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**Article**

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# Demand for international tourism in Africa: the role of financial development, trade openness, natural resources, and quality environment

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# Demand for international tourism in Africa: the role of financial development, trade openness, natural resources, and quality environment

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## ABSTRACT

Studies have noted the potential benefits international tourism has to offer African economies. Consequently, research into the demand for international tourism especially for African countries has gained attention in recent years. What little is known about empirically is the effect that financial development, carbon dioxide emissions, trade openness and natural resources have on Africa's tourism. In this study international tourism is modelled as a function of financial development, carbon dioxide emissions, trade openness and natural resources while controlling for urbanization, exchange rate, economic growth and global financial crises effect. Data from seven African countries is explored for the 1995–2021 period. Regression analysis shows that in the long run, international tourism demand is positively enhanced by exchange rate, financial development, natural resources and trade openness. However, carbon dioxide emissions and global financial crises reduce demand for international tourism in the selected countries. The findings imply among others that commitment from governments in Africa to devote financial resources to support the attainment of low carbon economy will promote international tourism. Also, building a strong financial sector is recommended. Proper management of the abundant natural resources should be intensified.

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## 1. Introduction

Tourism activities have been with mankind for ages. However it has received massive recognition in recent times that appears to be unprecedented. This could be attributed to the pace of the expansion of the tourism industry. Globally, it is reported that the tourism industry grew in a way that from 1980 to 2019 there was an increase in international travels from 277 million to nearly 1.5 billion (World Economic Forum 2022). Using 2021 as the base, the first three months of 2022 also saw 182% increment for international tourism (World Economic Forum 2022). These pictures have made the sector one of the fastest if not the fastest growing subsector of the service sector. Per the pace of the expansion of the tourism sector its contribution to growth and development of economies has been appreciable. Over the years, tourism has contributed to the global economy in diverse ways. Between 2014 and 2019 a quarter of all global net new jobs and 10.3% of all jobs (333 million) came from the travel and tourism sector; although in 2020 due to the covid-19 pandemic 62million jobs related to the tourism sector were lost in 2021, 18.2 million jobs gained came from the sector (World Travel & Tourism Council 2022). Moreover, the sector contributed to 10.3% of global GDP (USD 9.6 trillion) in 2019 and 6.1% in 2021 which was more than 21.7% rise to reach USD 5.8 trillion (World Travel & Tourism Council 2022). The World Travel and Tourism Council (2022) argues that there are other indirect benefits from the sector to other sectors through the supply chain. Also, there was about US\$ 700 bn export revenues from international tourism in 2021 (UNWTO, 2022a).

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These among others have placed the tourism sector at the forefront of many international discussions. The expansion of the sector has not been uniform across continents and countries. Thus, developed countries from Europe like Germany, Spain and UK have witnessed massive expansion of their tourism sector (Visual Capitalist 2020). There are other developing countries like China, Turkey and Mexico (Visual Capitalist 2020) that have also made giants growth in their tourism industry. While North America, Asia-Pacific and Europe, respectively, have domestic tourism contributing 83%, 74% and 64% of total travel and tourism spending, Africa's situation is 55% (IFC, 2021). No African country is among the top twenty countries that travel and tourism contributes significantly to their GDP as at 2019 (Visual Capitalist 2020). The African continent which has vast tourism potential appears to be the one with least performance. The continent is endowed with vast river bodies, water falls, forest resources and other cultural heritage and historical sites of significant important to international bodies.

However, the sector has not grown as expected. Owing to the importance of tourism to the growth and development process of economies, it is believed that Africa's tourism potential can play a crucial role in addressing many of the numerous challenges of economic growth, poverty, unemployment and government revenue that confronts the continents. This is because the WTTC 2019 report reveals that over 24 million people in Africa were employed in the travel and tourism sector (IFC, 2021). It is projected that 11.8% of estimated 126 million new travel and tourism jobs between 2022 and 2032 will come from the African continent (WTTC, 2022). Talks have been held aimed at promoting Africa's tourism potential especially international tourism such that the continent could attract about 134 million tourists by 2030 (UNWTO, 2022b). To offer policy guidelines in that regard, research of this nature is paramount for policymakers to make informed decision. That notwithstanding empirical studies in that direction for the continent is relatively scarce (Saayman & Saayman, 2013; Wamboye et al., 2020).

Indeed since the 2000s, studies on the demand for tourism has increased (De Vita, 2014; Ding & Timmer, 2022; Eilat & Einav, 2004; Huang, 2012; Kisswani et al., 2022; Lee, 2012; Lim et al., 2023; Loganatan et al., 2019; Noonan, 2023; Ongan et al., 2017; Sharma et al., 2022; Song et al., 2023; Stefanović & Azemović, 2022; Vanegas et al., 2020; Yap, 2012). Empirically, varied factors have been identified to exert some influence on tourism especially international tourism. They include income, price, population, political stability and exchange rate (Vanegas et al., 2020). Eilat & Einav, 2004 found that common language, common border and trade enhance international tourism. Shafiullah et al. (2019) reported that international tourism for Australian states and territories is positively influenced by income while transportation price, exchange rate and domestic price negatively affects tourism for many of the states. For Tanzania it was reported that income and infrastructural development are the variables that promote international tourism (Wamboye et al., 2020). Saayman and Sayman (2008) found international tourism for South Africa is enhanced by income, travel cost and price. In their study which focused on some European countries (Germany, France, the UK, the Netherlands, Italy, Spain, and Sweden), Ongan et al. (2017) found that exchange rate promote international tourism for all the countries except the Netherlands that had insignificant effect while the effect of income was positive for Germany, France, and Sweden but negative for the UK. For a group of 218 countries, Martins et al. (2017) found that income levels, exchange rate and relative domestic price boost international tourism. Also, De Vita (2014) in a study on panel of 27 Organization for Economic Co-operation and Development (OECD) and non OECD countries found income and exchange rate to support international tourism. A paper by Montes-Rojas and Barroso (2020) on the drivers of international tourism for Sao Tome and Principe reported that income and export promote tourism.

In recent times there has been argument for the need to consider environmental quality and financial development in identifying the drivers of international tourism. According to the literature, financial development can promote international tourism via the provision of enabling environment for tourist to still engage in international financial markets while touring; the provision of financial support to tourist firms to be innovative; and the assurance of economic and political stability that attracts foreigners (Tsaurai, 2022). Also, cleaner environment especially air quality promotes tourism in many ways. For instance, Su and Lee (2022) have documented many works that found that air quality ranks very high among factors that tourists take into consideration when making decisions about where to travel. Also climate related factors do change the natural scenery to be enjoyed by tourists. Also, air pollution like smog and haze blocks visibility and threatens the health of tourists which may not attract them to visit

places (Su & Lee, 2022). The works of Huang (2012), Churchill et al. (2023) and Su and Lee (2022) on one hand and, Tsurai (2022) and Khanna and Sharma (2021, p. 106) on the other hand, have confirmed that environmental quality and financial development, respectively, have negative and positive affect international tourism.

The role of trade openness on international tourism has also been mentioned by some authors. Owing to globalization, economies have opened up to trade among themselves which is deemed very helpful in the development of international tourism. The reasons include that trade openness reduces transaction and searching cost (Chaisumpunsakul & Pholphirul, 2018) and promotes business travels which allows people to experience tourist sites in other countries. Such people also share their experience with others to ignite their appetite to visit such places (Puah et al., 2018). It facilitates the development of infrastructure which helps to make tourism attractive (Santana-Gallego et al., 2011 cited in Chaisumpunsakul & Pholphirul, 2018). The works of Konstantakopoulou (2022), Soh et al. (2022) and Lu et al. (2019) among others have reported of a positive effect of trade openness on international tourism.

Regarding these three variables, available information reveals that Africa's financial sector has grown in recent times since the various reforms that took place in the late 1980s and early 1990s. For instance, number of banks and stock market size has expanded over the years (Hammond et al., 2022). Also, international trading activities have increased over the years for Africa. The minimum and maximum value of exports between 2005 and 2019 were US\$ 370bn and US\$ 710bn, respectively, with that of import registered as US\$ 310bn to US\$ 790bn (WTO 2022) for the same period. Despite this the continent's value of goods and service in the global market is less than 4% (WTO 2022). With the onset of the African Continental Free Trade Area (AfCFTA), it is expected that by 2040 intra-regional trade will increase from 15% to 20% and this is anticipated to promote the continent's tourism development (World Economic Forum, 2022). With more opportunities for the continent to expand its share in the global trade it is important to analyse the international tourism implication.

Also, although the continent is the least emitter of carbon dioxide emissions there has been more than triple the emission levels from 1980 to 2022 (World Bank, 2023). Researchers have therefore paid attention to these observations with a varied focus including the determinants of financial development (Adom, 2019), the effect of financial development on economic growth (Arif et al., 2022; Bibi & Sumaira, 2022; Ibrahim & Alagidede, 2018; Wen et al., 2022), effect of financial development on energy consumption (Kwakwa, 2020) and effect of financial development on carbon emissions (Kwakwa & Alhassan, 2018). There are those who have looked at the drivers of carbon dioxide emission (Kwakwa, 2021), the effect of carbon emission on output (Kwakwa et al., 2023) and power generation (Adom et al., 2019). What remains to be investigated is the effect trade openness, financial development and environmental quality have on international tourism for African countries.

More so, natural resources such as river bodies, wildlife, forest and minerals abound in Africa which can boost its international tourism. About 17% of the UNESCO World Heritage Natural sites is located in the continent (World Economic Forum, 2022). The Travel and Tourism Competitiveness Report (2019) has indicated the abundance of natural resources that Africa can take advantage of to promote tourism potentials (World Economic Forum, 2022). The growth and development effect of natural resources has been assessed by some researchers (Ampofo et al., 2023; Kwakwa, 2021; Musibau et al., 2022; Tabash et al., 2022). However, the international tourism development potential of natural resources remains an issue to be investigated.

From the above, towards the efforts to promote tourism in Africa, this study seeks to identify the factors that can promote or hinder international tourism. To do so, the study specifically assesses the effect of financial development, trade openness, natural resource and air quality on international tourism.

As mentioned earlier this is not the first study on the determinants of international tourism. However, the current study contributes to the existing studies in many ways. First, the evidence is from Africa where the subject matter is comparatively under researched (Fourie & Santana-Gallego, 2013; Gholipour et al., 2022; Naudé & Saayman, 2005; Seetanah et al., 2010). Second, empirical studies on the contribution of natural resources to the international tourism of countries are scarce. Considering the numerous roles of natural resources in the growth and development process of economies it is important to consider tourism has another potential through which natural resource can support development process. Third, although financial development has given attention over the years, there has not been

analysis to reveal the effect of the different indicators (Gopalan & Khalid, 2022). In this study the effect of five different indicators of financial development is analyzed. These are domestic credit to private sector, Domestic credit to private sector by banks, Broad money, Foreign direct investment net inflows (% of GDP) and an index constructed by using principal component analysis method from the four indicators. This is significant to provide useful information for policymakers in drafting the appropriate framework based on their respective effect. The study also assesses the post global financial crises effect.

## 2. Literature review and hypothesis development

### 2.1. Financial development and international tourism

Financial development according to Tsaouri (2022) promotes international tourism by offering tourists the chance to enjoy their holiday by accessing financial services while away from their home country. A well-developed financial sector offers tourism and its related firm's access to cheap credit for business expansion. The tourism sector requires a standard accommodation facilities, camping facilities, transportation and restaurants all of which needs the full participation of private firms. Difficulty in accessing credit at affordable rate may cripple firms ability to offer some of these services (Kwakwa et al., 2023). It is for this reason that financial inclusion a major component of financial development is also argued to promote tourism by enabling firms in the industry to access cheap funds (Gopalan & Khalid, 2022). Through this, there will be an increase in the supply of tourism and travel services (Gopalan & Khalid, 2023). As a risky venture Williams and Baláz (2015) opined that firms in the sector are able to diversify their risk when the financial sector is well developed. Gounopoulos et al. (2012) linked financial sector development to political stability which sends positive signal to the international community to have no fears should they want to visit.

An increasing number of empirical studies have reported that financial development enhances international tourism development. For instance, Khanna and Sharma (2021) noted a positive effect of financial development on international tourism demand for 207 countries. Habib et al. (2019) found financial development increased tourism development in Bangladesh. Jamel (2020) also in analyzing demand for tourism in Saudi Arabia found a positive effect of financial development. For a group of emerging economies, Tsaouri (2022) reported of a positive effect of financial development on tourism development. Gopalan and Khalid (2022) found financial inclusion increases demand for tourism among emerging markets and developing economies.

The explanations given to justify the positive effect in these studies have been among others financial development allows visitors to engage in financial transactions without restrictions and the support it gives to firms in the sector. However, Yenisehirlioglu and Bayat (2019) found that among MENA countries financial development has no effect on tourism demand. From the above, it is hypothesized that:

Hypothesis 1: Financial development enhances international tourism in Africa

### 2.2. Environmental quality and international tourism

Quality environment remains a key developmental issue in the world. Globally about 7 million lives are lost every year through environmental destruction or pollution (World Bank, 2023). It therefore stands to reason that tourists would be inclined to visit places of a quality environment. Quality environment in the form of low emission of greenhouse gases, water pollution and deforestation can therefore attract foreign visitors. Because, environmental destruction may have health implications for which reason demand for international tourism may be negatively affected (Konstantakopoulou, 2022). Badulescu et al. (2022) argue that environmental destruction negatively affects tourism sites which will reduce tourism demand. Also, poor environmental quality or environmental destruction may affect natural beauty, habitat and eco-tourism development. The effect will be a decline in demand for international tourism (Chaudhry et al., 2022). In all, international tourists are regarded as rational beings who would look for alternatives and so when they visit a place found to be polluted they would abandon it and visit other

places the next time (Butler 2000 cited in Chaudhry et al., 2022). Such tourists are likely to not also recommend such polluted places to others for visitation.

Empirically, Badulescu et al. (2022) found carbon dioxide emissions reduce international tourism for EU countries. Huang (2012) in an assessment of demand for China's tourism found that air pollution has an adverse effect on international tourism while water pollution does not matter. Chaudhry et al. (2022) found for 20 countries in East-Asia and Pacific region that environmental destruction reduces demand for international tourism. Su and Lee (2022) recorded of a decreasing effect environmental pollution on the demand for international tourism for 99 countries. Tsaurai (2022) obtained a negative effect of carbon dioxide emissions on demand for international tourism in Argentina, China, Peru, Turkey, Brazil, Mexico and Thailand. For China Becken et al. (2017) noted that perceived poor quality of air reduced international tourist visitation. Churchill et al. (2023) found that air pollution has negative effect on the number of international tourist visiting G20 countries. However, Kisswani et al. (2022) analysis for asean-5 countries found a mixture of positive and negative effects of carbon emissions on international tourists visitation. From the above and situation in Africa it is hypothesized that:

Hypothesis 2: Environmental quality increases demand for international tourism in Africa

### **2.3. Trade openness and international tourism**

International trade is touted as one of the promoters of international tourism. This is because the level of business and trading activities with partners in other countries could influence destinations of external travels (Abass, 2013). As a service product tourism forms part of goods and service that are transacted through international trade. Thus, an increase in the trade openness could expand demand for international tourism (Chaisumpunsakul & Pholphirul, 2018). This could be that trade relations tend to reduce transaction cost (Leitão, 2010) and searching cost (Chaisumpunsakul & Pholphirul, 2018). Through this there can be an improvement in the competitiveness of a country's local tourism sector which increases demand by international tourists (Surugiu et al., 2011). It also affords people on international business trips the opportunity to visit tourist sites (Puah et al., 2018). The development of infrastructure to facilitate trading activities can promote international tourism (Chaisumpunsakul & Pholphirul, 2018). Trade openness can also support the development of the tourism industry with the acquisition of some essentials goods that are not produced locally.

Evidence provided by Fourie and Santana-Gallego (2013) shows that trade openness increases demand for tourism in Africa and other countries. Also, Eilat and Einav (2004) found a positive effect of trade on international tourism for a group of developed and developing countries. Mushtaq et al. (2021) found that trading activities with other countries attract international tourists to India. Surugiu et al. (2011) found that Romania attracts international tourist through international trade activities. However, Erjavec and Devčić (2021) reported of an insignificant effect of trade openness on international tourism for Croatia. Thailand's receipt of foreign tourists was found to be positively affected by export and import (Chaisumpunsakul & Pholphirul, 2018). Soofi et al. (2018) also found trade openness to positively affect the number of tourists visiting members of the Organization of Islamic countries. From the above it is hypothesized that:

Hypothesis 3: Trade openness enhances demand for international tourism in Africa

### **2.4. Natural resources and international tourism**

Shafiullah et al. (2022) revealed that natural resources promote tourism development. Abundance of natural resources may attract tourists because of the natural beauty and serene atmosphere it poses. Natural resources can promote healthy wildlife and eco-tourism thereby attracting visitors (Lovei, 2019). del Río-Rama et al. (2020) has hinted that natural resources promotes tourism through the creation or formation of heritage sites. Because of the health benefits of natural resources, it is noted to promote health tourism (Mosedale et al. 2022). In addition, natural resources promotes hunting tourism (Kalvelage

et al., 2022). An assessment by Vukočić et al. (2023) showed that natural resources have a high tendency to attract tourists. Rent from natural resources can be channeled to support the development of tourism centers in an economy to make it more attractive. Natural resources are among key determinants of FDI (Bokpin et al., 2015; Elheddad, 2016; Lu et al., 2020). Through this investors can visit tourist sites in such countries. It is therefore hypothesized that:

Hypothesis 4: Natural resources rent increases demand for international tourism in Africa

## 2.5. Gaps in the literature

The reviews so far has revealed that growing number of studies have explored the determinants of international tourism. A large number of evidence has been from outside Africa. While the effect of financial development is gaining popularity the effects of the various dimensions are scarce. More so, the trade and environmental quality effects have been under explored for Africa. Despite the importance of natural resources to tourism there is dearth of econometric analysis to estimate the effect. To contribute to the literature, the above gaps are addressed in this study.

## 3. Methodology

### 3.1. Theoretical framework and model specification

Although there is no specific theory for international tourism demand, various arguments are given in modelling demand for tourism. That is various factors are justified and chosen to be part of the factors that influence demand for tourism. In all, the studies the factors identified to exert some influence on tourism especially international tourism are those that “can considerably affect the tourism demands of not only the destination country but also the tourist generator country” (Ongan et al., 2017). However, there appears to be the situation where the economic factors have predominately been explored in the tourism models. One variable often included in the economic model is financial development. The reason is that a vibrant and effective financial sector can pull foreigners who are concerned with conveniently engage in financial transactions outside their country (Tsurai, 2022). Owing to the fact that tourism is a service people want to enjoy, the influential factors therefore go beyond economic variables. For instance the effect of environmentally related factors such as pollution is worth investigating. The influence of environmental quality on tourism has become popular in recent times. The literature argues that quality environment promotes international tourism by preserving interesting tourists sites of attraction, facilitation of transportation and reduction of health risk (Su & Lee, 2022). Also, in line with the sustainable development goals the increased actions to protect the environment can attract people to their tourist sites. Trade openness is touted to promote international tourism via the promotion of business trips and reduction in transaction cost (Puah et al., 2018; Surugiu et al., 2011). Besides these natural resources have the potential to support international tourism through eco-tourism and foreign firms that operate in the extraction of natural resources (Lovei, 2019). Following from the above discussion and empirical works like Seetanah et al. (2010) and (Konstantakopoulou, 2022), the study models demand for international tourism in Africa as:

$$TOUR_{it} = f(TO_{it}, EQ_{it}, NR_{it}, FD_{it}) \quad (1)$$

Where

$TOUR$  is demand for country's  $i$  tourism products by tourists

$TO$  is the level of trade openness of country  $i$

$EQ$  is environmental quality of county  $i$

$FD$  is the financial development of country  $i$

$NR$  is natural resources of country  $i$

$i$  is reference to a country

$t$  is the time dimension

Equation (1) can be transformed through natural logarithm as shown in Equation (2) below, so that the estimated coefficients are interpreted directly in terms of elasticity.

$$\ln TOUR_{it} = a + \theta \ln TO_{it} + \beta \ln EQ_{it} + \delta \ln FD_{it} + \sigma \ln NR_{it} + \varepsilon_{it} \quad (2)$$

where all variables remain same as explained. Also,  $a$ ,  $\theta$ ,  $\beta$  and  $\delta$  are parameters to be estimated; and  $\varepsilon$  denotes the error term and the country effect. To avoid the problem of omission bias effect the study needs to accounts for other factors that could potentially affect international tourism. Such variables as identified in the literature as economic growth (GDP) (Kisswani et al., 2022; Panahi & Nasibparast, 2018), exchange rate (ER) (Ongan et al., 2017; Saayman & Saayman, 2013) and urbanization (UB) (Luo et al. 2016; Law (1992; Naudé & Saayman, 2005).

Consequently, the natural logs of ER, GDP and UB are incorporated in Equation (2) to get

$$\ln TOUR_{it} = a + \theta \ln TO_{it} + \beta \ln EQ_{it} + \delta \ln FD_{it} + \sigma \ln NR_{it} + \gamma \ln GDP_{it} + \vartheta \ln UB_{it} + \psi \ln ER_{it} + \varepsilon_{it} \quad (3)$$

International demand can be subjected to external shocks including the global financial crises of 2009 (Khanna & Sharma, 2021; Konstantakopoulou, 2022). A chow test performed confirms a structural break at 2009. A dummy variable (DUM) to denote the post global financial crises effect is added to yield:

$$\ln TOUR_{it} = a + \theta \ln TO_{it} + \beta \ln EQ_{it} + \delta \ln FD_{it} + \sigma \ln NR_{it} + \gamma \ln GDP_{it} + \vartheta \ln UB_{it} + \psi \ln ER_{it} + \chi DUM_{it} + \varepsilon_{it} \quad (4)$$

### 3.2. Econometric approach

In conducting the study, the following key steps were followed in the analysis of the data. Cross sectional dependence is common among panel data such that it has become necessary to take such feature into consideration when analyzing such data. For instance the presence of cross depended among the variables would mean that first generation panel unit root techniques of Im, Pesaran, and Shin, and Maddala and Wu panel unit root test will results in misleading results. As such secondary unit root test such as Pesaran Panel Unit Root test (CIPS) is appropriate which considers cross sectional dependence become appropriate. In the light of this the study uses the cross sectional dependence test of Breusch-Pagan LM, Pesaran scaled LM and Pesaran CD to ascertain whether the series are cross section dependency. After this the appropriate unit root test is employed to verify the stationarity of the variables in order to avoid obtaining spurious results from regression analysis. The next step taken is to test for cointegration among the variables which is necessary to ascertain the long run relationship among the variables. In this study the Pedroni panel cointegration test (Pedroni, 1999) was used to test the existence of cointegration among the variables. After the cointegration test the long-term coefficients of exchange rate, financial development, renewable energy and carbon dioxide emissions were estimated using the panel Fully Modified Ordinary Least Square (FMOLS) model due Phillips and Hansen (1990). The reliance on the FMOLS is based on its ability to tackle the problems of endogeneity and serial correlation issues which may be associated with the data. Following the works of Bai and Kao (2006) and Alhassan (2021), the panel FMOLS is expressed as;

$$\Omega_{pfmols} = \left[ \sum \sum (x_{it} - x_i)' \right]^{-1} \sum (\sum (x_{it} - x_i) y_{it}^+ + T \Delta_{\varepsilon\mu}^+) \quad (5)$$

where  $\Delta_{\varepsilon\mu}^+$  is the serial correlation correction term and  $y_{it}^+$  is the transformed dependent variable of  $y_{it}$  to achieve the endogeneity correction.  $x_{it}$  is an n-dimensional vector of independent variables.

### 3.3. Data description and source

For the purpose of this study, data was taken from the World Bank (2023) World Development Indicators for the period 1995 to 2021. The focus was on seven most visited countries in Africa- Egypt, Tunisia, Kenya, South Africa, Zimbabwe, Ivory Cost, and Morocco. The dependent variable, international tourism is measured as international tourism receipts (% of total exports). Although there are many indicators to

**Table 1.** Descriptive statistics and correlation results.

	LTOUR	LCO	LTO	LFIN	LURB	LY	LNATU	LEXR	DUM
Statistics									
Mean	2.869757	0.989422	4.126753	3.908105	4.020177	8.125884	1.232517	1.614339	0.480000
Median	3.022997	0.860615	4.077847	3.982428	4.069257	8.121423	1.409927	1.889156	0.000000
Maximum	3.570642	2.148572	4.739208	4.270333	4.237781	8.745899	2.722211	2.878217	1.000000
Minimum	2.043119	0.039262	3.409382	3.179080	3.753215	7.340444	-1.645775	-0.055777	0.000000
Correlation									
LTOUR	1.000000								
LCO	-0.859858	1.000000							
LTO	0.126822	-0.246803	1.000000						
LFIN	-0.349358	0.394451	0.428849	1.000000					
LURB	-0.434064	0.317407	0.697432	0.648354	1.000000				
LY	-0.855691	0.948996	-0.095986	0.390257	0.369401	1.000000			
LNATU	-0.182153	0.328651	-0.051873	0.085362	-0.237349	0.442726	1.000000		
LEXR	-0.010134	0.167255	-0.528135	-0.096356	-0.316653	0.082462	-0.202174	1.000000	
DUM	-0.245349	0.183645	0.211370	0.108988	0.207291	0.399312	0.309711	0.230457	1.000000

denote demand for international tourism, international tourism receipts (% of total exports) remains one of the leading measurement used in the literature (Puah et al., 2018; Badulescu et al., 2022). Using this measurement is significant to reveal the monetary contribution from the number of international tourists who visit African countries. It is direct means to quantify the demand for tourism services by foreigners (Gan, 2015). Besides there were no sufficient data for the alternate measurement of international tourism.

Regarding the explanatory variables, carbon dioxide emission measured in per capita metric tons is used to capture environmental degradation since it takes the greatest share of greenhouse gases (Kwakwa et al., 2023). Previous studies including Badulescu et al. (2022) used carbon emission to represent environmental pollution. Financial development is measured by four indicators: domestic credit to private sector (DCPC), Domestic credit to private sector by banks (DCBB), Broad money(BM), Foreign direct investment net inflows (% of GDP) (FDI) and an index (FINDEX) constructed by using principal component analysis method from the four indicators. These were chosen based on data availability and they have been commonly used in significant finance studies (Adu et al., 2013). Urbanization is measured as urban population (% of total population); natural resources is measured by natural resources rent (% of GDP); trade openness is measured by trade (% of GDP); exchange rate is represented by official exchange rate and economic growth is measured as GDP per capita. To measure the post 2008 financial crises effect, the years 2008 and beyond took the value of 1 while those before were equated to 0. The choice of these proxies were based on data availability and it follows what has been used in previous studies (Adom et al., 2019; Alhassan et al., 2022; Kwakwa et al., 2020; Quadri & Zheng, 2011). The descriptive statistics of the variables and correlation are reported in Table 1. For want of space the financial development reported is for Domestic credit to private sector by banks.

## 4. Results and discussion

### 4.1. Cross sectional dependence results

From results reported in Table 2 the various tests for the cross sectional dependence among the variables generally confirm the presence of cross sectional dependence. Breusch-Pagan LM and Pesaran scaled LM indicates the variables in a country are interrelated with those in other countries. This makes it necessary to use the CIPS unit test to assess the stationarity of the variables.

### 4.2. Unit root and cointegration

The unit root test to ascertain the stationarity of the variables have the results reported in Table 3. At levels the CIPS test shows the variables contain unit root and as such required the need to take their difference. At first difference however, the variables become stationary making them appropriate the analysis in this study. In Table 4 where the cointegration results reported show some level of confirmation of the presence of cointegration among the variables from the various tests. In Table 4 Panel

**Table 2.** Results for series cross-section dependence test.

Series	Test			
	Breusch-Pagan LM	Pesaran scaled LM	Bias-corrected scaled LM	Pesaran CD
LEXR	187.67***	25.71***	25.58***	8.60***
LTOUR	115.96***	14.64***	14.50***	5.39***
LFIN	155.09***	20.69***	20.55***	0.0019
LCO	249.91***	35.32***	35.17***	6.62***
LTO	124.78***	16.01***	15.87***	5.58***
LNR	64.54***	12.19***	12.09***	5.15***
LUB	299.57***	42.98***	42.85***	9.91***
DUM	411.71***	60.28***	60.15***	18.36***
LFINBM	132.52***	17.20***	17.06***	5.89***
LFINPC	122.87***	15.71***	15.57***	-1.81***
LFINFDI	58.66***	5.81***	5.67***	4.10***
LFINDEX	73.55***	8.10***	7.96***	0.28

\*\*\*&lt;1%.

**Table 3.** CIPS Unit root test results.

Series	At levels	First difference	Conclusion
LEXR	-0.678	-3.94**	I(1)
LTOU	-1.13	-5.73***	I(1)
LFIN	-0.186	-3.241***	I(1)
LCO	-1.07	-4.71***	I(1)
LTO	-1.67	-4.79***	I(1)
LNR	-0.28	-3.62***	I(1)
LUB	-1.10	-2.76***	I(1)
DUM	1.35	-5.11***	I(1)
LFINBM	-1.02	-4.35***	I(1)
LFINPC	-1.54	-4.21***	I(1)
LFINFDI	-1.31	-4.54***	I(1)

\*\*\* and \*\* denote 1% and 5% levels of significance, respectively.

**Table 4.** Pedroni cointegration test results.

	Statistic	Prob	Weighted Statistic	Prob
Alternative hypothesis: common AR coeffs. (within-dimension)				
Panel v-Statistic	9.408253	0.0000	0.900690	0.1839
Panel rho-Statistic	2.091298	0.9817	1.607552	0.9460
Panel PP-Statistic	-3.882221	0.0001	-5.394542	0.0000
Panel ADF-Statistic	-1.328009	0.0921	-2.105413	0.0176
Alternative hypothesis: individual AR coeffs. (between-dimension)				
	Statistic	Prob.		
Group rho-Statistic	3.0676	0.9989		
Group PP-Statistic	-3.2943	0.0005		
Group ADF-Statistic	-1.0663	0.1431		

PP-Statistic and Group Panel PP-Statistic confirm that international tourism receipt, financial development, exchange rate and carbon dioxide emissions, economic growth, urbanization, trade openness and dummy for 2008 financial crises are cointegrated. Although all the models with the different indicators of financial development confirmed cointegration, for want of space only one is reported here. This implies that in the long run the level of international tourism can be determined by financial development, exchange rate and carbon dioxide emissions, economic growth, urbanization, trade openness and dummy for 2008 financial crises.

### 4.3. Regression results

The regression results to analyse the effects of financial development, trade openness, global financial crises, income, natural resources rent, urbanization and exchange rate on tourism are reported in Table 5. The long run results from FMOLS in Table 5 shows that all the variables seem to have some effect on international tourism. Generally, financial crises and carbon dioxide emission have negative effect on demand for international tourism in Africa while income, trade openness, natural resource rent, exchange rate and urbanization have positive effect.

**Table 5.** Regression results.

Variable	LFIN = DCPC		LFIN = BM		LFIN = FDI		LFIN = DCPC		LFIN = FINDEX	
	Coeff	Std. Error	Coeff	Std. Error	Coeff	Std. Error	Coeff	Std. Error	Coeff	Std. Error
LFIN	-0.065	0.051	0.235***	0.066	0.007	0.017	-0.193	0.152	-0.134	0.081
LCO	-0.787***	0.022	-0.684***	0.036	-0.784***	0.025	-0.685***	0.122	-0.712***	0.091
LTO	0.178**	0.068	0.122*	0.067	0.184*	0.094	-0.285	0.233	-0.104	0.232
DUM	-0.307***	0.021	-0.306***	0.019	-0.297***	0.024	-0.360***	0.067	-0.336***	0.059
LY	0.252***	0.056	0.196***	0.052	0.286***	0.063	-0.220	0.303	-0.213	0.291
LNATU	0.127***	0.018	0.093***	0.018	0.112***	0.019	0.285***	0.092	0.277***	0.092
LEXR	0.221***	0.016	0.140***	0.025	0.212***	0.017	0.292	0.096	0.315***	0.095
LURB	0.187	0.171	0.061	0.139	0.053	0.188	1.657**	0.780	1.297*	0.689
Adj-R <sup>2</sup>	0.81		0.81		0.81		0.76		0.79	

Note: \*\*\*, \*\* and \* denote 1%, 5% and 10% levels of significance, respectively. DCPC=Domestic credit to private sector, DCBB=Domestic credit to private sector by banks, BM=Broad money, FDI=Foreign direct investment net inflows (% of GDP) (FDI) and FINDEX=index for financial development.

The natural resources effect is seen to be positive. This suggests that the abundance of natural resources supports international development. The outcome is an indication that over the years African countries with many natural resources like the mountains, lakes, rift valleys, forest reserves and wildlife among others have attracted international tourists. In addition, those with resources such as oil and minerals might have attracted foreign tourists through FDIs and other business ventures. This goes to support the assertions made by del Río-Rama et al. (2020) and Mosedale et al. (2022) that natural resource promotes tourism development. The result is also in line with evidence by Vukoičić et al. (2023).

Carbon dioxide emission reduces international tourism. Carbon dioxide has become one of the greenhouse gasses that need to be reduced in an attempt to reduce climate change. Thus, the more carbon dioxide emitted negatively affect the quality of the environment via climate change which has had many implications on the ecosystem and health of humans. More carbon dioxide emitted might have therefore adversely affected some natural tourist sites in these countries thereby impeding their ability to attract international tourists. The weather dynamics in the region might have also changed which makes reduces its attractiveness to foreigners. Foreigners who may be health conscious may not be willing to visit these countries despite their tourist sites. They may therefore choose to visit other areas with lower environmental pollution (Su & Lee, 2022). The negative effect of poor quality of air reducing international tourism is in line with the evidence reported by Badulescu et al. (2022) and many others documented by Eusébio et al. (2020).

The effect of trade openness is largely noted to be positive. The results mean that an increase in trade openness supports demand for international tourism in Africa and it falls in line with Lu et al. (2019). This could be that as argued by Pedak (2018) tourism as a form of trade in the services. Relaxing trade restrictions therefore allows people outside a country to visit tourist site available. This means that the selected African countries have benefitted from trade openness at least in terms of the promotion of international tourism. In addition, trade openness might have afforded these countries the opportunities to market their products to the outside world. Development of tourist sector requires many things including technologies that are not produced in Africa. Trade openness might have therefore enabled these countries to acquire the needed technologies for the enhancement of the tourist sector which might have attracted foreigners. Konstantakopoulou (2022) found similar effect for a group of developing and developed countries.

The effect of financial development is subject to the way it was measured. Among all the indicators of financial development used in this study, broad money supply is the only one found to positively promotes international development in the long run. The other indicators including the index created do not yield any significant effect. The positive effect recorded for broad money supply is an indication that to some extent financial development can enhance international tourism for African countries. The financial sector in Africa although it can be described as developing compared to other countries has seen some substantial development since the late 1980s when many of the countries adopted the World Bank/IMF economic reform programs. Thus, since that period the financial sector has been liberalized leading to a growth in the number of financial institutions. While this has generally supported economic growth and some business activities in the region as some studies have shown (Alhassan et al., 2022) the results show that it has also promoted international tourism. It implies that financial development

has brought some efficiency in the tourism industry in the regions making it expand to attract foreigners. It has also helped in the provision of financial support for firms in the tourism industry to diversify their activities, expand their operations and diversify their risk. Also, the confidence of international tourists might have been boosted as a result of the pace of financial development (Tsauroi, 2022; Khanna & Sharma, 2021). Financial development in these countries implies that foreigners who intend to visit these places can easily engage in any financial transactions they desire (Tsauroi, 2022). The results reported in this study corroborate the works of Tung and Thang (2022) and Tsauroi (2022).

Financial crises are noted to negatively affect the level of international tourism. This means that the crisis and its aftermath effect have reduced international inbound tourism for African countries. There are two or so reasons that can be given to support this outcome. First, the situation saw many people lose their jobs and also it negatively affected financial position of many people outside Africa. As a result their demand for many goods and services including international tourism have been affected. Second, the financial crises reduced remittances to African countries. This could have reduced revenue generation to support the development of tourism to also attract foreigners. The results confirm previous studies such as Konstantakopoulou (2022) that has confirmed that global financial crisis has adversely affected many economic activities including international tourism.

The positive effect of economic growth on international tourism falls in line with the popular notion that internal tourists look for places where they can enjoy their visit and in doing so the level of economic growth sends a signal. Higher growth suggests that the country is in a position to provide essential services that would make international visitors have value for their money. The result is suggestive that the increased levels of economic growth in these countries have enabled authorities to invest in the tourism sector thereby attracting foreigners to these countries. Again, higher economic growth is capable to attract more business trips. The works of Kisswani et al. (2022), Panahi and Nasibparast (2018), Abass (2013), Gan (2015) and Ongan et al. (2017) reported a similar outcome.

There is some evidence of a positive effect of urbanization on international tourism for the selected African countries. Inference from Van der Borg et al. (1996) suggests that tourism development at urban centers can attract international tourists. Urban expansion has been associated with infrastructural development including accommodation places and places of entertainment. This situation could be behind why urbanization is observed to have some positive effect on international tourism. In addition, Law (1992) suggests that urban towns due to the presence of business activities and other entertaining centers attract foreigners. It also affirms that by its nature as a service intensive activity, tourism is enhanced by economies of scale in the urban areas (Naudé & Saayman, 2005).

The study finds that in the long run exchange rate positively affects international tourism. This means that an increase in the exchange rate for the African countries inures to their advantage in terms of developing their international tourism. This is because foreigners perceive it to be cheaper for them to visit these places following an increase in the exchange rate. The exchange rate in many African countries has not been stable and it usually increases than it decreases. This might have triggered many international tourists to visit these areas since an increase in the exchange rate might have made it cheaper to visit via a reduction in their flight tickets, accommodation fees and other expenses in the region (Chaudhry et al., 2022). Previous studies such as Tung and Thang (2022) on 43 developing countries; Kisswani et al. (2022) on Asean 5 countries and Chaudhry et al., (2022) on East-Asia and Pacific region reported similar findings.

## 5. Conclusion and recommendation

African countries' quest to develop a vibrant tourism sector remains on course. Attracting foreigners is one of the potential ways of developing Africa's tourism sector. The literature has identified many factors including income, price and exchange rate as some of the drivers of international tourism. While environmental quality, trade openness and financial development have also been mentioned in the literature not much is known about their role in promoting international tourism in Africa. Moreover, the international tourism effect of natural resources has not been subjected to empirical investigation. Given the level of abundance of natural resources, the increasing level of environmental pollution, financial development and trade openness in Africa, this study examines the effect of

environmental pollution, financial development and trade openness in Africa by controlling for economic growth, exchange rate, urbanization and global financial crises. The study relies on data from top seven tourism destinations in Africa over the 1995–2021 period it was subjected to econometrics analysis.

Regression results provided evidence that economic growth, urbanization, natural resources, trade openness and financial development supports the demand for international tourism. Environmental pollution and global financial crisis have negative effect on the demand for international tourism. Theoretically, the findings have shown that estimating the drivers of international trade needs not to ignore the effect of natural resources, financial development and environmental quality variables of carbon dioxide. Thus, having a stronger financial sector, natural resources abundance and cleaner environment can attract international tourists. Other African countries that may have similar characteristics with the countries used in the study can rely on the findings for some policy formulation.

Observing the significant positive effect of financial development in the promotion of international development for the countries under study this calls for strict enforcement from the central banks in these countries to ensure that financial institutions do not become financially distressed. As nonperforming loans is very high among financial institutions in Africa the earlier strategies are adopted to deal with it the better it would be. Authorities in the tourism sector should equally strategically position themselves to receive the needed financial support from the financial sector.

The promotion of a quality environment should be at the heart of government agencies, civil societies and policymakers in these countries in order to attract more international tourists. Carbon dioxide emission sources in these countries should be closely monitored to find feasible means of reducing it. In line with that, there is a need to spearhead the transition to renewable energy. Africa's share of the global renewable energy production and consumption is comparatively low. Commitment from governments to devote financial resources to support the production of renewable energy and its consumption will help reduce carbon dioxide emissions while offering other benefits to their respective countries including the promotion of international tourism. Players in the tourism sector may also have to promote clean energy for their numerous activities. Transportation, cooking, hoteling among others rely on energy. If the players are able to adopt renewable energy for these and other activities it would also be helpful in promoting international tourism. If complete transition to renewable energy may not be possible operators in the tourism sector should ensure they have energy efficient technologies for their activities.

Proper management of natural resources is necessary to maintain its positive effect on demand for international tourism. One challenge facing African countries when it comes to natural resources is its management. The difficulty in conserving these resources may hamper international tourism on the continent. It appears regulatory and law-enforcing agents are not functioning effectively to protect many of the forest areas. Illegal felling of trees and mining abound in some forest reserves. The effect has been the destruction of some wildlife, forest cover and water pollution. The earlier these illegal activities are brought to their barest minimum the better it will be. Portions of natural resources rent should be set aside to develop infrastructural facilities that can make international tourism attractive.

Promoting international trade is expected to enhance the development of African tourism to attract foreigners. In developing trade policies with other countries authorities in Africa should be conscious of the international tourism impact. It is important that African countries take advantage of trade openings and market the tourism potential to the outside world. Intensive advertisement of tourism sites on the continent to the world can be pursued through trade. Since external shocks like the financial crises are seen to reduce international tourism on the African continent it is necessary to promote local tourism. This will ensure that the benefit the tourism industry will offer will not be seriously hampered following future shocks like global financial crises. Once the exchange rate is noted to positively affect international tourism in Africa it signals that an increase in the exchange rate drives people's decision to visit countries in the continent. For this reason it is imperative for policymakers to expose the tourism opportunities to the world so that they benefit from it during a shock in the exchange rate. Urbanization has become part of every economy. It is necessary for African countries to capitalize on these growing urban towns to attract more foreigners. Committing resources to uplift the state of social infrastructure in urban Africa will be helpful. There is a need for government to also partner with the private sector in other areas that can attract foreigners like the building of conference

facilities, restaurants and accommodation facilities. Ensuring business-friendly environment by the government is a best bet towards this. A similar argument can be made to promote economic growth on the continent.

For future studies, it is suggested that, where variables are available, the effect of other environmental quality variables such as nitrous oxide and methane is also examined for African countries. The effect of the individual components of the financial sector such as the stock market, commercial banks and insurance companies may be analyzed for broader knowledge. If data becomes readily available future studies can explore the effects of the variables analyzed in this study on various types of tourism such as cultural tourism, business tourism and geographical Tourism.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

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