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Contact to corresponding author: Maja Nikšić Radić, majanr@fthm.hr

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Maja Nikšić Radić

University of Rijeka, Croatia

 orcid.org/0000-0002-8871-6833

Siniša Bogdan

University of Rijeka, Croatia

 orcid.org/0000-0001-6649-5980

Intricate nexus of FDI, remittances, emigration, tourism and growth: Navigating economic landscape of Croatia

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Abstract

Research background: In Croatia, a small-open and growing economy that lags behind more developed countries, globalisation has had a considerable impact on economic stability. The globalised world economy, characterised by international trade, capital flows and migration, has strongly influenced the economic landscape of Croatia. Although foreign direct investment (FDI) and remittances are fuelling economic growth, emigration poses a major challenge. In addition, the vital tourism sector in Croatia emphasises these relationships and can increase overall economic prosperity.

Purpose of the article: The main purpose of this study is to analyse the causal relationships between FDI, remittances, emigration and economic growth in Croatia. In addition, it examines the causal relation between FDI, remittances and tourism growth. Moreover, this study examines the relationships between emigration and FDI, as well as emigration and remittances.

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Methodology: This study adopted a methodological approach that includes time series analysis and panel data analysis to consider the complexity of this issue in more detail. Specifically, the study applied a two-pronged approach such as time series analysis to investigate the causal relationships between FDI and emigration, FDI and tourism growth, remittances and emigration as well as remittances and tourism growth. In parallel, panel data analysis devoted itself to analysing the subtle inter-relationships between FDI, remittances, emigration and their combined effects on economic growth using the same methodological approach.

Findings & value added: Key findings show several causal relationships in the Croatian context: emigration substantially affects FDI, remittances influence emigration patterns, a bidirectional causal relationship exists between FDI and tourism growth and tourism growth boosts remittance flows. FDI boosts economic growth in Croatia, which, in turn, causes the flow of remittances and patterns of emigration. The importance of this study lies in highlighting the potential significance of FDI and remittances, as well as the crucial role of tourism in Croatia while emphasising the potential threat posed by emigration to the Croatian economy. These findings provide a crucial framework for policymakers to design targeted strategies that navigate these inter-connected factors, ensuring sustainable economic growth in similar small, growing economies worldwide.

Introduction

The dynamics of international capital and labour mobility are central to the context of globalisation. Although foreign direct investment (FDI) has attracted considerable research attention, the impact of migration remains relatively under-researched (Bodvarsson & Van den Berg, 2013). International migration plays a role comparable to that of capital, goods and services in the global marketplace (Tadesse & White, 2011). Recent World Bank data show that remittances have overtaken global FDI to become the most important source of external finance in low- and middle-income countries. Croatia, despite its developed status, consistently records higher remittance levels than FDI. The country is heavily dependent on tourism, especially in comparison to other EU countries. Building on the approach of Song and Liang (2019), this study incorporates emigration as a sociocultural variable that is an important determinant of the impact of FDI on the tourism sector. As a small country, Croatia is highly intertwined with globalisation.

In addition, the recent volatility, uncertainty, complexity and ambiguity (VUCA) environment has dramatically altered the global economic landscape. The expansion of the global economy, driven by international trade, the movement of capital, the migration of people as well as the power of tourism, has had a profound impact on the economic trajectory of Croatia. The economic progress of the country is largely dependent on

FDI and remittances, although it also faces challenges regarding emigration patterns. Moreover, tourism plays a central role in the Croatian economy. The main purpose of this research was to determine the relationship between FDI and remittances with tourism growth, as well as their relationship with emigration. Furthermore, this study aimed to establish a connection between these fundamental globalisation indicators – FDI, remittances and emigration – and the economic growth of Croatia. This study adopted a methodological approach that was disaggregated into time series and panel data analyses to address this multi-faceted problem. The main objective was to identify the importance of the relationships between FDI, remittances, emigration trends and tourism growth, which have been highlighted in previous studies as crucial factors for economic growth. This study adopted a two-pronged approach by combining time series and panel data analyses. The time series analysis examined the causal relationships between FDI and emigration, FDI and tourism, remittances and emigration as well as remittances and tourism. The panel data analysis addresses the complicated relationship between FDI, remittances, emigration and their combined effects on economic growth using the same methodology.

To date, scant scholarly research has explored causal relationships among FDI, remittances, emigration and their implications for economic growth. Only a few studies, such as Mihi-Ramirez *et al.*'s (2019) research in Spain and Al and Kameyama's (2020) study in Japan, have ventured into this domain. This investigation provides a distinctive examination of these relationships within Croatia, employing a mixed-methods approach and utilising available national and regional data. Notably, to the author's knowledge, this study is the first to probe these dynamics at the regional or county level, underscoring its innovative nature.

The rest of the manuscript is organised as follows: The introduction is followed by a section that provides a concise overview of the theoretical foundations of the literature review. The next section defines the methodological framework, data sources and methodology of the study. The following sections present the research results and discussions. Finally, the conclusion offers a comprehensive summary and comments.

Literature review

This section provides an extensive and in-depth review of the relevant scholarly literature and presents a comprehensive analysis of the multi-dimensional impact of FDI, remittance and emigration on tourism and economic growth. Their interaction is highlighted, potentially causing economic growth, and their concurrent influence on the tourism industry is mentioned. The following sections present the examination of the causal relationships between these variables. For a more detailed overview, see Table 10 in the Annex.

The *FDI-led migration hypothesis* proposed by Aubry, Kugler and Rapoport (2012) postulated a relationship between emigration and FDI. Research on the relationship between FDI and emigration provides contradictory results. Various studies by Ricketts (1987), Sanderson and Kentor (2008), D'Agosto *et al.* (2013), Wang *et al.* (2013) and Xu and Sylwester (2016) indicated that FDI can increase emigration. In addition, there are opposite conclusions; for instance, Aroca and Maloney (2005) suggested that FDI reduces emigration. In summary, the literature presents a dual narrative: FDI can either exacerbate emigration by creating economic imbalances and labour market disruptions or reduce it by enhancing local economic conditions. The impact of FDI on emigration is context dependent, influenced by factors such as the nature of the investments, the existing economic conditions in the home country and the specifics of the labour market of the host country. The study of Song *et al.* (2020) demonstrated the significant impact of Chinese emigration on FDI in Chinese tourism. The complex relationship between FDI and emigration is a highly important academic topic, as Gheasi and Nijkamp (2017) acknowledged. Sassen (1990) suggested that FDI increases the attractiveness of emigration. Moreover, as Rauch (2003) argued, the diaspora plays an important role in promoting international trade and investment. This is because the diaspora builds trust and provides valuable market insights in a weak international legal environment. The diasporan knowledge of market needs in their home country is invaluable to foreign investors, as Gao (2003) confirmed. While most research has focused on the impact of skilled migration on FDI flows, studies on reverse causality – how FDI causes migration – are relatively limited (D'Agosto *et al.*, 2013).

The FDI-led migration hypothesis states that migration patterns can be influenced by FDI, either by attracting skilled labour for new opportunities or by displacing local labour. Jobs in sectors that require specialised skills are often created by FDI, leading to an inflow of skilled migrants, whereas demand for labour-intensive jobs may decline, encouraging emigration. Based on these facts, the first hypothesis (H1) of this paper is as follows: The inflow of FDI causes the number of emigrants from Croatia.

The *remittance-led migration hypothesis* examines the influence of remittances on emigration. Although commonly associated with family separation and transnational households (Castañeda & Buck, 2011), this study tests whether remittances influence emigration trends. Remittances provide direct income to cover emigration costs (Schiff, 1994; van Dalen *et al.*, 2005; Metelski & Mihi-Ramirez, 2015; Mihi-Ramirez *et al.*, 2019). In addition, Le Goff and Salomone (2016), Mihi-Ramirez *et al.* (2019) and Al and Kameyama (2020) confirmed a positive relationship between remittances and emigration. Overall, these studies collectively indicated that remittances facilitate emigration by providing essential financial resources that lower the cost barriers to migration and support individuals' ability to relocate. According to the theory of cumulative causation, migration that has begun gains momentum over time (Sanderson & Kentor, 2008; Massey *et al.*, 2005). Migrants remit funds to their families, potentially increasing inequality and motivating further potential migrants (Stark & Taylor, 1989). The notion that migration and remittances can lead to subsequent chain migration has received limited attention in academic research (Dimova & Wolff, 2015). Remittances can signal migration as a lucrative opportunity; however, evaluating their impact is complex owing to numerous factors in the emigration decision process. When remittances have this effect, it leads to 'chain migration', where the flow of remittances encourages more individuals to emigrate (van Dalen *et al.*, 2005). The influence of emigration intentions and the receipt of remittances depend on the size, type and characteristics of migrant networks (Bauer *et al.*, 2000).

The remittance-induced migration hypothesis states that remittances can influence migration behaviour by improving living standards and thereby facilitating further migration. Financial support from remittances can boost the local economy, leading to further migration. Therefore, the second hypothesis (H2) of this paper is as follows: The inflow of remittances causes the number of emigrants from Croatia.

The relationship between tourism and FDI is called the *FDI-led tourism growth hypothesis* (Salleh *et al.*, 2011). Research on this relationship yields contradictory results. There is evidence that FDI causes international tourist arrivals (Tang *et al.*, 2007; Zhang & Daly., 2011; Perić & Nikšić Radić, 2016); however, there is also evidence of the reverse relationship (Katircioglu, 2011). According to the cited papers, FDI can boost international tourism by fostering economic growth and infrastructure development and transforming underdeveloped regions into tourist hubs, particularly through sustainable initiatives. However, it may also lead to economic dependency, cultural homogenisation and revenue leakage, potentially undermining long-term sustainability and exposing host countries to external economic shocks.

A review of previous findings on the impact of FDI in host countries highlights that global FDI plays an important role in the tourism sector. FDI is a relevant factor in advancing the tourism industry, although its share of global FDI allocated to tourism is relatively small (Endo, 2006; UNCTAD, 2007). FDI inflows allow host countries to integrate into international tourism networks, consequently increasing tourist flows and revenues from tourism-related activities (Endo, 2006).

The FDI-led tourism growth hypothesis states that FDI can significantly boost tourism growth in host countries by investing in infrastructure such as hotels, resorts and transport networks. This improved infrastructure can attract more tourists, boost the local economy and create jobs. In addition, FDI is an important driver for tourism growth in host countries. Therefore, the third hypothesis (H3) of this paper is as follows: The inflow of FDI causes the tourism growth in Croatia.

Moreover, remittances affect tourism development, known as the *remittance-led tourism hypothesis*. Mora-Rivera *et al.* (2019) demonstrated a positive influence of remittances on domestic tourist spending in Mexico, and Cerón and Mora-Rivera (2014) found that emigrant households allocate a portion of remittances to tourism activities. However, remittances alone do not fully capture the role of diaspora in reducing poverty in their home countries.

Beyond remittances, the diaspora significantly contributes to poverty alleviation through various means such as FDI, market expansion through outsourcing, technology transfer, philanthropy, tourism, political contributions and intangible flows such as knowledge, new perspectives and cultural influence (Newland & Patrick, 2004). Diaspora contributions

encompass financial investments, trade, tourism, philanthropy and employee benefits (UN migration, 2020). Diaspora tourism, which is closely linked to remittances, financially benefits local communities (CBI, 2020). Inadequate coverage of diaspora visitors often results in underestimated contributions to tourism and local development. Moreover, the use of passports from their home country can hinder recognition and appreciation of their impact on tourism (Asiedu, 2005).

Although not always classified as tourists, those who primarily visit family, friends and relatives in their home country bring resources, values and ideas (economic and social remittances) that can influence local development (Newland & Taylor, 2010). Diaspora finance includes remittances and investments and provides a comprehensive approach to diaspora financial engagement (Gelb *et al.*, 2021). Remittances generate multiplier effects even when used for consumption (Maimbo & Ratha, 2005). From a macro-economic perspective, total remittance flows are important owing to their stability relative to other financial inflows such as FDI. Moreover, they often exhibit a countercyclical pattern, increasing during periods of economic challenges in the home country when the number of migrants increases and providing important support to families in the home country (Neagu & Schiff, 2009; De *et al.*, 2016).

The remittance-led tourism hypothesis states that remittances can boost tourism in home countries. Increased disposable income from remittances often leads to increased spending on travel and leisure by recipients. In addition, remittances can improve local infrastructure and services, making destinations more attractive. This increase in spending and improved amenities can attract more visitors. Therefore, the fourth hypothesis (H4) of this paper is as follows: The inflow of remittances causes tourism growth in Croatia.

The relationship between FDI and gross domestic product (GDP) is commonly referred to as the *FDI-led growth hypothesis* (Shan *et al.*, 2004). Several studies have examined the causal relationships between these two economic variables in different countries. Cuadros *et al.* (2004) identified unidirectional causalities from real FDI and real exports to real GDP in Mexico and Argentina, which implies that increases in FDI and exports lead to growth in real GDP in these countries, indicating that FDI and export activities significantly contribute to economic growth. Conversely, Chowdhury and Mavrotas (2006) observed unidirectional causality from GDP to FDI in the case of Chile and bidirectional causality between GDP

and FDI in Malaysia and Thailand for the period 1969–2000. Nair-Reichert and Weinhold (2000) found that FDI caused GDP in 24 developing countries between 1971 and 1995. Hansen and Rand (2006) found a bidirectional causality between FDI rates and GDP in 31 countries between 1970 and 2000.

Although FDI generally has a positive impact on economic growth, there are also recognised negative effects such as crowding-out domestic investment, economic dependence and increased external vulnerability. Given the capital inflow of FDI and its impact on employment, investment and technology transfer, research suggests a noticeable impact on GDP. In an Indian context, Nadar (2021) found that FDI causes changes in GDP per capita, but not the other way around. Short-term causality tests indicate no causal relationship between FDI and GDP per capita, implying that, in the short run, these variables do not correlate with each other.

The FDI-led growth hypothesis states that FDI drives economic growth in host countries. FDI increases productivity, creates jobs and promotes technological progress. It often improves infrastructure and increases production efficiency. In addition, FDI can boost domestic investment and economic activity as a whole. Consequently, FDI is a key factor in accelerating economic growth. Therefore, the fifth hypothesis (H5) of this paper is as follows: The inflow of FDI causes the economic growth in Croatia.

The *remittance growth hypothesis*, proposed by Tsaurai (2013), assumes that remittances from emigrants can significantly contribute to economic growth, improve welfare, reduce poverty and provide various economic benefits.

However, empirical results on this hypothesis are mixed. Some studies, such as Ahamada and Coulibaly's (2012) analysis of sub-Saharan African countries, have found no causal relationship between remittances and economic growth. Contrarily, Olubiyi (2014) suggested that remittances significantly contribute to GDP in Nigeria by employing a VECM Granger causality for data spanning between 1980 and 2012. Moreover, results are mixed; for instance, Ali *et al.* (2018) found that the relationship between remittances and economic growth largely depends on the specific context of each country. In their sample of 10 countries, unidirectional causality between remittances and economic growth was found only in Honduras, the Kyrgyz Republic, Lebanon and Moldova. Nikšić Radić *et al.* (2023) point out that most of the existing research on this topic con-

cludes that there is a positive relationship between remittances and economic growth, although this relationship varies depending on the country's income level.

The remittance growth hypothesis posits that remittances contribute to economic growth in the recipient countries. High household income through remittances boosts consumption and investment and raises the standard of living. This financial inflow stimulates the local economy and supports infrastructure development. Therefore, the sixth hypothesis (H6) of this paper is as follows: The inflow of remittances causes the economic growth in Croatia.

According to the literature studied, the last hypothesis is the least explored. The *relationship between emigration and GDP* is complex, with potentially positive outcomes such as high remittances and low unemployment but also numerous negative outcomes such as brain drain, population ageing owing to emigration of younger people and dependence on remittances.

Narayan and Smyth (2007) found that migration boosts real GDP in Fiji in the long run, and out-migration from Fiji boosts real GDP. In the short run, their study found unidirectional Granger causality between migration and real GDP. In contrast, Kónya's (2006) bootstrap panel causality test found a bidirectional causal relationship between emigration and GDP in Estonia for the entire period, with no such relationship observed in other countries.

The relationship between emigration and GDP is not straightforward. Emigration can reduce the labour force and possibly reduce GDP growth in the home country. However, emigrants' remittances can increase household income and consumption. In addition, returning migrants can bring new skills and knowledge with them. Because emigration may initially have a negative impact on GDP, remittances and skill transfer can boost economic growth in the long term. Based on these facts, the seventh hypothesis (H7) of this paper is as follows: The number of emigrants from Croatia causes the Croatian economic growth.

Based on all the previously mentioned and elaborated hypotheses, Figure 1 in the Annex presents the conceptual framework of this study.

Methodological framework

Data

Two data processing methods were used in this study. By employing appropriate econometric methodologies, the forthcoming analysis will evaluate the hypotheses mentioned in Table 1 in the Annex.

As shown in Table 1, one approach is designed to process time series data, whereas the other is tailored to process panel data. This choice is related to the nature of the dataset because certain variables are available only annually at the national level, whereas others are accessible quarterly at the county level.

To test H2, H3, H4, H5 and H6, a quarterly time series dataset covering the period 2001 Q1 to 2022 Q1 were examined. This dataset contains variables on *FDI*, *GDP*, *tourism revenue (TOUR2)*, *remittances (REM)* and *emigration (EMIG)* at the country level. In the absence of annual emigration data, a simple inter-polation method was used to obtain quarterly data. Data related to *GDP* and *TOUR2* are seasonally adjusted using the CENSUS X-12 method. Table 2 presents the variables used, and all data were obtained from the official national website of the Croatian Bureau of Statistics.

The investigation of H1, H3 and H7 relies on the analysis of panel data. This dataset contains variables on *FDI*, *GDP*, *tourism nights (TOUR1)* and *EMIG* at the county level. Given the relatively short time series associated with the latter dataset, the use of a panel analysis approach was considered more appropriate. To answer the questions posed in this study, a statistically sound sample size was used. Specifically, the study uses a panel dataset that covers 20 Croatian counties, such as the city of Zagreb, which holds the designation of a county. This dataset uses annual data from 2000 to 2021.

Methods

The first part of the research was based on time series analysis. To investigate the hypotheses suggesting causal relationships between *REM* and *EMIG*, *REM* and *TOUR2*, *REM* and *GDP*, *FDI* and *TOUR2* as well as *FDI* and *GDP*, this study employs the vector autoregression (VAR) methodology, implementing the following five pairs of two-equation models:

$$FDI_t = a_o + a_1 FDI_{t-1} + \dots + a_p FDI_{t-p} + b_1 GDP_{t-1} + \dots + b_p GDP_{t-p} + u_t \quad (1a)$$

$$GDP_t = c_0 + c_1 GDP_{t-1} + \dots + c_p GDP_{t-p} + d_1 FDI_{t-1} + \dots + d_p FDI_{t-p} + v_t \quad (1b)$$

$$REM_t = a_o + a_1 REM_{t-1} + \dots + a_p REM_{t-p} + b_1 EMIG_{t-1} + \dots + b_p EMIG_{t-p} + u_t \quad (2a)$$

$$EMIG_t = c_0 + c_1 EMIG_{t-1} + \dots + c_p EMIG_{t-p} + d_1 REM_{t-1} + \dots + d_p REM_{t-p} + v_t \quad (2b)$$

$$FDI_t = a_o + a_1 FDI_{t-1} + \dots + a_p FDI_{t-p} + b_1 TOUR2_{t-1} + \dots + b_p TOUR2_{t-p} + u_t \quad (3a)$$

$$TOUR2_t = c_0 + c_1 TOUR2_{t-1} + \dots + c_p TOUR2_{t-p} + d_1 FDI_{t-1} + \dots + d_p FDI_{t-p} + v_t \quad (3b)$$

$$REM_t = a_o + a_1 REM_{t-1} + \dots + a_p REM_{t-p} + b_1 TOUR2_{t-1} + \dots + b_p TOUR2_{t-p} + u_t \quad (4a)$$

$$TOUR2_t = c_0 + c_1 TOUR2_{t-1} + \dots + c_p TOUR2_{t-p} + d_1 REM_{t-1} + \dots + d_p REM_{t-p} + v_t \quad (4b)$$

$$GDP_t = a_o + a_1 GDP_{t-1} + \dots + a_p GDP_{t-p} + b_1 REM_{t-1} + \dots + b_p REM_{t-p} + u_t \quad (5a)$$

$$REM_t = c_0 + c_1 REM_{t-1} + \dots + c_p REM_{t-p} + d_1 GDP_{t-1} + \dots + d_p GDP_{t-p} + v_t \quad (5b)$$

In the aforementioned models, all variables represent natural logarithms of the *GDP*, *FDI*, *TOUR2*, *EMIG* and *REM* for the Republic of Croatia, respectively. In each pair of models, the parameter p denotes the optimal lag length, and parameters a , b , c and d denote parameters that require estimation. The variables u and v represent zero-mean error terms. The analytical process encompasses several stages.

To verify the stationarity of the variables in this research, three unit-root tests are employed: the augmented Dickey–Fuller (ADF) test (1979), the Phillips–Perron (PP) test (Phillips & Perron, 1988) and the Kwiatkow-

ski–Phillips–Schmidt–Shin (KPSS) test (1992). The ADF test is often criticised for its low power; therefore, it is supplemented with the PP and KPSS tests. The ADF unit-root test is utilised to examine the presence of a unit root in each variable, where the null hypothesis of non-stationarity is tested against the alternative hypothesis of stationarity. Phillips and Perron (1988) proposed an alternative non-parametric approach for controlling serial correlation in error terms without adding lagged difference terms when testing for a unit root. The primary difference between the ADF and PP tests lies in their methods of addressing serial correlation and heteroskedasticity in the error terms. In contrast, the KPSS test is a stationarity test where the null hypothesis of stationarity is tested against the alternative hypothesis of non-stationarity. This test employs the Newey–West heteroskedasticity and autocorrelation consistent estimator of long-run variance. The KPSS test is typically used to complement stationarity tests such as the ADF and PP tests. The results of the stationarity test are essential for the subsequent modelling process involving the estimation of an appropriate VAR model. Furthermore, when assessing VAR models, it is essential to ensure that the residuals are normally distributed to allow for valid hypothesis testing and reliable confidence intervals. In addition, the residuals should exhibit no serial correlation, ensuring that the past errors do not influence the current ones. Moreover, the residuals should have a constant variance over time (homoscedasticity) to ensure reliable standard errors and valid inferences. Subsequently, Granger causality tests are conducted to explore potential causal relationships.

The second part of the research was based on panel analysis. A major advantage of panel data analysis is its ability to use data from cross-sectional and time series analyses. Conducting a panel data causality study requires a comprehensive methodological approach to understand the causal relationships between the variables in question, in this case *GDP*, *TOUR1*, *FDI* and *EMIG* and their respective interactions. After checking the stationarity of the data, the Dumitrescu–Hurlin test (Dumitrescu & Hurlin, 2012) was conducted. This method extends Granger’s (1969) methodology for proving causality in panel data. In their framework, they considered two stationary variables, $\chi_{i,t}$ and $y_{i,t}$, for each individual i at time t . Coefficients can vary across individuals but remain time invariant. The employed regression model entails:

$$y_{i,t} = \alpha_i + \sum_{k=1}^K \gamma_i^{(k)} y_{i,t-k} + \sum_{k=1}^K \beta_i^{(k)} x_{i,t-k} + \varepsilon_{i,t} \quad (6)$$

Lag order K is presumed to be consistent across all individuals in the balanced panel (Dumitrescu & Hurlin, 2012; Lopez & Weber, 2017). The Akaike information criterion (AIC) is used as a measure to assess the goodness of fit of a statistical model.

Results

The research is divided into two parts: The first part refers to the analysis of time series, and the second part refers to the panel analysis. As a first step of the methodology approach, ADF unit root, PP unit root and KPSS tests were employed to identify the integration order of the series. Table 3 in the Annex presents evidence of stationarity of the time series. After plotting the series and conducting visual inspection, the ADF and PP tests with intercept and no trend were the suitable methods to be used. Second, lag lengths must be specified based on selected criteria; instead of arbitrarily assigning them, the Schwarz information criterion is utilised as the lag selection criterion for the ADF test and Newey–West method as a lag selection criterion for the PP test. According to the results from Table 3, it is possible to conclude that all series are stationary at second differences, which is a prerequisite for validating the use of VAR and Granger causality techniques in the further analysis; thus, second-differenced variables will be employed in the subsequent analyses.

The next step was to select the optimal lag order, as shown in Table 4 in the Annex. This table presents the results of the lag length selection criteria based on the conventional information criteria, culminating in the determination of the optimal lag order, which is based on the inherent quality of the model. Although the standard information criteria indicate several selections of a maximum lag length for each VAR model, the final decision of the optimal lag length is based on the quality of the VAR models. All VAR models were rigorously tested and confirmed to meet the key assumptions of normality, homoscedasticity and serial correlation. The residuals follow a normal distribution, exhibit constant variance over time and indicate no signs of autocorrelation. These results validate the reliability of our models for accurate estimation and inference. Therefore, the optimal lag length selection is based on fulfilling the proposed

assumptions. The optimal lag length selection for assessing causal relationships indicates that a lag of seven periods is suitable for examining the relationship between *FDI* and *GDP*. In contrast, a lag of eight periods is appropriate for investigating the causal relationship between *REM* and *TOUR2*. For the relationship between *FDI* and *TOUR2*, as well as between *REM* and *GDP*, a lag length of five periods is deemed optimal. Finally, the assessment of the relationship between *REM* and *EMIG* indicates an optimal lag length of seven periods.

The conventional approach to Granger causality analysis involves performing a Wald test for the initial p parameters associated with the exogenous variables in the VAR model. If the Wald test yields statistical significance, then the null hypothesis is rejected positing the absence of causality. Table 5 in the Annex presents the outcomes of this Granger causality test. The findings of this research substantiate the existence of unidirectional causal relationships from *FDI* to *GDP*, from *TOUR2* to *REM*, from *GDP* to *REM* and from *REM* to *EMIG*. Moreover, this study reveals a bidirectional causal association between *FDI* and *TOUR2*.

The second part of the research explored causality in panel data. The first step was to investigate the cross-sectional dependence of the panel data. This evaluation focused primarily on assessing the residual correlations between the above variables, and Table 6 presents the results of this evaluation. in the Annex. In addition, the results of the cross-sectional dependence tests, such as the Breusch–Pagan LM, Pesaran scaled LM and Pesaran CD tests, indicate the presence of significant cross-sectional dependence or correlation in the residuals of the given variables. Given the strong evidence of cross-sectional dependence, it was imperative to perform a second-generation unit-root test such as the cross-sectionally augmented IPS (CIPS) test to adequately account for cross-sectional dependence in assessing the stationarity of the panel data series presented in Table 7 in the Annex. Based on the empirical results, the data exhibit stationarity after log transformation and differentiation; thus, differenced variables are employed in the subsequent analyses. The next step was to conduct the Dumitrescu–Hurlin causality test, with the results presented in Table 8 in the Annex. Evidently, causal relationships exist between certain variables. In particular, causality is found between *GDP* and *TOUR1*, *FDI* and *TOUR1*, *GDP* and *EMIG* as well as *EMIG* and *FDI*. The varying interpretations stem from the distinct p values associated with the Z -bar, Z -tilde and W statistics. Given the assumption that data are

stationary around a mean level, the Z-bar statistic was applied because it is suitable for data that fluctuate around a constant mean. The W statistic was deemed unreliable owing to significant cross-sectional dependence, and the Z-tilde statistic was not used because it is more suitable for panel data with outliers. A significant causality at 10% was found between *TOUR1* and *FDI* and between *EMIG* and *TOUR1*.

Discussion

The obtained research outcomes clearly suggest the need to discuss them, especially considering the hypotheses that have been refuted and are not in accordance with the author's expectations. Table 9 in the Annex presents the discrepancy between the author's expectations and the obtained research results.

The first hypothesis (*the inflow of FDI causes the number of emigrants from Croatia*) is not confirmed. Both observed variables are very important for the functioning of the Croatian economy. The inflow of *FDI* is highly desirable, whereas the emigration processes to which Croatia is exposed distort the already undesirable demographic situation in Croatia. Analysing previous research and their results (Sassen, 1990; Wang *et al.*, 2013; Xu & Sylwester, 2016) on large panels of countries proved that the inflow of *FDI* increases the number of emigrants. The authors expect that in the case of Croatia, the inflow of *FDI* will increase the emigration activity. However, the research results indicated the opposite situation, *EMIG* causes *FDI* in Croatia. The research results suggest that the emigration population of Croatia likely serves as a channel of information transmission across international borders (Javorcik *et al.*, 2006). Consequently, a great integration of Croatia into global economic flows is apparent, which results in a great *FDI* inflow.

Moreover, the research results confirmed the second hypothesis: *The inflow of remittances cause the number of emigrants from Croatia*. The authors expect that remittance inflows will increase emigration in Croatia. Because numerous previous studies (Le Goff & Salomone, 2016; Mihir-Ramirez *et al.*, 2019; Grigoryan & Khachatryan, 2022) on the example of countries marked by strong emigration processes have proven such trends, it was logical to assume that the same situation occurs in Croatia. Note that Croatia is more dependent on remittances than any other EU

member states; the share of remittances in GDP at the EU level is 0.8%, whereas at the Croatian level, it is 6.6%. In parallel, strong emigration processes have been taking place in Croatia for years. In 2021, Croatia had 3.89 million inhabitants, which is 9.25% less than in 2011 (Croatian Bureau of Statistics, 2022). Remittances thus certainly cover future migration costs. Regardless of the numerous advantages of remittances to the Croatian economy, Croatia unfortunately witnesses negative ones, that is, remittances trigger chain migration. Existing migration theories warn against such negative effects. According to social capital theory, remittances originating from individuals involved in migrant networks often serve as initial capital for those considering emigration. Moreover, the push and pull theory clearly emphasises the fact that remittances can stimulate the desire to emigrate by signalling the economic benefits of international migration. Regardless of these results, migration is inevitable, and there is no point in trying to stop it completely (De Haas, 2005). Finally, remittances are another advantage that individuals receive from their migrant network and can be considered a form of social capital (Becerra & Kiehne, 2016). As reported by van Dalen *et al.* (2005), the way individuals use remittances in their home country is a unique story for each country, and within each country, there are indications that charity and personal gain play a role.

Research results confirmed H3: *The inflow of FDI causes tourism growth in Croatia*. The time series and panel data analyses provided equivalent exploratory results, demonstrating the reliability and robustness of the findings. The authors expect that the inflow of FDI will boost the development of Croatian tourism. These conclusions are based on previously conducted research that has proven that in the case of Croatia there is an *FDI-led tourism hypothesis* (Perić & Nikšić Radić, 2016; Bezić & Nikšić Radić, 2017). The mentioned research used the data as of 2012. Considering that only with the adoption of the Tourism Development Strategy until 2020 (Official gazette, 2011) Croatia strongly decided to attract FDI to tourism and that the share of FDI in tourism in total FDI increased from 3.6% (from 1993 to 2012) to 7.6% (from 2012 to 2020), a repeat test of the subject hypothesis is warranted. The research conducted over a long period of time proved that in addition to *FDI* causing TOUR1 and TOUR2 in Croatia, TOUR1 and TOUR2 also causes *FDI*. These results are in accordance with numerous previous studies (Haley & Haley, 1997; Craigwell & Moore, 2008; Samimi *et al.*, 2013; Fauzel, 2021). Croatia, as a coun-

try with intensive tourism development, today strongly attracts foreign investors to that part of the economy; nonetheless, parallel *FDI* in tourism significantly improved the presence of global hotel brands in the Croatian market, which has been crying out for such investments, in the past decades.

Research results reject H4: *The inflow of remittances cause tourism growth in Croatia*. The authors expect that the inflow of remittances will spur tourism growth. Families of emigrants who have remained in Croatia now have increased incomes in the form of remittances that they can spend on tourist activities in their own country. This view is based on the results of previous research (Schiff, 1994; van Dalen *et al.*, 2005; Metelski & Mihi-Ramirez, 2015; Mihi-Ramirez *et al.*, 2019). However, the results of this study indicate that in Croatia, *tourism growth causes remittances*. Considering the strength of tourism in the Croatian economy, it is possible for Croatian citizens to invest part of their money in, for example, tourist real estate to additionally fertilise the money earned abroad.

The research results confirmed H5: *The inflow of FDI causes the economic growth in Croatia* but also reject H6—*The inflow of remittances cause the economic growth in Croatia*. The authors expect that the *FDI* and *REM* inflows will cause *GDP of Croatia*. A similar study was conducted by Makun (2018), whose results indicated that remittances and *FDI* have a positive impact on long- and short-term economic growth in the Fiji Islands. The proven causal relationship that goes in the direction from *FDI* to *GDP* is in line with most of the existing research that reached the same results (Nupehewa *et al.*, 2022). *FDI* stimulated economic growth in Croatia by facilitating the transfer of technology and soft skills, the development of human capital and the development of institutional infrastructure. The empirical results of this study suggest that in Croatia, there is a unidirectional causality from *GDP* to *REM*; however, there is no link from *REM* to *GDP*. Our research results are in line with those in Olayungbo and Quadri (2019) or Ale *et al.* (2018). Despite the size of remittances that flow into Croatia (and which exceed the amount of *FDI* in the Croatian economy), policymakers and government authorities risk assuming causation without analysing its direction, whether it is inherently short or long term and whether there is any correlation within a given regional context (Ahmed & Hakim, 2017). According to Ale *et al.* (2018), in countries where economic growth led to remittances, policymakers and government authorities should stimulate economic growth to boost remittances. In the case of

Croatia, future research might focus on how best to utilise remittances: through consumption, investment or some combination with the aim of enhancing economic growth.

Examining the relationship between emigration and GDP is particularly interesting for Croatia owing to its historical emigration patterns and its EU accession, which causes labor mobility and remittances within the EU. The results of the research did not confirm the seventh hypothesis: *The number of emigrants from Croatia causes Croatian economic growth*; however, the reverse causality, that is, economic growth cause the number of emigrants, was confirmed. Considering that Croatia suffers from a strong exodus of labour force, the authors were expecting that emigration will significantly boost Croatian economic growth. However, an ‘inverse-U’ relationship between emigration and development is present in Croatia. It is possible to identify two crucial factors that strongly trigger emigration: growing per capita income and increased investment in education (Dao *et al.*, 2018).

The basic limitation of this research is that Croatia, as a relatively young country, has available statistics of very short time series. This is one of the basic reasons why the authors used a combination of different data frequencies in the research. An additional limitation is related to the fact that in this study, the authors examined only the direction of causality, not the presence of a positive or negative influence. In addition, the study focuses on a narrow set of variables, potentially neglecting some other factors such as technology and education that could influence economic growth. Therefore, as a recommendation for future research, the need to examine the positive and negative directions of the causal relationships in question is quite logical. To rigorously test all hypotheses, future research should consider expanding the dataset to encompass a broader range of countries.

Conclusions

Business and social networks are crucial in facilitating international trade. Moreover, the international economy is notably influenced by the interplay between capital and labour. The dynamics of their significance for the international economy can especially be followed during the third wave of the old globalisation model as well as in the first wave of the new globalisation model. Integrating the market of goods and services and production

factors had a positive impact on the development of countries that decided to enter the global market as open economies. Nevertheless, the world is currently witnessing the emergence of change-oriented policies that could hinder the future liberalisation of international trade and the free movement of labour and capital. This poses a significant potential threat to global economic progress, particularly in a context where the labour market remains fragmented. In this ‘age of migration’, migration has become a particularly sensitive political issue. Therefore, it is important to recognise that migration is not inherently a political objective.

Furthermore, the recent VUCA environment has introduced new dynamics that can influence the extent and intensity of these phenomena. Croatia, as a small-open and developing economy, is highly dependent on liberal international trade and the free movement of labour and capital. However, its integration into the European Union and the adoption of liberalisation trends have brought certain challenges, such as significant and persistent emigration pressures. In 1997, Mountford (1997) asked whether emigration of the most educated residents of a country has a lasting impact on per capita output. Croatia is characterised by an unusually high share of remittances in GDP, which is unusual among developed countries. Fostering an environment conducive to migration and remittances is an essential prerequisite for comprehensive income growth in regions where migrants move (Taylor, 1989). These factors are crucial for development through migration. Over the last decade, the share of remittances in the GDP of Croatia has been steadily increasing, which contrasts with the sporadic inflows of FDI that constitute a percentage of GDP. In addition, tourism contributes significantly to its GDP.

The research findings reveal several causal relationships in Croatia: *EMIG* causes *FDI*, *REM* cause *EMIG*, there is a bidirectional relationship between *FDI* and *TOUR1/TOUR2*, *TOUR2* causes *REM*, *FDI* causes *GDP* and *GDP* causes both *REM* and *EMIG*. This study makes a novel contribution by identifying these unique relationships within the Croatian context, which have not been extensively explored in prior literature. Remarkably, most of these relationships deviate from the authors’ initial assumptions, underlining that Croatia deviates from the basic economic characteristics of typical developed countries. Globally, existing research findings show considerable variability, which underscores the need for individual single-country studies, as advocated by previous researchers (Perić & Nikšić Radić, 2016; Bilas, 2020a).

It is important to emphasise that this research addresses a significant gap by providing new insights into how FDI, remittances, migration and tourism interact in Croatia, thereby enhancing our understanding of these factors in emerging markets. This study makes a substantial contribution to the academic literature, particularly as this topic remains underexplored in the context of the Republic of Croatia. The results of the research will primarily contribute to the scientific field of economics. They are applicable in theoretical terms by improving theoretical knowledge about the connection between FDI, remittances, emigration trends and tourism and their impact on economic growth. In addition, it is crucial to consider the recent VUCA environment, which has significantly altered the global economic landscape. This dynamic environment could affect how FDI, remittances, tourism, emigration and other factors interact and impact economic growth. The results of this research are applicable because proving their connection and the consequent impact on economic growth have significant political implications for future reflection on the development of the Croatian economy. The authors especially focused on defining the theoretical framework within which FDI, tourism, remittances and emigration trends affect economic growth in the Republic of Croatia. Policymakers should focus on creating a conducive environment to attract and sustain FDI because this can directly contribute to economic growth. Moreover, effective migration policies should balance the benefits of migration, such as remittances, with strategies to retain and attract talent. Given that Croatia, as an EU member, has the highest share of remittances in GDP, it is particularly important to focus on political measures that retain skilled labour and leverage the benefits of remittances. Understanding these relationships can help policymakers to use the mentioned factors to promote economic growth and address the challenges of emigration. The results of this study are crucial for developing policies that optimise FDI, leverage remittances, boost tourism and promote economic growth.

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Compliance with ethical standards

This article does not contain any studies with human participants or animals performed by the authors. Extracting and inspecting publicly accessible files (scholarly sources) as evidence, before the research began no institutional ethics approval was required.

Data availability statement

All data generated or analyzed are included in the published article. The raw data supporting the conclusion of this article will be made available by the authors, without undue reservation. The raw anonymized data can be provided by emailing the primary author.

Author contributions

All listed authors have made a substantial, direct and intellectual contribution to the work, and approved it for publication. The authors take full responsibility for the accuracy and the integrity of the source analysis.

Conflict of interest statement

The authors declare that the research 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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Annex

Table 1. Formulated hypotheses

	Hypothesis	Causality link	Data structure
H1	The inflow of FDI causes the number of emigrants from Croatia.	FDI => EMIG	Panel data
H2	The inflow of remittances causes the number of emigrants from Croatia.	REMITT => EMIG	Time series
H3	The inflow of FDI causes the tourism growth in Croatia.	FDI => tourism	Time series/panel data
H4	The inflow of remittances causes the tourism growth in Croatia.	REMITT =>tourism	Time series
H5	The inflow of FDI causes the economic growth in Croatia.	FDI => GDP	Time series
H6	The inflow of remittances causes the economic growth in Croatia.	REMITT => GDP	Time series
H7	The number of emigrants from Croatia causes the Croatian economic growth.	EMIG => GDP	Panel data

Table 2. List of variables

Symbol	Variable	Description	Frequency	Analysis
TOUR1	Tourist nights	Total number of tourist nights – proxy variable for tourism growth	Annually	Panel
GDP	Gross domestic product	Gross domestic product (at current prices) in EUR – proxy variable for economic growth	Annually/quarterly	Panel and time series
TOUR2	Tourism revenues	International tourism revenue – proxy variable for tourism growth	Quarterly	Time series
FDI	Foreign direct investments	Inflow of FDI	Annually/quarterly	Panel and time series
EMIG	Emigration	Emigration abroad represents the movement of Croatian individuals to other countries	Annually/quarterly	Panel and time series
REM	Remittances	Remittances represent funds sent by Croatian emigrants back to their home country	Quarterly	Time series

Source: All data were obtained from the official national website of the Croatian Bureau of Statistics at <https://podaci.dzs.hr/hr/> (06.09.2023).

Table 3. ADF, PP and KPSS unit-root tests

		FDI	GDP	REM	TOUR2	EMIG
ADF test	Level	-2.17 (0.22)	-1.22 (0.66)	1.03 (0.99)	-2.47 (0.13)	-0.75 (0.83)
	First difference	-18.05 (0.00)	-9.42 (0.00)	-9.23 (0.00)	-10.44 (0.00)	-9.21 (0.00)
	Second difference	-6.24 (0.00)	-11.92 (0.00)	-8.79 (0.00)	-15.39 (0.00)	-7.27 (0.00)
PP test	level	-10.08 (0.00)	-1.22 (0.66)	-0.76 (0.83)	-1.89 (0.34)	-0.73 (0.83)
	First difference	-40.70 (0.00)	-9.42 (0.00)	-22.61 (0.00)	-13.89 (0.00)	-9.21 (0.00)
	Second difference	-9.21 (0.00)	-41.99 (0.00)	-77.02 (0.00)	-56.74 (0.00)	-80.71 (0.00)
KPSS test	level	13.97 (0.00)	355.86 (0.00)	140.49 (0.00)	207.42 (0.00)	106.21 (0.00)
	First difference	0.017 (0.99)	3.95 (0.00)	1.73 (0.09)	0.57 (0.57)	1.54 (0.13)
	Second difference	0.08 (0.99)	0.10 (0.93)	0.08 (0.88)	0.204 (0.80)	0.00 (1.00)

Table 4. Optimal lag order selection

Causality	VAR lag order selection criteria	Optimal lag length
Causality between FDI and GDP	4/5/7	7
Causality between REM and TOUR2	3/4/8	8
Causality between FDI and TOUR2	5/8	5
Causality between REM and GDP	3/5/7	5
Causality between REM and EMIG	1/3/4/7	7

Table 5. Causality analysis

Null hypothesis	Chi-square	p value
FDI \nRightarrow GDP	14.86028	0.0378**
GDP \nRightarrow FDI	10.26252	0.1742
TOUR2 \nRightarrow REM	15.15373	0.0562***
REM \nRightarrow TOUR2	5.895904	0.6589
FDI \nRightarrow TOUR2	15.39719	0.0088***
TOUR2 \nRightarrow FDI	11.00222	0.0513*
REM \nRightarrow GDP	7.669176	0.1754
GDP \nRightarrow REM	9.710661	0.0839*
REM \nRightarrow EMIG	12.41782	0.0876*
EMIG \nRightarrow REM	4.348425	0.7389

Notes: ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively. In the parenthesis, the p values of each test are reported. The symbol \nRightarrow denotes 'does not linearly Granger cause'. All variables were differenced twice and logged.

Table 6. Residual cross-section dependence test

Test	Statistic	d.f.	Prob.
Breusch–Pagan LM	892.6270	210	0.0000
Pesaran scaled LM	33.30879		0.0000
Pesaran CD	24.21437		0.0000

Table 7. Panel unit-root test

Variable	Log		Log-diff	
	CIPS	Truncated CIPS	CIPS	Truncated CIPS
TOUR1	-2.18*	-2.14*	-3.04***	-3.04***
GDP	-1.22	-1.22	-2.68***	-2.68***
FDI	-3.27***	-3.26***	-3.86***	-3.64***
EMIG	-3.24	-2.63	-3.75***	-3.16***

Note: ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

Table 8. Dumitrescu–Hurlin causality test

Null hypothesis	\bar{W}	\bar{Z}	\bar{Z}
GDP \Rightarrow TOUR1	0.26	-2.41**	-2.25**
TOUR1 \Rightarrow GDP	1.08	0.26	-0.16
GDP \Rightarrow FDI	4.95	1.54	-0.44
FDI \Rightarrow GDP	1.09	0.29	-0.12
TOUR1 \Rightarrow FDI	5.17	1.89*	-0.29
FDI \Rightarrow TOUR1	13.33	15.12***	5.16***
GDP \Rightarrow EMIG	1.84	2.70***	1.75*
EMIG \Rightarrow GDP	0.77	-0.76	-0.95
TOUR1 \Rightarrow EMIG	0.76	-0.79	-0.98
EMIG \Rightarrow TOUR1	0.40	-1.95*	-1.89*
FDI \Rightarrow EMIG	0.71	-0.95	-1.11
EMIG \Rightarrow FDI	5.49	2.41**	-0.07

Note: ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively. AIC criterion to determine optimal number of lags. Decisions were made based on the 5% significance level. All variables were differenced and logged.

Table 9. Summary of research outcomes derived from testing formulated hypotheses

	Hypothesis	Expected causality link	Causality link—research results	Data analysis	Presence (+) or absence (-) of expected causality
H1	The inflow of FDI causes the number of emigrants from Croatia.	FDI => EMIG	EMIG => FDI	Panel data	-
H2	The inflow of remittances causes the number of emigrants from Croatia.	REM => EMIG	REM => EMIG	Time series	+
H3	The inflow of FDI causes the tourism growth in Croatia.	FDI => TOUR1/TOUR2	FDI <=> TOUR1/TOUR2	Time series/Panel data	+
H4	The inflow of remittances causes the tourism growth in Croatia.	REM => TOUR2	TOUR2 => REM	Time series	-
H5	The inflow of FDI causes the economic growth in Croatia.	FDI => GDP	FDI => GDP	Time series	+
H6	The inflow of remittances causes the economic growth in Croatia.	REM => GDP	GDP => REM	Time series	-
H7	The number of emigrants from Croatia causes the Croatian economic growth.	EMIG => GDP	GDP => EMIG	Panel data	-

Note: As shown in the table, causalities are identified for all seven hypotheses. However, hypotheses H1, H4, H6 and H7 exhibit relationships that are reversed compared with the expected hypotheses, whereas hypothesis H3 shows a unidirectional causality.

Table 10. Literature review

Author	Sample	Methodology	Results
FDI – Emigration			
1. Mihi-Ramirez <i>et al.</i> (2016)	Seven Scandinavian and Baltic countries, 1999–2014	Panel VAR—causality	No causality between FDI and emigration
2. Buch <i>et al.</i> (2003)	Germany, period: 1994–2000	Cross-sectional regressions	In terms of causality between FDI and migration over time, results remain somewhat inconclusive: while it seems as if outward migration of Germans triggers outward FDI, the reverse direction of causality seems to hold true for inward FDI and inward migration of foreigners.

Table 10. Continued

	Author	Sample	Methodology	Results
2.	Buch <i>et al.</i> (2003)	Germany, period: 1994–2000	Cross-sectional regressions	In terms of causality between FDI and migration over time, results remain somewhat inconclusive: while it seems as if outward migration of Germans triggers outward FDI, the reverse direction of causality seems to hold true for inward FDI and inward migration of foreigners.
3.	Akkoyunlu (2010)	Turkish migration to Germany, period: 1969–2004	Co-integration analysis	FDI first increasing migration and later decreasing it
4.	Kugler and Rapaport (2005)	US data on bilateral labour inflows and capital outflows, 1990–2000	OLS	Skilled migration is associated with future increases in FDI inflows
5.	D'Agosto <i>et al.</i> (2013)	91 developing countries year 2000	Cross-sectional analysis	Strong positive relationship (complementarity) between emigration flows and FDI. In addition, FDI can be seen as a substitute for emigration through direct and indirect labour demand effects.
6.	Gheasi <i>et al.</i> (2013)	UK, 2001–2007	Gravity model	When there are more educated migrants from a certain country, the positive effect they have on FDI in both directions (inward and outward) is strong.
7.	Aroca and Maloney (2005)	Mexico, 1990–2000	Fixed-effect panel regression	Increased FDI and trade reduce emigration and influence the labour market.
8.	Docquier and Lodigiani (2010)	83 countries, 1980–2000	Cross-sectional and panel regression	Skilled migrants drive FDI to their home countries, with small countries benefitting less from this phenomenon.
9.	Federici and Giannetti (2008)	Small-open economy	Simultaneous differential equations	FDI inflows and migration exhibit initial growth, with migration serving as an incentive for FDI owing to its information-revealing effect.
10.	Sanderson and Kentor (2008)	25 less-developed countries, period: 1985–2000	Cross-national panel regression	The stock of FDI has a significant long-term positive effect on the level of emigration over the period 1985–2000.
Remittance—Emigration				
1.	Mihi-Ramirez <i>et al.</i> (2016)	7 Scandinavian and Baltic countries, 1999–2014	Panel VAR-causality	Remittance => emigration causality
2.	Akkoyunlu (2010)	Turkish migration to Germany, period: 1969–2004	Co-integration analysis	Remittances have a strong positive effect on migration in the short run as well as in the long run.
3.	Dustmann and Mestres (2010)	12 waves of the German Socio-Economic panel (CSOEP 1984–1995)	Fixed effects, GMM, causality	Remittance cause emigration
4.	Piracha and Saraogi (2013)	Moldova, June and August 2006	Two-equation system	Dual causality between receipt of remittances by non-migrants and their migration intentions
5.	Grigoryan and Khachatryan (2022)	Armenia, 2011	Bivariate probit model	Remittances are the cause of emigration
6.	Metelski and Mihi-Ramirez (2015)	Spain, 1975–2013	Granger causality	Two-way causality
7.	Dimova and Wolff (2015)	Bosnia and Herzegovina, 2001–2004	Panel analysis	Remittances have a significant positive effect on the migration prospects of their recipients.
8.	Van Dalen <i>et al.</i> (2005)	Egypt, Morocco and Turkey, 1996–1997	Survey	Receiving remittances boosts emigration intentions among those in the home country and can spur new migration flows.

Table 10. Continued

	Author	Sample	Methodology	Results
9.	Becerra and Kiehne (2016)	Mexico, 2009	A cross-sectional survey design	Receiving remittances greatly increased intentions to emigrate.
10.	Leeves (2009)	Fiji and Tonga, 2005	Survey	Receiving remittances predicted migration intentions, particularly among those in remittance-receiving households with family members abroad.
Remittance – Tourism				
1.	Mora-Riviera and García-Mora (2021)	Mexico, 2016	Probit and Tobit regressions	International remittances provide the necessary resources to alleviate the liquidity constraints that restrict access to tourism activities for recipient households.
2.	Mora-Riviera <i>et al.</i> (2019)	Mexico, 2010, 2012, 2014 and 2016	Treatment and multi-treatment techniques	Receiving remittances has a positive effect on tourist consumption.
3.	Kumar (2014)	Kenya, 1978 – 2010	Toda– Yamamoto Granger non-causality	Tourism => remittance
4.	Cerón and Mora-Rivera (2014)	Mexico, 2007–2011	Selectivity model	The findings of the study show that around 6% of remittances are spent on domestic tourism.
5.	Bassey <i>et al.</i> (2019)	Calabar, Cross River State, 2011–2015	Descriptive statistical techniques	Private tourist organisations remittances support government funding for local tourist agencies and infrastructure development in the research area.
6.	Balli <i>et al.</i> (2023)	1995–2018, 30 countries	Dynamic OLS estimations	Remittances inflows per emigrant have a strong impact on emigrants' home visits.
7.	Hasan <i>et al.</i> (2022)	Six South Asian countries, 1996–2020	Pooled ordinary least squares, fixed effects, feasible generalised least squares and Prais–Winsten regression with panel-corrected standard errors	In South Asia, international remittances primarily support essential needs, potentially hindering international tourism development. In addition, when political stability prevails, the relationship between international remittances and tourism development strengthens, suggesting that remittances may be directed towards the tourism sector.
8.	Salinas López <i>et al.</i> (2016)	Southern Mexico, 2007	Interviews	Channelling remittances via 'nostalgic tourism' predominantly bolsters local economic sectors, particularly trade and services.
9.	Al and Kameyama (2020)	From seven Asian countries to Japan, 2000–2015	Panel data analysis	Foreign workers in Japan who remit money to their families abroad exert a negative influence on Japan's tourism industry by reducing the willingness of those families to visit Japan
10.	Cahyanto <i>et al.</i> (2023)	Indonesian diaspora in the USA, 2020	Qualitative approach: four focus groups (n = 25) and 10 individual interviews	The study highlights the role of diasporas as social capital for destinations and provides insight on how to manage tourism crises by engaging them in social and economic engagement, such as information sharing, knowledge transfer, philanthropy, investment, remittances and return visits.
FDI – Tourism				
1.	Tang <i>et al.</i> (2007)	China, 1978–2005	VECM, Granger causality	FDI → tourism
2.	Craigwell and Moore (2008)	21 SIDS, 1980–2004	Granger causality (HINC, HC, HENC)	Bidirectional causality
3.	Katircioglu (2011)	Turkey, 1970–2005	ARDL methodology, Granger causality	IARR → FDI

Table 10. Continued

	Author	Sample	Methodology	Results
4.	Othman <i>et al.</i> (2012)	18 major international tourism destinations, 1995–2010	ARDL methodology, Granger causality	Mixed results of causality (depending on the country)
5.	Tang <i>et al.</i> (2012)	20 developing countries, 1995–2008	Panel VECM, Granger causality, Pedroni co-integration test	T-FDI → ARR ARR → T-FDI
6.	Perić and Nikšić Radić (2016)	Croatia, 2000–2012	Granger causality	FDI-T => IARR
7.	Rajapakse (2016)	Sri Lanka, 2005–2013	Granger causality	Unidirectional causality from FDI to tourism
8.	Yazdi <i>et al.</i> (2017)	27 countries, 1995–2014	Dynamic panel causality	No causality relationship between FDI and tourist receipts
9.	Tecel <i>et al.</i> (2020)	14 selected countries around the Mediterranean Sea region, 1995–2016	Dumitrescu and Hurlin causality analysis	Unidirectional causality from FDI to tourism
10.	Liu and Chokethaworn (2020)	Thailand, Singapore, Indonesia, Malaysia, Vietnam and Philippines, 2005–2019	Granger causality	Granger causality from FDI to ITA (except Thailand and Malaysia)
FDI—GDP				
1.	Hsiao and Hsiao (2006)	Eight rapidly developing East and Southeast Asian economies, 1986–2004	Granger causality	China: unidirectional causality from GDP to FDI Taiwan: FDI on GDP, only indirectly through exports Korea: no causality Hong Kong: no causality Singapore: FDI causes GDP (at 10% sig) Malaysia and the Philippines: no causality between GDP and FDI Thailand: bidirectional causality GDP weakly causes FDI (at 15%), and FDI also causes GDP (at 10%)
2.	Liu <i>et al.</i> (2002)	China Quarterly from 1981 to 1997	Granger causality	Bidirectional causality between each pair of real GDP, real exports and real FDI
3.	Kohpaiboon (2003)	Thailand annual data for the period 1970–1999	Granger causality	Unidirectional causality from FDI to GDP
4.	Dritsaki <i>et al.</i> (2004)	Greece over the period 1960–2002	Granger causality	Unidirectional causality FDI to real GDP
5.	Kosztowniak (2016)	Poland over the period 1992–2012	Granger causality	Bidirectional relationships between FDI and GDP: the impact of GDP on attracting FDI inflows to Poland is stronger than that of FDI on GDP growth.
6.	Bilas (2020b)	13 most recent members of European Union (EU13): Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Hungary, Latvia,	Dumitrescu–Hurlin panel causality test	Relationship between the GDP growth rate and FDI growth rate is only indirect.

Table 10. Continued

Author	Sample	Methodology	Results
7. Moudatsou and Kyrkilis (2011)	Lithuania, Malta, Poland, Romania, Slovakia and Slovenia, 2002–2018 European Union and Association of South Eastern Asian Nations, 1970–2003	Panel causality	Regarding the EU countries, the results support the hypothesis of GDP–FDI causality (growth driven FDI) in the panel. Regarding the ASEAN, there is a two-way causality between GDP per capita and FDI.
8. Sengupta and Puri (2020)	India, Pakistan, Nepal, Bangladesh and Sri Lanka, 1995–2015		Unidirectional FDI Granger cause GDP for India, Bangladesh, Sri Lanka and Nepal.
9. Kholdy and Sohrabian (2005)	25 countries over the period of 1975–2002	Granger causality model	Results suggest that FDI cannot induce economic growth.
10. Vasile <i>et al.</i> (2020)	Period: 1996–2019, EU member states plus three non-member states (Moldova, Ukraine and Turkey)	Dumitrescu–Hurlin panel Granger causality	Unidirectional causality FDI Granger cause GDP/capita for Moldova, Ukraine, Turkey, Romania, Croatia, Poland, Hungary, Lithuania, Slovakia, Estonia, Italy, France, the United Kingdom, Germany, Finland, Austria, Netherlands, Sweden, Denmark and Belgium. Bidirectional causality FDI Granger cause GDP/capita and GDP/capita Granger cause FDI for Bulgaria, Latvia, Greece, the Czech Republic, Portugal, Slovenia, Cyprus, Malta and Spain
Remittance–GDP			
1. Depken <i>et al.</i> (2021)	Croatia, period 2000 Q1 through 2020 Q2	Granger causality	No causal link between remittances and economic growth in either direction
2. Ahamada and Coulibaly (2013)	Annual data over the period 1980–2007 for 20 SSA countries	Granger causality	No causality from remittances to growth and no causality from growth to remittances
3. Chirila and Chirila (2017)	Romania, yearly frequency and the period analysed comprises the interval 1994–2015	Granger causality	The results confirm that remittances do not Granger-cause the economic development of Romania, as measured by GDP, in either direction
4. Akkoyunlu and Siliverstovs (2014)	Turkey, from 1970 to 2000	Granger causality	Authors find no statistical evidence that remittances Granger cause output in Turkey. In turn, we also could not reject the null hypothesis that remittances are not Granger caused by GDP
5. Bucevska (2022)	Six SEE countries: Albania, Bosnia and Herzegovina, Croatia, Montenegro,	Granger causality	No causality between remittances and GDP in either direction

Table 10. Continued

Author	Sample	Methodology	Results
6. Jouini (2015)	the Republic of North Macedonia and Serbia (SEE6) over 2008 Q1 to 2020 Q2 Tunisia over the period 1970–2010	Granger causality	Unidirectional causal link from economic growth to remittances without feedback
7. Siddique <i>et al.</i> (2012)	Bangladesh, India and Sri Lanka, from 1976 to 2006	Granger causality	Unidirectional causality running from remittances to economic growth in Bangladesh and a bidirectional causality in Sri Lanka
8. Yadeta and Hunegnaw (2022)	Ethiopia, data ranging from 1980 to 2015	Granger causality	Unidirectional causality from remittances to economic growth
9. Kumar <i>et al.</i> (2018)	Kyrgyzstan and Republic of North Macedonia period of 1990–2015	Granger causality	The causality results support the remittance-led growth (GDP/capita) hypothesis for Kyrgyzstan and growth (GDP/capita)-led remittance hypothesis for Macedonia
10. Sibindi (2014)	Lesotho between the period 1975–2010	Granger causality	One-directional causality running from remittances to economic growth
Emigration—GDP			
1. Recepoglu (2022)	Estonia, Latvia, Lithuania, Hungary Poland, Slovakia and Slovenia. Period between 1995 and 2019	Bootstrap panel rolling window causality test	Bidirectional causality relationship between emigration and economic growth only in Estonia
2. Burakov (2017)	Russia, period from 1990 to 2015	VAR, co-integration	In the short run, the author found causality between economic growth and emigration.
3. Tabassum <i>et al.</i> (2017)	Pakistan, period 1983–2014	Granger causality	Labour migration causes the GDP. It shows that if labour moved towards another nation, then GDP also caused in Pakistan. GDP does not cause the labour migration. If GDP changes, then Pakistan citizens do not migrate to another country for work.
4. Oyegoke, and Amali (2022)	Nigeria, period 1977–2021	ARDL, OLS	Labour emigration positively contributes to the economic development of people in the sending countries.

Figure 1. Conceptual framework of economic growth causality with international flows of FDI, remittance, emigration and tourism development

