percentage-point rise in inflation tends to reduce growth by about 0.12 percentage points. While mild inflation can sometimes stimulate demand in the short term, sustained or volatile inflation reduces investment, weakens purchasing power, and ultimately hampers growth. This result is consistent with earlier analyses for South Asian economies that showed high inflation eroding long-term economic stability (Dahal et al., 2024; Mehmood et al., 2024). It reinforces the need to maintain price stability in host countries coping with additional pressure on goods and housing markets from refugee inflows.

Unemployment also shows a negative and significant relationship with growth, confirming Hypothesis 4. A one-percentage-point increase in unemployment reduces GDP growth by roughly 0.18 percentage points. This outcome supports Okun’s law, which states that higher unemployment limits growth by reducing labor utilization and household spending. The effect is especially relevant in economies that face both rigid labor markets and growing labor supply due to refugee inflows. Similar evidence has been observed in the European Union and Sub-Saharan Africa (Burger and Šlampaiková, 2025; Ozili and Oladipo, 2024; Rahman et al., 2023).

Government expenditure is likewise negative and significant, validating Hypothesis 5. An increase of one percentage point in government spending relative to GDP lowers economic growth by about 0.14 percentage points. This suggests that public funds are often directed toward short-term welfare and administrative costs rather than toward productive investments such as infrastructure, technology, or education. The result supports the fiscal burden argument, similar to findings from Nepal, Tunisia, and resource-dependent African economies (Duwal and Suwal, 2024; Hanane et al., 2024; Donkor et al., 2025). In contrast, studies have shown that when spending is well-targeted—such as in G7 or ECOWAS countries—government investment can drive growth even under challenging conditions (Dahal et al., 2025; Okunlola et al., 2024). The present evidence, however, suggests that in most host countries, welfare-driven expenditure associated with refugee inflows constrains long-term growth potential.

In summary, the baseline results show a consistent pattern: refugee inflows have short-term negative effects on growth through fiscal and labor-market pressures, while trade openness enhances economic performance. Managing inflation, unemployment, and the composition of government spending remains essential for converting refugee presence into long-term economic opportunity.

To test robustness, the model was re-estimated using Fully Modified OLS (FMOLS), Canonical Cointegrating Regression (CCR), and Fixed-Effects OLS (FE-OLS). The results, summarized in Table 10, remain consistent in both sign and significance across all estimators. Refugee inflows continue to show negative effects on GDP growth, while trade openness remains positive. Inflation, unemployment, and government expenditure consistently appear as growth inhibitors. These consistent outcomes confirm the reliability of the main DKSE estimates.

Finally, the Dumitrescu–Hurlin panel causality test (Table 11) explores the direction of influence among variables. The test shows that inflation, unemployment, and government expenditure all

TABLE 7 Panel unit root test.

Variable	LLC		CIPS		CADF		Order
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)	
GDP	-12.2248***	-23.8151***	-3.304***	-5.426***	-2.876***	-4.411***	I(0)
RE	-3.8570	-11.5234***	-1.995	-3.487***	-2.117*	-2.459***	I(1)
TOP	-3.7755	-20.6112***	-1.380	-4.189***	-1.169	-3.267***	I(1)
INF	-8.6922	-20.1364***	-2.721***	-4.951***	-2.262***	-4.120***	I(1)
UNE	-7.0043***	-13.6913***	-2.439***	-3.748***	-2.071*	-2.922***	I(0)
GFE	-6.7500***	-16.9109***	-1.812	-4.148***	-1.951	-3.308***	I(1)

\*\*\*p < 0.01.

TABLE 8 Panel cointegration test.

Test		Without trend		with trend	
		Statistics	p-value	Statistics	p-value
Westerlund	Variance Ratio	-2.7347	0.0031	-3.0990	0.0010
	Modified Phillips-Perron t	0.9183	0.1792	1.9363	0.0264
Pedroni	Phillips-Perron t	-15.3827	0.0000	-16.9997	0.0000
	Augmented Dickey-Fuller t	-12.4685	0.0000	-12.8726	0.0000
	Modified Dickey-Fuller t	-5.0540	0.000		
Kao	Dickey-Fuller t	-8.3150	0.000		
	Augmented Dickey-Fuller t	-4.8521	0.000		
Kao	Unadjusted modified Dickey-Fuller t	-21.7473	0.000		
	Unadjusted Dickey-Fuller t	-14.0629	0.000		

TABLE 9 Driscoll-Kraay standard error (fixed effect).

Variable	DKSE	t-value
RE	-0.3407775** (0.1525743)	-2.23
TOP	0.1151605*** (0.0351788)	3.27
INF	-0.0689896*** (0.0202371)	-3.41
UNE	-0.2746867*** (0.0810596)	-3.39
GFE	-0.4205802*** (0.1272498)	-3.31
_cons	10.21816*** (2.865741)	3.57
Observations	408	
Number of Groups	17	
Within R-squared	0.2452	

\*\*p < 0.5, \*\*\*p < 0.01.

TABLE 10 Robustness check (FMOLS, FE-OLS, CCR).

Variable	FMOLS	FE-OLS	CCR
RE	-0.82*** (-0.0723)	-0.3407775*** (0.1055541)	-0.84*** (-0.0819)
TOP	0.18*** (0.00429)	0.1151605*** (0.0147809)	0.18*** (0.00704)
INF	-0.16*** (-0.00766)	-0.0689896*** (0.0099115)	-0.15*** (-0.0109)
UNE	-0.58*** (-0.1099)	-0.2746867*** (0.0711621)	-0.61** (-0.2206)
GFE	-0.77*** (-0.0423)	-0.4205802*** (0.0680311)	-0.73*** (-0.0890)

\*\*\*p < 0.01.

Values in parenthesis are standard errors.

Granger-cause GDP growth, indicating that macroeconomic stability and fiscal management directly shape output performance. Refugee inflows, however, are found to influence GDP growth indirectly, through their effects on inflation and public spending rather than direct causation.

In summary, the results reveal that refugee inflows tend to exert short-term pressure on host-country economies through fiscal and labor channels, while trade openness remains a consistent driver of growth. The combination of fixed-effects estimation, multiple robustness tests, and causality analysis provides strong empirical support for these conclusions and highlights the structural—rather than purely temporary—nature of the economic impact of refugee inflows.

## 5 Conclusion and policy recommendations

### 5.1 Conclusion

This study investigates the macroeconomic effects of refugee inflows in 17 host nations from 2000 to 2023 with respect to how they have influenced the growth of GDP, inflation, unemployment rate, openness to trade, and government expenditure in these countries. The analysis provides credible evidence on the role of refugee arrivals

TABLE 11 DH-causality test.

Variables relationship	W-stat	Z-bar	p-value
GDP → RE	1.5451	1.5892	0.1120
GDP → TOP	1.0298	0.0869	0.9307
GDP → INF	1.6813	1.9862	0.0470**
GDP → UNE	1.4774	1.3919	0.1640
GDP → GFE	1.1865	0.5439	0.5865
RE → GDP	1.5158	1.5037	0.1327
TOP → GDP	1.0454	0.1323	0.8947
INF → GDP	3.7777	8.0982	0.0000***
UNE → GDP	4.2505	9.4769	0.0000***
GFE → GDP	1.9967	2.9059	0.0037***

\*\* $p < 0.5$ , \*\*\* $p < 0.01$ .

in economic outcomes using a fixed-effects model with Driscoll-Kraay standard errors, which is supported by robustness checks using FMOLS, CCR, and FE-OLS. The findings indicate that the statistical significance of all three forms of fiscal strain–unemployment and inflationary pressure–negatively affects the growth of GDP due to refugee inflows. By contrast, trade openness is a steady growth factor, whereas high government expenditure, increasing unemployment, and continuous inflation deter performance. These results prove that refugee inflows cannot be considered short-effective shocks but rather long-term structural processes with long-term macroeconomic relations. The authors have added value to the literature by incorporating several macroeconomic channels into one empirical model and using sophisticated econometric analysis methods to arrive at strong conclusions.

## 5.2 Policy recommendations

The results of this study provide valuable policy implications for host nations regarding the economic impact of refugee inflows. First, governments should redesign their expenditure policies by decreasing the use of welfare transfers and redirecting resources to productive investments, such as infrastructure, education, and vocational training. This would increase long-term growth opportunities and the potential for refugees to add productively to the economy. Second, there should be a focus on labor market integration using policies that create fewer obstacles to jobs, improve the ability to recognize skills, and encourage entrepreneurship among refugees. Successful integration reduces unemployment pressure, increases the tax base, and relieves fiscal pressure. Third, it is time to strengthen the policies of price stability, which will undermine growth and increase the costs of the inflow of refugees. Coordination between monetary and fiscal policies is needed so that short-term consumption shocks do not lead to ongoing inflationary strain. Fourth, trade liberalization must be sought as a complementary policy to absorb external shocks, create new growth opportunities, and cover the fiscal costs of accommodating refugees. Finally, this research reveals the critical role of financial aid, technical aid, and resettlement

initiatives by the international community in the form of burden sharing, as the expenses of accommodating refugees are not evenly shared. Combined with the above measures, host countries can reconcile their humanitarian obligations with sustained economic viability.

## 5.3 Limitations and future research opportunities

Although this study provides robust evidence of the macroeconomic consequences of refugee inflows, certain limitations should be acknowledged. First, the analysis relies on aggregate panel data, which may mask the country-specific heterogeneity in institutional capacity, policy responses, and social dynamics. Future research could complement this approach with country-level case studies to more precisely capture contextual variations. Second, the study measures refugee inflows as a share of the population but does not account for differences in legal status, duration of stay, or integration outcomes, all of which may influence economic effects. Incorporating micro-level or household survey data can provide deeper insight into these dimensions. Third, although advanced panel estimators were employed to address endogeneity and cross-sectional dependence, unobserved institutional or political factors may still bias the results. Expanding the analysis to include governance, institutional quality, or social cohesion indicators would enrich the explanatory framework. Finally, this study focuses on five macroeconomic variables: GDP growth, trade openness, inflation, unemployment, and government expenditure. Future research could extend the analysis to include innovation, productivity, poverty reduction, or environmental sustainability, thereby broadening the scope of understanding. Addressing these limitations will not only refine empirical insights but also strengthen the policy relevance of future research in refugee and development economics.

### List of countries:

Bangladesh, Colombia, Ecuador, Ethiopia, Germany, Greece, Italy, Sweden, Turkiye, Jordan, Kenya, Lebanon, Pakistan, Peru, Rwanda, Tanzania, Uganda.

## Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

## Author contributions

MR: Validation, Funding acquisition, Project administration, Writing – review & editing, Supervision, Formal analysis, Resources, Software, Methodology, Data curation, Writing – original draft, Investigation, Conceptualization, Visualization. ZA: Data curation, Project administration, Writing – original draft, Visualization, Validation, Investigation, Writing – review & editing, Supervision, Resources, Formal analysis. JK: Writing – original draft, Data curation, Writing – review & editing, Validation, Methodology, Supervision. CL:

Writing – original draft, Writing – review & editing. MD: Writing – review & editing, Supervision, Formal analysis, Project administration, Data curation, Writing – original draft. W-kM: Funding acquisition, Writing – original draft, Supervision, Writing – review & editing.

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## Conflict of interest

The author(s) declared that this work was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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