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An empiric on geopolitical risk and the tourism-economic growth nexus

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Abstract

Purpose – This study empirically examines the moderating role of geopolitical risk on the tourism-economic growth nexus by applying a recent geopolitical risk indicator developed by Caldara and Iacoviello (2022) in a cross-country panel data growth model context for a sample of 24 countries.

Design/methodology/approach – A Dummy Variable Least Squares (DVLS) panel data model, nonparametric covariance matrix estimator and SYS-GMM estimation techniques are employed for the analysis. We capture the GPR moderating effect by disaggregating the cross-country sample according to low vs. high country GPR score and through a GPR interaction coefficient. Several controls are included in our models such as gross fixed capital formation and - consistent with Barro (1990) - government consumption. Trade openness is

used to account for the export-led growth effect. In line with neoclassical growth theory (e.g., Barro, 1991) we also include the real interest rate, to account for policy makers' commitment to macroeconomic stability, financial depth, as a proxy for financial development, population growth, and the level of secondary school education. We also control for unobserved country-specific and time-invariant effects.

Findings – The research finds that the interaction term of geopolitical risk significantly contributes to the predictive ability of the regression and provides empirical evidence that confirms that only in low geopolitical risk countries international tourism positively and significantly contributes to economic growth. Important theoretical and policy implications flow from these findings.

Originality/value – The study not only contributes to advancing academic knowledge on the tourism-growth nexus, it also has impact beyond academia. Many countries have in the past pursued, and many continue to pursue, tourism specialization and/or tourism-led growth strategies based on the theoretically well-established and empirically validated positive link between inbound tourism and economic growth. Our findings alert policy makers in such countries to the significant moderating role that geopolitical risk plays in affecting the above-mentioned relationship and to the importance of prioritizing geopolitical stability as a policy precursor for the successful implementation of such strategies.

Keywords Geopolitical risk, International tourism, Economic growth, Panel data

Paper type Research paper

1. Introduction

Geopolitical risk – defined as the wide array of risks linked to wars and any other sort of conflict or tension between sovereign states that affect or threaten to affect international relations (Caldara and Iacovello, 2022) – has long been recognized as a key factor influencing

economic variables and financial markets (Balcilar *et al.*, 2018; Soybilgen *et al.*, 2019; Adra *et al.*, 2023; etc.). Few recent studies have also shown that geopolitical risk has a significant impact on inbound tourism (see, among others, Demir *et al.*, 2019; Tiwari *et al.*, 2019; Syed *et al.*, 2021). Yet, although since the pioneering contributions by Copeland (1991) and Lanza and Pigliaru (2000) a substantial strand of the literature has also identified a strong positive link between tourist arrivals or tourism development and economic growth (see Nunkoo *et al.*, 2020; Li *et al.*, 2018), no study to date has empirically investigated the moderating role of geopolitical risk on the inbound tourism - economic growth nexus.

The gap is significant, and it is important to fill it given that, conceptually, geopolitical risk, by heightening the perception of harmful outcomes, making travel less attractive and lowering tourist confidence, may well dissipate any economic growth benefits expected to be accrued from inbound tourism. Inbound tourism is highly risk-sensitive (Roehl and Fesenmaier, 1992) and would inevitably be reduced where geopolitical risk is, or is perceived to be, particularly high. Indeed, contrary to one interpretation of the etymology of the word 'travel' – from Old French 'travail', 'to overcome adversity' or 'to embark on an arduous journey' – as observed by Neumayer (2004), modern mass tourism is, by and large, put off by political conflict, war, potential acts of terrorism and the like, with tourists only willing to travel to foreign places in mass numbers if their journey and their stay are safe and shielded from events that threaten a joyous holiday experience. Consistent with this line of argument, Demiralaya and Kilincarslan (2019) recently highlighted how geopolitical events ranging from the 2015 Paris attacks to the annexation of Crimea, have unveiled the fragility of the tourism industry (or 'travel and leisure industry' as they call it), "that is greatly vulnerable to external shocks such as war acts, terrorist attacks and nuclear threats" (ibid, p. 460).

When geopolitical risks increase, they can have a mediating effect on tourism and economic growth through several mechanisms. First, geopolitical risk can create an atmosphere

of uncertainty and fear, discouraging tourists from visiting a country (Zhang et al., 2022; Reivan-Ortiz et al., 2023). Security concerns, travel advisories, and negative media coverage can all contribute to a decline in tourist arrivals. This reduction in tourism can directly impact the revenue generated from the sector and have a ripple effect on related industries such as hospitality, retail and transportation. Second, geopolitical risks can disrupt the overall business environment, making it difficult for local and foreign travel and hospitality companies to operate effectively. Political instability, policy unpredictability, and trade conflicts can hinder investment in travel and tourism industries, resulting in a negative effect on economic growth (Akadiri et al., 2020; Drakos and Kallandranis, 2015). Third, geopolitical risks, particularly conflicts and terrorism, can cause physical damage to infrastructure, tourist attractions, and other valuable assets. Destruction of transportation networks, hotels, cultural sites and other tourism-related infrastructure can take a significant amount of time and resources to repair or rebuild (Harvie and Saleh, 2008). The costs associated with reconstruction and the time required for recovery can slow down economic growth. Also, geopolitical risks can tarnish a country's reputation as a safe and desirable tourist destination. Unfavorable perceptions and media portrayal of a country's political situation or security threats can have a long-lasting impact on its image. Rebuilding trust and reestablishing a positive reputation may take considerable effort and time, further affecting tourism and economic growth (Avraham, 2015; Farmaki, 2023).

While geopolitical risks can have a salient influence on tourism and economic growth, the tourism-growth literature has for several decades concerned itself with aspects related to tourism risk, crisis and disaster management, political stability, security and peace (see, among others, Hall, 1994; Sönmez *et al.*, 1999; Edgell *et al.*, 2013; Liu *et al.*, 2021). Nevertheless, as the most recent review article by Ritchie and Jiang (2019) that launched a curated collection on tourism risk demonstrates, detailed scrutiny of the 142 relevant papers (published between

1960 and 2018) their meta-analysis is based on reveals that even such a strand of literature is still completely silent as to how geopolitical risk may moderate the inbound tourism – economic growth nexus.

Also, while there are a few studies attempting to examine the tourism and economic growth nexus by including geopolitical risk as an explanatory variable, they failed to investigate how the geopolitical risk may moderate the tourist flows and growth relationship in a cross-country disaggregated sample framework and tend to focus on a single country or a region (Akadiri et al., 2020; Lee et al., 2021; Ghosh, 2022; Nawaz et al., 2023).

In this paper we therefore focus on this specific, heavily unresearched yet critical aspect of the longstanding debate revolving around the tourism-growth nexus, by empirically investigating the moderating role of geopolitical risk in a cross-country disaggregated sample framework for a comprehensive panel dataset of 24 countries, with the latter proxied by a recent geopolitical risk indicator developed by Caldara and Iacoviello (2022).

2. A synthesis of the limited literature investigating the geopolitical risk – tourism nexus

While there is the bulk of literature on tourism and economic growth (see, for example, Pablo-Romero and Molina, 2013; Antonakakis et al., 2015; Destek and Aydin, 2022; Hailiang et al., 2023; Raihan, 2023; Wu et al., 2023) and some research on the relationship between geopolitical risk and tourism (for instance, Demir et al., 2019; Lee et al., 2021; Syed et al., 2021; Ghosh, 2022), there is scant literature on the relationship among geopolitical risk, tourism and growth. Notable exceptions include studies by Akadiri et al. (2020), Lee et al. (2021) and Nawaz et al. (2023).

In the absence of any studies focusing on the moderating effect of geopolitical risk on the relationship between inbound tourism and economic growth, this brief review section

concentrates on the limited, related literature that has considered the question of whether geopolitical risk affects inbound tourism.

Balli *et al.* (2019) use the wavelength method to ascertain whether geopolitical risk affects international tourism for 8 countries. They find that while some countries are impacted severely by geopolitical risk, others remain largely unaffected. They also find that while for some countries the impact of geopolitical risk is short-lived, for others it lasts for several months. It should be noted, however, that wavelet method Balli *et al.*'s study is based on, merely examines the temporal (lead-lag) association between tourism and geopolitical risk using a 'two-variable' time and frequency-based technique to detect and display (graphically) the directionality and dependence structure of the correlation over the sample period.

In a similar vein, Tiwari *et al.* (2019) use, in a second step, a partial wavelet filtering procedure to parcel-out common shocks captured by geopolitical risk and EPU. Their findings, which exclusively focus on India for 2003-2017, conclude that geopolitical risk has a stronger incidence on tourism than EPU, and that the former has a more long-lasting effect compared to the latter.

Still focusing on the case of India, Ghosh (2022) finds that tourism, geopolitical risk, and several other economic variables form a cointegrating vector, and geopolitical risk significantly deters tourism to India. The direction of causality is confirmed in the study to run unidirectionally from geopolitical risk to tourism.

Using both standard fixed-effects and Dummy Variable Least Squares (DVLS) estimations, Demir *et al.* (2019) examine the effect of geopolitical risk on tourism for 18 countries over 1995-2016. They employ an early iteration of the Caldara and Iacovello GPR index and find that geopolitical risk negatively affects tourism for the countries in their sample.

Drawing on Demir *et al.*'s (2019) model, Syed *et al.* (2021) investigate the effect of geopolitical risk on tourism for five countries by employing a range of estimation methods. While taken collectively their overall results point to a clear adverse effect of geopolitical risk, the results from quantile estimations suggest that this is the case only for high quantiles, while at low quantiles the impact of geopolitical risk is found to be marginal.

Akadiri *et al.* (2020) investigate the direction of causality among geopolitical risk, tourism and growth. Using quarterly data for Turkey over 1985-2017, their results indicate a unilateral causation running from geopolitical risk to growth and from geopolitical risk to tourism.

Lee *et al.* (2021) test an augmented tourism model on a sample of 16 countries estimated for cointegration and causality using data for 2005-2017. They find that geopolitical risk negatively impacts tourism demand leading them to conclude that the political conditions significantly affect both tourist travel/consumption decisions and the economy of tourist destinations.

Nawaz et al. (2023) explore the relationship between Christians' religious tourism, geopolitical risk and pollution in Italy by using annual data for the period 1997-2019. Based on autoregressive distributed lag and wavelets coherence analysis, their study suggests an assuaging effect of religious tourist arrivals and geopolitical risk on pollution levels.

On balance, the studies summarized above suggest that geopolitical risk significantly deters tourism inflows, which coupled with the well-established finding of the growth-enhancing effect of inbound tourism, makes it all the more striking that to date no attention has been paid to the specific moderating effect of geopolitical risk on the inbound tourism - economic growth nexus at single country or cross-country level, thus providing a strong rationale for our empirical investigation.

3. Method, model and data

A moderating effect can be described as an effect taking place when a third variable affects the relationship between a predictor and an outcome. In this empirical research article, we capture the moderating effect of geopolitical risk (third variable) on the relationship between inbound tourism (predictor) and the growth rate of GDP (outcome) in two ways: i) we disaggregate the cross-country sample according to low vs. high country geopolitical risk (GPR) score; and ii) we estimate a GPR interaction coefficient with tourist arrivals in an aggregate growth regression model.

Our novel, panel data analysis to test the moderating effect of geopolitical risk specifies a comprehensive panel data growth model for 24 countries over the 1995-2019 period[1]. We use the Dummy Variable Least Squares (DVLS) panel data approach to estimate the relationship under scrutiny, which is equivalent to the fixed effects method. Fixed effects assume that differences between units of the panel can be accommodated using a different intercept. Instead, the DVLS approach uses dummy variables to account for such differences.

Our empirical specification is as follows:

$$GDPPG_{it} = \alpha_0 + \alpha_1 GPR_{it} + \alpha_2 TA_{it} + \sum_{j=1}^{8} \alpha_j C_{it} + D_i + D_t + \varepsilon_{it}$$

where $GDPPG_{it}$ is the growth rate of real per capita GDP (see, e.g., Romer, 1986; Mankiw *et al.*, 1992), for country i at time t. GPR_{it} is the geopolitical risk index (from Caldara and Iacoviello, 2022) which is constructed as the share of newspapers articles mentioning

[1] Data for this study are available from the authors.

geopolitical tensions. The underlying algorithms include eight text category searches sub-divided into 'threats' and 'acts' sub-indexes. The index data measure the monthly variation of negative geopolitical occurrences and related risks. We calculate the annual geopolitical risk by taking the average GPR index across the twelve months in a year.

TA_{it} is the number of tourist arrivals, in log form (as used, for example, by De Vita and Kyaw, 2016). Tourist arrivals are defined as non-resident visitors, same day or overnight visitors. As part of our robustness tests, we later re-estimate the regressions using tourism receipts as a percentage of GDP as a proxy for inbound tourism. C_{it} represents a set of control variables. To account for the key drivers of technological progress in human capital models (see Lucas, 1988), we include investment (gross fixed capital formation) and, consistent with Barro (1990), government consumption. Trade openness is also accounted for to control for the export-led growth effect (as in, for example, Figini and Vici, 2010).

In line with conceptual models based on neoclassical growth theory (for example, Barro, 1991) and empirically the copious tourism literature that has investigated the tourism-growth nexus (see, *inter alia*, Dritsakis, 2012; Du *et al.*, 2016; Sokhanvar and Jenkins, 2022), we also include in our model the real interest rate (to account for policy makers' commitment to macroeconomic stability) rather than the exchange rate, financial depth, as a reliable proxy for financial development across our cross-country panel (see, e.g., Calderón and Liu, 2003; De Vita and Kyaw, 2017), population growth (as originally included by Ghali, 1976), and secondary school enrolment. Due to many missing data for the latter variable in the World Development Indicators (WDI) database, we collect the level of secondary school education attainment data from Barro and Lee's (2013) dataset. D_i and D_t are the fixed-effects country and year dummy variables, accounting for unobserved country-specific and time-invariant effects on the dependent variable. In our estimations we employ robust, Windmeijer-corrected

standard errors clustered at country level as a way to alleviate cross-country heterogeneity across the units of the panel. Finally, we drop country-year observations for which there are no data for the above control variables, which yields a total of 375 country-year observations for 24 countries from 1995 to 2019.

Our start date is dictated by data availability and the end date chosen to remove the inevitable influence of the COVID-19 outbreak and related travel restrictions and lockdowns, which had a heavy incidence on both the global tourism industry and countries' economic growth rates worldwide. The countries included in our sample are Argentina; Australia; Canada; Chile; China; Colombia; Hong Kong, China; India; Indonesia; Israel; Japan; Republic of Korea; Malaysia; Mexico; Norway; Peru; Russian Federation; Saudi Arabia; South Africa; Thailand; Ukraine; United Kingdom; United States of America; Bolivarian Republic of Venezuela.

Table I reports the full description of the variables used in estimation and their respective sources. Tables II and III report the summary statistics and covariance matrix of correlation coefficients, respectively.

< Tables I, II and III about here >

4. Empirical results

4.1. Main estimations

The estimated impact of inbound tourism (TA) and geopolitical risk (GPR) on economic growth is reported in Table IV. Column 1 of Table IV displays the results of the aggregate, baseline model. The TA coefficient is statistically significant at the 5% level and is positively related to real per capita GDP growth (GDPPG) with an estimated value of 1.8707,

while the GPR estimated coefficient is negatively related to GDPPG at the 5% level (-2.2637). In columns (2) and (3), we report estimates disaggregated according to high and low GPR countries, respectively. Only in the low GPR subsample (column 3) tourist arrivals positively and significantly contribute to economic growth (the estimated coefficient is 2.4072).

In column 4, the dummy 'GPR_Dum' is based on the GPR average index of our sample countries (1 = High GPR and 0 = Low GPR) computed on the basis of the 'mean' GPR score of the overall sample (0.2284) taken as the central measure. The interaction term (TA*GPR_Dum) in column 4 is negative and statistically significant at 5% (-0.5979), and the R^2 coefficient is higher with the interaction term included in the regression than without it (0.4197 vs. 0.4104). Hence, we conclude that the interaction term significantly contributes to the predictive ability of the regression, that is, only in low GPR countries tourist arrivals positively and significantly contribute to growth.

We are, inevitably, unable to compare these results with those of previous studies since, to date, no study has attempted to identify the moderating effect of geopolitical risk on the relationship between inbound tourism and economic growth. Nevertheless, it is reassuring that the results obtained are intuitively plausible and economically meaningful. They are also consistent across the two approaches (sample disaggregation into low vs. high country GPR score and use of an interaction coefficient) that we employ to disentangle the existence of the moderating effect investigated.

< Table IV about here >

As regards the other controls variables, with the exception of the results in column 2 (for the high geopolitical risk countries subsample), both investment and population growth positively and significantly correlate with economic growth, results consistent with previous

studies (see, e.g., De Vita and Kyaw, 2016; Shahzad *et al.*, 2017). Financial development registers a statistically significant (except in column 2) negative correlation with economic growth (the coefficient ranges between -0.0234 and -0.0254). We rationalize the growth-reducing effect of financial development based on the cogent arguments advanced by Arcand *et al.* (2015), who argued that the adverse impact is mostly due to the expansion of credit in the absence of financial intermediary responsibility, regulation, and supervision.

4.2. Robustness tests

A rigorous analysis would be incomplete without testing the sensitivity of our results and their robustness to two critical econometric issues that commonly arise when estimating panel data models, namely cross-section dependence and endogeneity.

Starting with the issue of cross-section dependence (an issue far too often ignored in panel data studies aiming to estimate tourism-growth panel regressions), a large amount of econometric literature highlights that panel-data models are likely to unveil the presence of cross-section dependence stemming from common shocks or influences that ultimately are captured by the error term of the regression (Pesaran, 2004; Baltagi, 2005). If unaccounted for, the consequences of cross-section dependence can be very serious for the reliability of the results. Specifically, in its presence, the standard estimators are no longer efficient (albeit still consistent), and the estimated standard errors are biased.

In the context of the present study the likelihood of cross-section dependence is particularly high because the global tourism industry is highly susceptible to regional or global common shocks due to, for example, pandemics such as SARS or COVID-19, and so are countries' economic growth rates (the 2007 global financial crisis is a case in point). Tourist destination choices also tend to be influenced at least to some extent by common trend

preferences, neighborhood effects and herd behavior, thereby raising the likelihood of the presence of cross-section dependence. Moreover, since the late 1980s there has been an incessant trend of greater integration of countries also in terms of tourism agreements, strategies and policies, which translates into interdependencies between cross-sectional units in panel datasets. Mindful of this econometric issue, therefore, after having confirmed its presence in the data by using Pesaran's (2015) test (with a *p value* = 1, indicating we cannot reject the null of weak cross-section dependence), we re-estimate our main regression model using the Driscoll and Kraay's (1998) nonparametric covariance matrix estimator, which generates heteroskedasticity and autocorrelation consistent standard errors that are robust to the presence of spatial and temporal dependence.

The results of this permutation (see Table V) are essentially identical to those reported above using DVLS. Only tourist arrivals (TA) in low geopolitical risk countries have a significantly positive effect on GDP growth. The standard errors obviously differ slightly from those reported in Table IV since we now account for cross-section dependence in estimation, with a few control variables (Education; Real interest rate; Trade openness; Financial development) consequently gaining statistical significance but, overall, the results corroborate our previous inferences.

< Table V about here >

Turning our attention to the issue of endogeneity, it must be understood that whilst inbound tourism, by financing the import of foreign capital and increasing tourists' consumption, promotes economic growth in a host country, such a host country's ability to attract international tourists is also contingent upon its quality as a tourist destination (e.g., investment in tourism promotion, physical infrastructure, local facilities including hotels and services) which, in turn, is a function of economic growth of the host country and its capacity

to invest in the tourism sector (Albaladejo and Martínez-García, 2013). Controlling for the possibility of endogeneity of the tourism variable in growth regressions is, therefore, of paramount importance, especially given that many empirical studies have found a bi-directional causality between measures of inbound tourism or tourism development and GDP growth (see, *inter alia*, De Vita and Kyaw, 2016; Antonakakis *et al.*, 2019; Pulido-Fernández and Cárdenas-García, 2021).

Following De Vita (2014), to address the potential endogeneity problem we adopt a powerful panel estimation technique, namely the System Generalised Methods of Moments (SYS-GMM) (see Arellano and Bower, 1995; and Blundell and Bond, 1998). SYS-GMM corrects for both potential correlation and measurement error. Even more importantly, thanks to its unique dynamic instrumentation of each regressor, it also addresses potential issues of endogeneity bias (for more detail, see De Vita, 2014, and De Vita *et al.*, 2018). In this robustness permutation we also take the opportunity to check if the obtained results are dependent upon the measure used to proxy inbound tourism by replacing tourist arrivals (TA) with tourism receipts (TR), a common alternative typically used in empirical tourism-growth studies.

< Table VI about here >

The SYS-GMM results are reported in Table VI. In terms of diagnostics, both the Sargan (1958) over-identifying restrictions test and the Arellano and Bond (1991) second order correlation test (both reported in Table VI) confirm the validity of the proposed specification. Turning to the estimated coefficients themselves, also these new SYS-GMM robustness estimations are broadly consistent with those of Table IV, thereby reaffirming the validity of our previous results.

5. Policy implications and recommendations

Our findings are important, and important policy implications flow from them. They are important because they reveal not only that peace and geopolitical stability are a significant determinant of inbound tourism but that they are also a *conditio sine qua non* for inbound tourism to significantly contribute to the economic growth of (tourism) recipient countries. It follows that countries pursuing tourism specialization or tourism-led growth strategies (see, *inter alia*, De Vita and Kyaw, 2017; Shahzad *et al.*, 2017; Nunkoo *et al.*, 2020) may not reap the benefits expected to be accrued from such strategies if the country in question is perceived as 'high risk' geopolitically.

A country scoring high on geopolitical risk as measured by this new GPR index, may, therefore, be better off by concentrating its policy efforts first on reducing the threats of adverse geopolitical events (including wars, terrorism, civil unrest, tension between states, nuclear threats, and the like) from their realization and escalation. Only then economic growth-gains from inbound tourism can be fully realized.

Specific recommendations to policy makers for sustainable tourism growth, particularly in times of geopolitical turmoil, include being vigilant about and possibly anticipating the media atmosphere of geopolitical risks, whilst being cognisant of its deleterious impact on tourism investment. In countries affected in this way, policy makers should also develop a range of counter measures to mitigate any negative effects, for example, by providing incentives in the form of subsidies or tax relief for both foreign and domestic capital investors in the travel and tourism sector.

Additionally, promoting domestic tourism may help soften the blow caused by lower inbound tourism due to geopolitical risk and contribute at least to some extent to the resilience of the sector by re-activating a slowing sector so as to protect tourism jobs and businesses. Promoting sustainable tourism and moving to a greener tourism system, could also help increase the competitiveness of the tourism sector in countries affected by geopolitical instability.

6. Conclusions

Although the growth promoting effect of inbound tourism is a well-established finding, and so is the role of geopolitical risk on tourism attraction, the investigation of the moderating role of geopolitical risk on the inbound tourism – economic growth nexus, remains conspicuous by its absence in the tourism literature. In this research article we fill this important gap by employing the Dummy Variable Least Squares (DVLS) estimation technique and by accounting for cross-section dependence on a comprehensive growth model for 24 countries over the period 1995-2019, and a recently developed indicator of geopolitical risk (Caldara and Iacoviello, 2022).

To assess empirically the moderating effect of geopolitical risk on the tourism-growth nexus we: i) disaggregate the cross-country sample according to low vs. high country geopolitical risk; and ii) estimate a geopolitical risk interaction coefficient with tourist arrivals. We find that the interaction term significantly contributes to the predictive ability of the regression, and that only in low geopolitical risk countries tourist arrivals positively and significantly contribute to economic growth. For countries classified as having high geopolitical risk, tourist arrivals do not significantly contribute to growth.

Our results prove to be robust to re-estimations based on tourism receipts instead of tourist arrivals as a proxy for inbound tourism, and alternative estimation methods (Driscoll and Kraay's nonparametric covariance matrix estimator and SYS-GMM) that can satisfactorily deal with heterogeneity, measurement error, cross-section dependence and potential endogeneity problems stemming from omitted variables and/or simultaneity bias.

By being the first study to highlight the moderating effect of geopolitical risk on the inbound tourism – economic growth relationship, our findings not only contribute to advancing academic knowledge and theory, they also carry significant policy relevance with potential high impact beyond academia. Many countries have in the past pursued, and many continue to pursue, tourism specialization and/or tourism-led growth strategies based on the well-established positive link between inbound tourism and economic growth. Our ground-breaking findings alert policy makers in such countries to the significant moderating role that geopolitical risk plays in affecting the above-mentioned relationship and to the importance of prioritizing geopolitical stability as a policy precursor for the successful implementation of such strategies.

6.1. Limitations and avenues for future research

Despite the validity and significance of our results, three final caveats are in order when interpreting our findings, which may pave the way for profitable avenues for future research. First, although the different estimation methods employed in this study also account for dynamics and lagged effects in variable instrumentation, it may be interesting in future studies to investigate the possibility of nonlinearities in the form of a threshold effect in the moderating role of geopolitical risk on the inbound tourism – economic growth nexus by identifying the specific tipping point of geopolitical risk beyond which the growth promoting effects of inbound tourism dissipate.

Second, although the underlying algorithms of Caldara and Iacoviello's (2022) geopolitical risk index are sub-divided into 'threats' and 'acts' sub-indexes, data for such sub-indexes are not yet available at country level. Hence, data availability permitting, we leave it to future research to disentangle whether the moderating effect of geopolitical risk on the relationship between inbound tourism and growth is stronger for *threats* of adverse geopolitical events or for their *realizations.*

A final limitation of this study due to data availability constraints relates to the examination of whether there is any asymmetry in the dynamics between geopolitical risks and tourism-growth in short term versus long term horizons, which would be interesting to investigate in future research when more higher frequency data become available.

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Table I

Variable description and sources of data.

Variables	Description	Source
GDPPG	Rate of growth of real GDP per capita	World Bank WDI
TA	Tourism arrivals	United Nations World Tourism Organization (WTO)
TR	Tourism receipts as a percentage of GDP	United Nations World Tourism Organization (WTO), World Bank WDI
Investment	Investment as a percentage of GDP	World Bank WDI
Government consumption	Government consumption as a percentage of GDP	World Bank WDI
Population growth	Population growth in annual percentage	World Bank WDI
Education	Secondary school education attainment (as a percentage of population aged 25 and over)	Barro and Lee (2013)
Real interest rate	Lending interest rate adjusted for inflation as measured by the GDP deflator	World Bank WDI
Trade openness	Trade openness as a percentage of GDP	World Bank WDI
Financial development	Money and quasi money as a percentage of GDP	World Bank WDI

Table II

Summary statistics.

	No.	Mean	S.D.	Min	Max	Skewness	Kurtosis
GDPPG	375	2.6316	3.5695	-14.3506	16.2620	-0.5245	6.0536
TA	375	9.3242	1.3492	6.2823	11.9987	0.0838	2.3517
GPR	375	0.2284	0.4088	0.0052	3.9256	5.2987	41.1317
Investment	375	24.5749	6.3604	13.2479	44.5188	1.1223	4.1846
Gov. consumption	375	14.7060	4.3140	4.8508	30.0035	0.2618	2.5800
Population growth	375	1.0229	0.6971	-1.0509	4.4386	-0.0276	4.6731
Education	375	44.7830	13.1114	11.7200	72.0000	-0.2662	2.5877
Real interest rate	375	4.4726	6.0895	-27.4167	31.4923	-0.1975	8.4874
Trade openness	375	76.8539	78.2642	16.3901	442.6200	2.9591	11.4720
Financial dev.	375	97.5809	76.1640	11.4874	403.3796	1.5697	5.5477

Table III

Covariance matrix.

	GDPPG	TA	GPR	Investment	Gov. consumption
GDPPG	1				
TA	0.0990*	1			
GPR	0.0301	0.3600***	1		
Investment	0.3890***	0.1970***	0.0212	1	
Gov. consumption	-0.2060***	0.0333	0.1910***	-0.1990***	1
Population growth	-0.0726	-0.2290***	-0.1790***	-0.0073	-0.2660***
Education	-0.0390	0.3120***	0.0499	0.1450***	0.4610***
Real interest rate	0.0309	-0.0450	-0.0334	-0.0900*	-0.0442
Trade openness	-0.0295	0.2360***	-0.1950***	-0.0356	-0.3320***
Financial dev.	0.0201	0.3600***	0.0106	0.2380***	-0.0100
	Population growth	Education	Real interest rate	Trade openness	Financial dev.
Population growth	1				
Education	-0.2430***	1			
Real interest rate	0.0270	-0.1300**	1		
Trade openness	0.0108	0.1590***	-0.0302	1	
Financial dev.	-0.2640***	0.4470***	-0.1440***	0.6460***	1

Note: * p < 0.10; ** p < 0.05; *** p < 0.01.

Table IV

Growth-tourist arrivals regressions to assess the impact of geopolitical risk.

	(1) All countries	(2) High GPR countries	(3) Low GPR countries	(4) Regression with interaction term
TA	1.8707**	2.3443	2.4072**	2.1655**
	(0.7337)	(2.2320)	(1.0083)	(0.8441)
GPR	-2.2637**			
	(0.8119)			
GPR_Dummy				5.0541*
				(2.5175)
TA*GPR_Dummy				-0.5979**
				(0.2882)
Investment	0.1921***	0.0319	0.2339***	0.1938***
	(0.0532)	(0.2221)	(0.0536)	(0.0572)
Government consumption	-0.1795	-0.4495	-0.1125	-0.1695
	(0.1755)	(0.4967)	(0.2008)	(0.1849)
Population growth	-1.4650***	-1.0901	-1.5121***	-1.4877***
	(0.4844)	(2.4555)	(0.5331)	(0.4856)
Education	-0.0537	0.0688	-0.0824*	-0.0402
	(0.0336)	(0.0645)	(0.0462)	(0.0346)
Real interest rate	0.0615	0.0058	0.0935*	0.0596
	(0.0397)	(0.0188)	(0.0496)	(0.0407)
Trade openness	0.0225**	0.0800*	0.0211*	0.0202**
	(0.0087)	(0.0374)	(0.0103)	(0.0089)
Financial development	-0.0254***	-0.0211	-0.0232**	-0.0240***
	(0.0060)	(0.0440)	(0.0083)	(0.0055)
Year dummy	Yes	Yes	Yes	Yes
N	375	95	280	375
R^2	0.4104	0.6789	0.4228	0.4197

Note: The estimation method is by Dummy Variables Least Squares (DVLS) with robust standard errors clustered at country level (displayed in parentheses). To choose between fixed- and random-effects specifications the Hausman test is used in all regressions. *** denotes statistical significance at the 1% level, ** 5%, and * 10%.

Table V

Robustness estimations using the nonparametric covariance matrix estimator.

	(1)	(2)
	High GPR countries	Low GPR countries
TA	2.3443	2.4072**
	(1.7978)	(1.1618)
Investment	0.0319	0.2339***
	(0.1762)	(0.0407)
Government consumption	-0.4495	-0.1125
	(0.5279)	(0.0907)
Population growth	-1.0901	-1.5121***
	(1.2029)	(0.2140)
Education	0.0688**	-0.0824***
	(0.0324)	(0.0289)
Real interest rate	0.0058	0.0935***
	(0.0080)	(0.0274)
Trade openness	0.0800*	0.0211***
	(0.0388)	(0.0059)
Financial development	-0.0211	-0.0232***
	(0.0267)	(0.0061)
Year dummy	Yes	Yes
N	95	280
R^2	0.6789	0.4228

Note: In estimation we use Driscoll and Kraay's (1998) standard errors robust to spatial and temporal dependence. *** denotes statistical significance at the 1% level, ** 5%, and * 10%.

Table VI

Robustness tests using SYS-GMM.

	(1)	(2)
	High GPR countries	Low GPR countries
Lag GDPPG	-0.2944	-0.4363
	(0.2570)	(0.3618)
TR	0.2891	4.9539**
	(4.1178)	(2.2816)
Investment	0.9815***	0.3206
	(0.1487)	(0.2362)
Government consumption	-0.7288**	0.3675
	(0.3135)	(0.3954)
Population growth		-4.8672**
		(2.1910)
Education		-0.0238
		(0.1059)
Real interest rate	-0.0906***	-0.3181
	(0.0338)	(0.2655)
Trade Openness		-0.0967
		(0.0596)
Financial Dev.	-0.0952**	-0.0498
	(0.0430)	(0.0364)
Year dummy	Yes	Yes
N	57	244
R^2	0.2200	0.0755
AR(2)	0.3151	0.5361
Sargan p-value	0.1290	0.3020
No. of instruments	34	40

Note: The SYS-GMM method is used. In column (1), the variables 'Education', 'Real interest rate' and 'Trade openness' are omitted due to multicollinearity and small number sample observations, while for other regressors (except year effects) the first lag is used as GMM-type instrument. In column (2), seven lags are used as GMM-type instruments for the regressors (except year effects). In order to limit instrument proliferation, we chose the 'collapse option' of 'xtabond2'. The values reported in parentheses are the Windmeijer-corrected standard errors. Following De Vita and Kyaw (2017), we also report an adjusted SYS-GMM 'R^2' goodness of fit measure. *** denotes statistical significance at the 1% level, ** 5%, and * 10%.