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ECONOMIC FREEDOM, TOURISM AND INCOME INEQUALITY IN SUB-SAHARAN AFRICAN COUNTRIES

Forthcoming: Current Issues in Tourism

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Abstract

Following the dearth of information on how the economic freedom interacts tourism to improve or undermine income distribution, this study investigates the moderation of economic freedom on the tourism-income inequality in 37 Sub-Saharan African countries from 2000 to 2020. This study used the panel corrected standard errors (PCSE) and generalized method of moment (GMM) estimation technique for a panel of 37 sub-Saharan African countries to account for the cross-sectional dependence and endogeneity issues, respectively. We find that tourism and economic freedom undermine income distribution. Moreover, the results reveal that economic freedom interacts tourism to improve income distribution. It means that the role of economic freedom as driver of the tourism-income distribution linkage in Africa remained important throughout.

1. Introduction

The aim of this study is to examine the moderation of economic freedom on the tourism-income inequality nexus. The tourism sector is often mentioned as one of the significant determinants of economic growth. In this regard, many studies have examined the influence of tourism growth on economic growth in recent years (Dossou, Amègnonna & Berhe, 2024; Dossou et al, 2023; Dossou et al, 2023). According to Xuanming et al. (2023), tourism can promote economic growth through job opportunities and international investment (Nguyen et al., 2020). Moreover, tourism can induce economic growth through improving human development, stimulating the services economy, increasing foreign exchanges (Dossou et al., 2023). In the same spirit, tourism can propel economic growth through financial development and export diversification (Brida, Matesanz Gómez, & Segarra, 2020; Dossou et al., 2023; Dossou et al., 2023; Shi et al., 2021). In this regards, the linkage between tourism and economic growth has been investigated many studies (Enilov & Wang, 2021; Song & Wu, 2021). Very recently, Alcalá-Ordóñez et al. (2023) have reviewed 82 articles on the relationship between tourism and economic growth and have pointed out four hypotheses. Firstly, using the endogenous growth theory, many studies have shown that tourism led-growth (Haini et al., 2023). As argued by the authors, tourism can lead to economic growth through several channels, namely physical and human accumulation, foreign direct investment, employment opportunities, technology and innovation. Second, based on the conservative hypotheses, many studies have unveiled that growth led-tourism (Ehigiamusoe, 2020). As explained by Ehigiamusoe (2020), the expansion of economic growth can propel tourism development through increasing new infrastructure and improving stability and education system. Third, many studies have revealed a bidirectional linkage between tourism and economic growth. Lastly, based on neutrality hypotheses, some studies have found no relationship between tourism and economic growth. Such diversity in outcomes highlights the complexity of tourism dynamics and their income distribution implications, which has been shaped by distinct regional contexts, income levels, and research methodologies (Dossou et al, 2023).

In recent years, the tourism economics literature has seen some extensions. For example, the positive influence of tourism on economic growth has been translated into socio-economic development (Dossou et al., 2023). As argued by Zeng and Wang (2021), tourism can lessen income inequality through the pro-poor growth theory and the trickle-down effect. According to the authors, tourism can reduce income inequality through improving social welfare. In this regard, many studies have assessed the tourism-income inequality nexus (Chi, 2020; Dossou & Berhe, 2024; Jiaqun et al., 2024). According to Chi (2023), the influence of tourism on income inequality can be either positive or negative.

Further, recent study has revealed an inverted U-shaped relationship between tourism and income inequality (Alam & Paramati, 2016). Very recently, a N-shaped relationship between tourism and income inequality has been found by Zhang (2021a) and Chi (2023). Although a myriad of studies has been conducted on the relationship between tourism and income inequality, very few studies have examined this topic in African countries, especially sub-Saharan African countries (Dossou & Berhe, 2024; Jiaqun et al., 2024). Even where such studies have been conducted, the findings are mixed and inconclusive (Dossou et al, 2023; Nguyen et al., 2020).

Considering the complex impact of tourism on income inequality (Dossou, Amègnonna & Berhe, 2024; Dossou et al., 2023), investigating how economic freedom may act as a moderator is of utmost importance compelling evidence from prior studies on the tourism-income inequality nexus. Given this fact, it becomes evident that exploring the role of economic freedom as a moderator in the relationship between tourism and income inequality is crucial. economic freedom has been shown to be instrumental in propelling economic growth, enhancing investment and trade. Therefore, by examining how economic freedom interact with tourism, we can uncover channels through which economic freedom may mitigate or amplify the effects of tourism on income inequality. As defined by Ouedraogo et al (2021), economic freedom is regarded as an institution and policy that are market-oriented. As economic freedom is related to market-oriented, Lee et al. (2022) argued that economic freedom has the potential to affect tourism competitiveness, which in turn can provide job opportunities, improve social welfare, income distribution and eradicate poverty. Similarly, as economic freedom and globalization are interconnected, economic freedom has been documented to improve tourism development, which by extension can improve income distribution and reduce poverty (Dossou et al., 2023). In an economically free society, people are expected to invest in economic activities, namely the tourism sector, which by extension can improve income distribution and inclusive growth. In the same spirit, economic freedom can propel economic growth, which by extension can enhance tourism development and thereby improving income distribution. Moreover, as economic freedom is related to economic reforms, Saha et al. (2017) argued that the increase in economic reforms seems to enhance tourism development, which in turn can improve income distribution. Similarly, economic freedom is seen as an engine of economic growth (Martins et al., 2023), which is expected to propel tourism development. As such, it could improve incomes distribution. Technological transfer has been documented as an important factor through which economic freedom can propel tourism development, which by extension can enhance income distribution. Moreover, direct investment, business development and knowledge have been found as a critical factor in which economic

freedom can promote tourism development (Jiang, 2023), which could direct create job opportunities, improve social welfare and income distribution. Despite the positive effect of economic freedom and tourism on income distribution, the study regarding the moderating effect of economic freedom on the tourism-income inequality nexus has been largely ignored.

The motivation of the current paper stems from the following paucity of the empirical study regarding the moderating effect of economic freedom on the tourism-income inequality relationship. Although some studies have assessed the economic freedom-income inequality relationship and the tourism-income inequality nexus, the moderation of economic freedom on the tourism-income inequality relationship in sub-Sahara African economies has been largely ignored. In this regard, sub-Sahara African economies have been selected to examine the moderating effect of economic freedom on the tourism-income inequality nexus and this choice has been made based on many reasons. First, Xu et al. (2021) documented that over the last two years, Africa has experienced economic expansion. However, according to the authors, such economic expansion has not been equally distributed. As argued by Xu et al. (2021), 10 countries among 19 most unequal countries across the globe have been found in Africa. This shows the high income gap between the rich and the poor in the continent (Dossou, Amègnonna, Emmanuelle, Bekun, & Eoulam, 2021; Dossou, Toyo Amègnonna, 2023; Toyo Amègnonna Marcel Dossou, Kambaye, Berhe, & Asongu, 2023; Ofori, Dossou, & Akadiri, 2021). Moreover, very recently, the COVID-19 pandemic has been undermined economic growth and income distribution across the globe (Dossou et al., 2023). According to Acheampong and Opoku (2024) and Ofori and Armah (2021), high income inequality can undermine social cohesion and economic growth. Second, due to the integration of people and culture, Africa has experienced the tourism growth in recent years. However, Adeola and Evans (2020) have pointed out the underdevelopment of the tourism sector in Africa compared to other continents, namely Asia and Latin America. According to Dossou et al. (2023), terrorism and political instability can be pointed out to explain such tourism underdevelopment. Third, economic freedom still remains low in Africa which explains the inefficiency of markets in the continent. Consequently, it is important to conduct an econometric analysis to determine the economic freedom thresholds at which tourism can improve income distribution.

Thus, the specific objective of the current paper is to examine the unconditional effect of economic freedom and tourism on income inequality. Further, the current study examines the conditional effect of economic freedom on the tourism-income inequality nexus. As we mentioned above most of previous studies have separately investigated the economic freedom-income inequality nexus and the tourism-income inequality

relationship. However, they have failed to investigate the moderating effect of economic freedom on the relationship between tourism and income inequality. The current paper contributes to the existing literature in many ways. First, this is the first study to empirically investigates how tourism and economic freedom affect income inequality simultaneously in sub-Saharan Africa. Moreover, we investigate how economic freedom plays its role in moderating the relationship between tourism and income inequality. By considering the compelling evidence from various studies on the negative or positive impact of tourism on income inequality, the study recognizes the need to understand how economic freedom can influence these linkages. This contribution addresses the gap in knowledge regarding the interaction between economic freedom and tourism, providing insights into the mechanisms through which economic freedom can mitigate or amplify the impact of tourism on income inequality. Second, whereas prior studies, using different tourism or income inequality indicators, have demonstrated the negative or positive effects of tourism on income inequality (Dossou et al, 2023), this study reinforces these findings by examining a broad sample of 37 countries and spanning a period from 2000 to 2020. The existing studies have used either international tourist arrivals or international tourism receipts to examine the impact of tourism on income inequality which makes this relationship unclear. Moreover, unlike previous studies that examined the economic freedom-income inequality relationship, this study provides segregated analysis for economic freedom indicators, namely economic freedom, which is government integrity, investment freedom, business freedom, financial freedom, trade freedom. This is due to the difference observed among these economic freedom indicators. Understanding the conditional impact of economic freedom on the tourism-income inequality nexus is crucial for policymakers and stakeholders seeking to address the potential economic challenges posed by the increasing income inequality. Third, economic freedom may have a favourable or detrimental effect on the relationship between tourism and income inequality. A favourable moderation means that economic freedom can promote the positive impact of tourism on income distribution while a detrimental effect insinuates that economic freedom can aggravate the impact of tourism on income inequality. The empirical results of such examination could be important for formulating policies that could contribute to the development of the tourism sector through economic freedom in order to improve social welfare and income distribution.

The rest of the paper is structured as follows: Section 2 of the current paper highlights the existing literature. Section 3 provides the methodology of the study. Section 4 elucidates the results, and Section 5 concludes the study policy implication based on section 4.

2. Literature review

2.1. Theoretical link between tourism and income inequality

Theoretically, the price effects, income effects, and tax effect can be used to explain the relationship between tourism and income inequality (Incera & Fernandez, 2015; Zhang, 2021b). As explained by Incera and Fernandez (2015), the price effects indicate that tourism has the power to increase the price related to accommodation, cultural and entertainment services, which by extension can increase the consumption of the rich and reduce income inequality through promoting local economy. Moreover, tourism employment appears to be used to explain the income effect (Zhang, 2021b). As argued by the author, tourism employment has been found to worsen income inequality. As reckoned by the author, the multinational firms seem to absorb the local firms due to some comparative advantages. Such process could contribute to the destruction of job opportunities and widen income inequality. Further, tax effects indicate that tourism has the power to increase government revenue which could to be beneficial for the poor in terms of redistribution (in terms of hospital, education and infrastructure). As such, it will contribute to improve social welfare and income distribution.

2.2. Theoretical link between economic freedom and income inequality

According to Haan and Sturm (2000), the new growth theory seems to be appropriate to explain the linkage between economic freedom and income inequality. Economic theory argued that economic freedom has the power to affect incentives, productive effort, and the effectiveness of resource use (Haan & Sturm, 2000). Considering the time of Adam smith, economists and economic historians documented that supply resources and competition in business are expected to be chosen by the freedom which can secure property rights, induce economic growth and improve income distribution through employment opportunities. Noted that securing property rights is crucial to hasten economic growth. Similarly, economists and economic historians argued that property acquired by people without the use of force has the power to propel economic growth and improve income distribution.

2.3. Empirical review

2.3.1. The relationship between tourism and income inequality

Recently, the relationship between tourism and income inequality has attracted the attention of many scholars; however, the conclusion regarding such linkage are unclear and mixed (Ngoc & Hai, 2022; Nguyen et al., 2020). On the one hand, many studies

argued that tourism can improve income distribution. Very recently, Akarsu (2021) has revealed many channels through which tourism can propel income distribution. For instance, based on the tourism led-economic growth hypothesis, tourism can induce income distribution through economic growth. As argued by Dossou et al. (2023), the Kuznets theory can be used to explain such process. According to Kuznets (1955), at the early stage, economic growth may lead to an increase in income inequality and after a threshold level of income per capita, income inequality may decline.

Another channel through which tourism can induce income distribution is job opportunities (Akarsu, 2021; Dossou et al., 2023). As argued by Akarsu (2021), tourism has been documented as a diffuse, multiple and labour-intensive economic activity which may contribute to improve income distribution. Similarly, the author documented that the tourism sector has the potential to raise labour demand and provide job opportunities for unskilled labour. Note that providing employment opportunities can reduce income inequality and poverty.

Similarly, profitable investment has been pointed out as an important channel through which tourism can induce income distribution (Dossou et al, 2023). According to Dossou et al. (2023), through vertical and horizontal integration, foreign direct investment has been documented to propel tourism development, which by extension can provide job opportunities. Note that job opportunities can induce income distribution, poverty reduction and improve living standards social welfare. Very recently, This argument has been supported by Dossou et al. (2023) who argued that investments in the tourism sector, namely sites and recreational facilities are expected to provide job opportunities, propel income distribution and poverty reduction.

In another account, economic integration and globalization have been found as an important channel through which tourism can induce income distribution (Dossou et al., 2023). For example, it has been argued that tourism has the power to stimulate economic diversification, which relies to structural transformation and tertiarization. Note that structural transformation and tertiarization can help to provide job opportunities and improve income distribution. Moreover, it has been said that tourism can promote globalization, which in turn can contribute to reduce information and transaction costs. Note that information and transaction costs can improve local economy and propel income distribution.

In same vein, tourism can induce income distribution through government tax revenues (Dossou et al., 2023). According to the authors, tax revenues obtained from the tourism sector can reduce tax burden related to other sectors. Note that reducing tax burden can help to increase investment regarding biodiversity conservation, education and

health, which have been found as an effective for ensuring income and gender equality (Akarsu, 2021). According to Dossou et al. (2023), direct taxes, namely entrance fees, visa fees and indirect taxes such as sales tax, value added tax can be obtained from the tourism industry. Note that these taxes may be used to invest in biodiversity conservation, education and health which can provide job opportunities and propel income distribution.

However, tourism can induce income inequality, according to recent studies, namely Dossou et al. (2023), Dossou et al. (2021), Ofori et al. (2021), Akarsu (2021). For instance, as tourism development is related to foreign currency, Akarsu (2021) documented that the local currency can be appreciated due to foreign currency. It is important to note that the appreciation of local currency can induce income inequality. Similarly, tourism can heighten income inequality through economic leakage as it is reliable to international supply chains (Akarsu, 2021). Note that economic leakage has the power to weaken local supply chain and small businesses, which by extension can exacerbate income inequality. Moreover, tourism can worsen income inequality due to some global events. For example, economic uncertainty seems to hurt tourism development, which by extension can undermine economic growth and worsen income inequality (Dossou et al., 2023; Jiaqun et al., 2024).

2.3.2. The relationship between economic freedom and income inequality

Empirically, the relationship between economic freedom and income inequality can be either positive or negative (Ahmad, 2017). On the one hand, many studies revealed the positive impact of economic freedom on income inequality. For instance, using 115 countries, Ahmad (2017) examine the joint impact of economic freedom and democracy on income inequality over 1970–2014. They found that economic freedom exacerbates income inequality. Further, the author unveiled that democracy attenuates the positive impact of economic freedom on income inequality. Similarly, the relationship between economic freedom and income inequality has been assessed by Graafland and Lous (2018). Using 21 OECD countries as a case study, they found that freedom from government regulation fiscal freedom and free trade exacerbate income inequality while sound money improves income distribution. Similar outcome has been confirmed by Huynh (2022) who used 35 Asian economies covering 2000 through 2018.

On the other hand, many studies show that economic freedom induces income distribution. For instance, Scully (2002) examined the relationship between economic freedom and income inequality and through many methodological approach, the author unveiled that economic freedom induce income growth.

3. Model specification, data and methodology

3.1. Model specification

The seminal work of Kuznets (1995) has shown the inverted U-shaped relationship between economic development and income inequality. Considering this theory, the first equation can be specified as follows:

$$IIE_{it} = \alpha_0 + \alpha_1 pcGDP_{it} + \alpha_2 pcGDP_{it}^2 + \varepsilon_{it} \quad (1)$$

Where IIE=income inequality, which are the Gini before tax and alternatively Gini after tax. The Gini before tax and Gini after tax reflect the level of income inequality in an economy on a scale from 0 to 100. While 0 reflects low inequality in the income distribution, 100 denote inequality in the distribution of income. pcGDP=economic growth, which is per capita gross domestic product; pcGDP^2 is the square of per capita gross domestic product. The real gross domestic product per capita reflects the average revenue earned by everyone in a country. i=country (37 sub-Saharan African countries); t=period (2000-2020); ε_{it}=error term.

Recently, many studies have pointed out some factors that might influence income distribution (Dossou & Berhe, 2024; Dossou, Kambaye, Berhe, & Alinsato, 2023; Dossou et al, 2023; Ofori et al., 2021, 2022; Xu et al., 2021). These factors are financial development, internet penetration, foreign aid, industrialization and inflation. Considering this fact, we extend the equation 1. Therefore, it can be specified as follows:

$$IIE_{it} = \alpha_0 + \alpha_1 pcGDP_{it} + \alpha_2 pcGDP_{it}^2 + \alpha_3 INT_{it} + \alpha_4 Faid_{it} + \alpha_5 Indus_{it} + \alpha_6 Infl_{it} + \varepsilon_{it} \quad (2)$$

Where: FD=financial development, which is Domestic credit to private sector (% of GDP); INT=internet penetration, which is individuals using the internet (% of population) ; Faid= foreign aid in millions US dollars; Indus=industrialization, which is industry (including construction), value added (%GDP); Infla=inflation, which is consumer prices (annual%).

The first aim of this study is to examine the unconditional effect of economic freedom and tourism on income inequality. Considering this objective, we extend the equation 2 as follows:

$$IIE_{it} = \alpha_0 + \alpha_1 pcGDP_{it} + \alpha_2 pcGDP_{it}^2 + \alpha_3 INT_{it} + \alpha_4 Faid_{it} + \alpha_5 Indus_{it} + \alpha_6 Infl_{it} + \alpha_7 EcoFr_{it} + \alpha_8 Tour_{it} + \varepsilon_{it} \quad (3)$$

Where: EcoFr= Economic Freedom, which is government integrity, investment freedom, business freedom, financial freedom, trade freedom. Government integrity, investment freedom, business freedom, financial freedom and trade freedom reflect the aspects of economic and entrepreneurial nature on a scale of 0 to 10 with 0 implies low economic freedom in an economy and 10 reflects high economic freedom in an economy. Tour=

international tourist arrivals; it reflects the number of tourists who visit a country over the period of time, and alternatively international tourism receipts, it denotes the amount of money expended by visitors during their travel over a period of time. Further, the present study has extended the income inequality, tourism and economic literature by examining the moderation of economic freedom on the tourism-income inequality nexus which has been largely ignored. Considering this fact, the equation 3 can be extended as follows:

$$IIE_{it} = \alpha_0 + \alpha_1 pcGDP_{it} + \alpha_2 pcGDP_{it}^2 + \alpha_3 INT_{it} + \alpha_4 Faid_{it} + \alpha_5 Indus_{it} + \alpha_6 Infl_{it} + \alpha_7 EcoFr_{it} + \alpha_8 Tour_{it} + \alpha_9 (Tour \times EcoFr)_{it} + \varepsilon_{it} \quad (4)$$

Where: $Tour \times EcoFr$= the interaction between tourism and economic freedom.

Considering the equation 4, the net effect can be computed as follows:

$$\frac{\partial IIE_{it}}{\partial Tour_{it}} = \alpha_8 + \alpha_9 EcoFr_{it} \quad (5)$$

Where $EcoFr$ is the average value of government integrity, government spending, investment freedom, business freedom, financial freedom, trade freedom.

The turning point of tourism is calculated as:

$$\text{Economic Freedom Threshold} = \left| \frac{\text{Unconditional impact of Tourism}}{\text{Conditional or Interactive impact of Tourism}} \right| \quad (6)$$

The turning point Tourism can be estimated by plugging the corresponding values of the unconditional and conditional coefficients from the regression results into the formula which is in absolute value.

3.2. Data

This study uses the data of 37 sub-Saharan African countries covering 2000-2020. Data on economic growth, tourism, financial development, internet penetration, industrialization and inflation were emanated from the World Development Indicators of the World Bank. Data on government spending, investment freedom, business freedom, financial freedom, trade freedom were collected from freedom house, while data on net (post-tax/transfer Gini index) and market (pre-tax/transfer Gini index) income inequality were taken from the SWIID.

3.3. Justification of control variables

Economic growth

As we have mentioned above it has been shown that economic growth and income inequality can have an inverted U-shape relationship (Kuznets, 1955). Recent studies corroborate the Kuznets hypothesis (Dossou et al, 2023; Dossou et al, 2023; Nguyen et al., 2021).

Financial development

In recent years, financial development has been documented to propel economic growth, which by extension can enhance income distribution. According to (Dossou et al. (2023), Ofori et al. (2022) and Ofori et al. (2023), the sustainable development goals cannot be achieved without financial development. The authors continue by arguing that financial development can contribute to the reduction of income inequality and poverty. For instance, financial development has been argued to reduce information and transaction costs which by extension can improve income distribution through promoting small businesses (Dossou et al, 2023). Following these arguments, we can expect the positive effect of financial development on income distribution.

Internet penetration

We add inflation in our model because the existing literature show the significant effect of internet on economic growth (Appiah-Otoo & Song, 2021). Economically, it has been argued that internet has the power to save costs in many sectors which can contribute to enhance economic growth and improve income distribution. Similarly, it has been documented that internet can improve both the economy's supply-side and demand-side, which by extension can improve economic growth, social welfare and income distribution.[1] This has been corroborated by (Maurseth, 2018) who found that internet enhances economic growth, which by extension can improve income distribution. Considering the abovementioned fact, we expect that internet can reduce income inequality.

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[1] https://blogs.worldbank.org/digital-development/can-internet-access-lead-improved-economic-outcomes

Foreign aid

Theoretically, the 'financing-gap' model – the 'two-gap' has been pointed foreign aid as contributing factor to income distribution. As argued by Tefera and Odhiambo (2023), foreign aids are expected to fill resource gaps which appears to propel economic growth, which by extension can improve income distribution. Similarly, the two-gap model states that foreign aids can complement two resource gaps, namely saving gap and trade gap which can help to meet investment and import requirements, which in turn can contribute to accelerate economic growth and improve income distribution (Chenery and Strout, 1966). Moreover, the authors documented that foreign aid can accelerate economic growth and propel income distribution through increasing supply of foreign exchange. In addition to the 'financing-gap' models – the 'two-gap', Bacha (1990) has pointed out the 'three-gap' model which indicated that foreign aids can improve economic growth and income distribution through filling fiscal gaps as it limits government investments. Considering the abovementioned fact, foreign aids might contribute to income distribution (Abate, 2022; Asaleye et al., 2023; Harb & Hall, 2019).

Industrialization

industrialization is introduced to the model for further examination. Recent studies have argued that industrialization remains an important instrumental in the economic development (Dossou et al, 2023). This has led to the investigation of the relationship between industrialization and income inequality (Dossou, et al, 2023; Nguyen et al., 2020). Most of these studies have shown that industrialization contribute to provide employment opportunities, which by extension improve social welfare and income distribution. Therefore, we expect that industrialization could contribute to reduce income inequality.

Inflation

We add inflation in our model because the existing literature indicates that inflation can influence income inequality. According to Sintos (2023), the rise of inflation could contribute to disrupt the well-function of a market economy and induce to the decline in the purchasing power of money, which by extension could contribute to undermine economic growth and income distribution. Similarly, high inflation can negatively influence productivity, which in turn can undermine economic growth and income distribution. In the same vein, investments can be curbed by the rise of inflation which can retard economic growth and heighten income inequality. Considering the above fact, we can conclude that rising inflation can worsen income inequality.

3.4. Estimation strategy

To unearth the moderation of economic freedom on the relationship between tourism and income inequality, we start to firstly examine the cross-sectional dependence developed by Pesaran (2004). According to recent studies such as (Dossou et al., 2024; Dossou, et al, 2023; Dossou, Ndomandji Kambaye, Asongu, Alinsato, Berhe, et al., 2023; Jiaqun et al., 2024; Xu et al., 2022), as the world has embarked in the global integration, it is important to prevent external shocks. To prevent any external shock, we use the cross-sectional dependence developed by Pesaran (2004). As shown in Table 1A all results are statistically significant, meaning that there is the presence of cross-sectional dependence. In such case, the panel corrected standard errors (PSCE) estimation technique developed by Jönsson (2005) is used to account for cross sectional dependence. Recent studies in tourism economics have used the panel corrected standard errors (PSCE) estimation technique. For instance, Xu et al. (2022) have used the panel corrected standard errors (PSCE) estimation technique to assess the impact of corruption on tourism. Similarly, using the panel corrected standard errors (PSCE) estimation technique, Nguyen et al. (2021) have examine the impact of tourism on income inequality. In the same vein, (Dossou et al. (2021) have used the panel corrected standard errors (PSCE) estimation technique to examine the moderation of governance quality on the relationship between tourism and poverty reduction. Unfortunately, the panel corrected standard errors (PSCE) estimation technique has not yet been used to investigate the moderation of economic freedom on the tourism-income inequality nexus. Further, we use the generalised method of moment (GMM) estimation technique to account for the endogeneity issue as the present income inequality depends on the previous one.

4. Results and discussion

4.1. Descriptive statistics and correlation matrix

Tables 1 and 2 reveal descriptive statistics and correlation matrix, respectively. As revealed in Table 1, the mean value of net (post-tax/transfer Gini index) and market (pre-tax/transfer Gini index) are 3.794 and 3.856, respectively. Further, the average value of tour1 and tour2 are 19.060 and 12.981, respectively. Moreover, the mean value of economic freedom (Investment freedom, Financial freedom, Trade freedom, Business freedom, Business freedom and Financial freedom) are 3.804, 3.690, 4.124,3.9 50 3.294, respectively. These results are supported by Figures 1 and 2.

Table 1. Descriptive statistics

| Variable	Mean	Std. Dev.	Min	Max
net (post-tax/transfer Gini index) (log)	3.794	0.149	3.4934	4.203
market (pre-tax/transfer Gini index) (log)	3.856	0.1528	3.5524	4.282
Tour1 (log)	19.060	2.027	11.512	23.380
Tour2 (log)	12.981	1.785	7.972	16.531
Investment freedom	3.804	0.424	1.609	4.499
Financial freedom	3.690	0.410	2.302	4.248
Trade freedom	4.124	0.220	2.944	4.488
Business freedom	3.950	0.233	3.186	4.441
Government integrity	3.294	0.413	2.282	4.218
Economic growth (log)	8.200	0.940	6.446	10.393
Industry (log)	3.107	0.446	1.516	4.278
Internet penetration (log)	1.446	1.818	-5.132	4.432
Financial development (log)	2.709	0.890	-.7105	4.958
Foreign aid (log)	19.78	1.319	15.57	23.159
Inflation	9.8051	34.060	-8.974	557.201
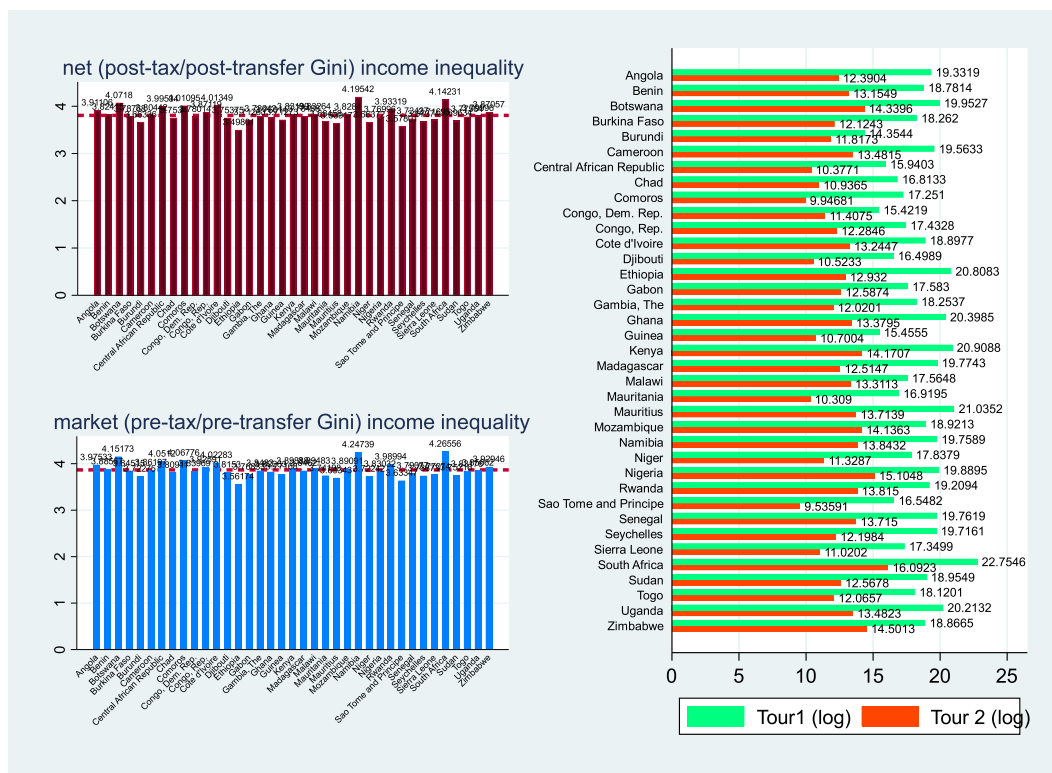
Figure 1. The mean value of income inequality and tourism development in Africa over the period 2000-2020.
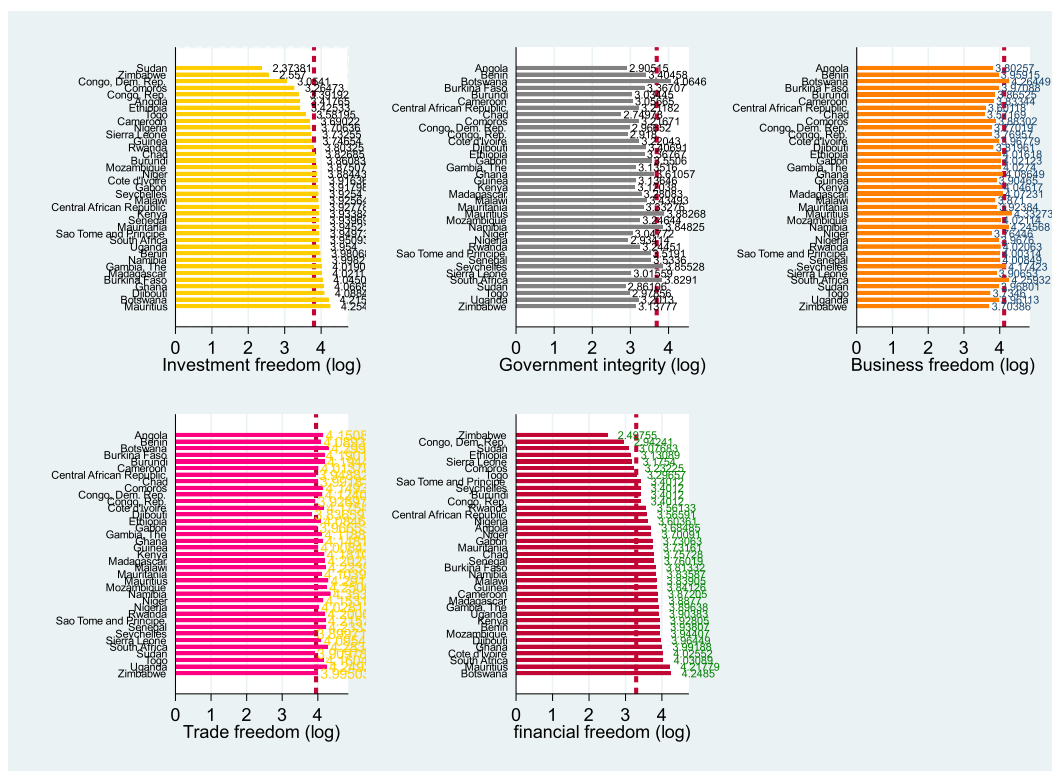

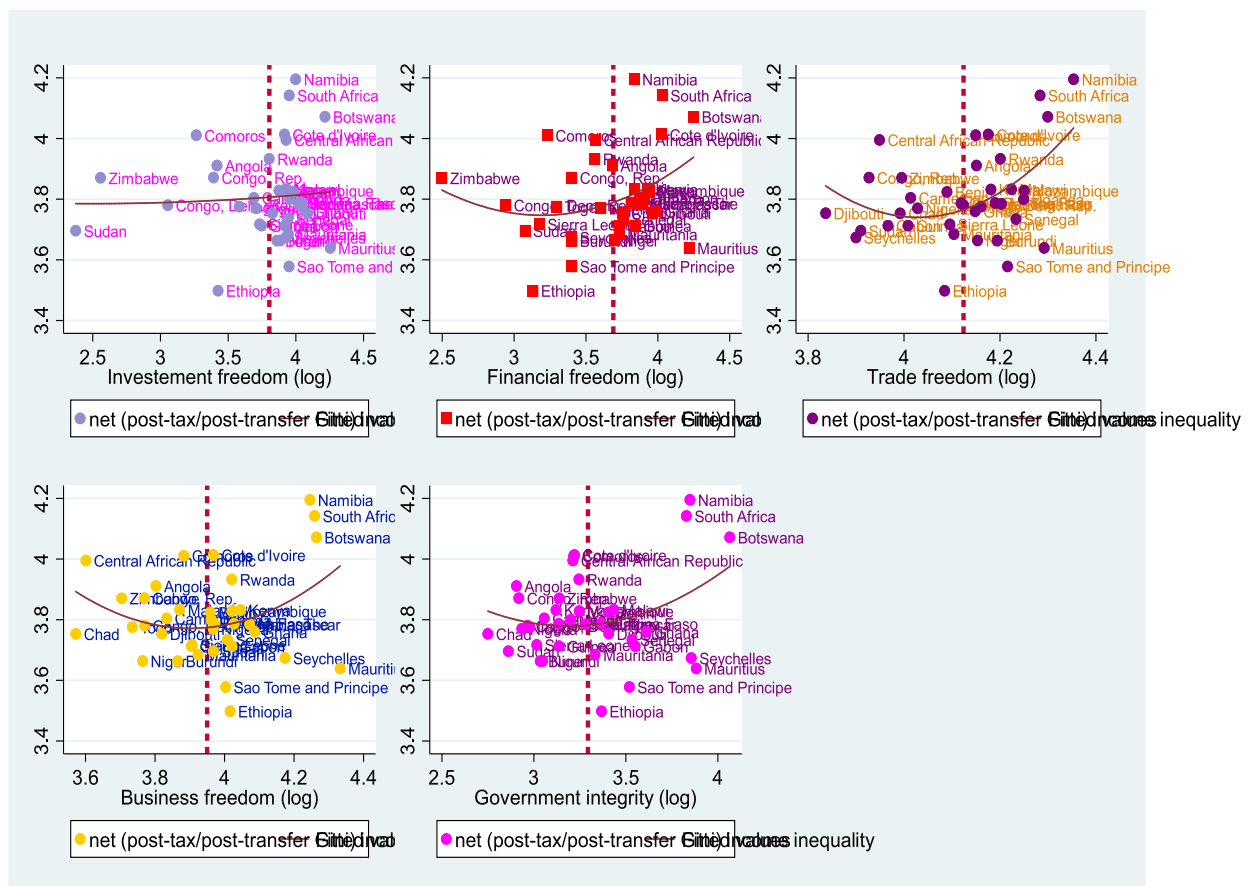Figure 2. The mean value of economic freedom in Africa over the period 2000-2020.

Figure 3. The relationship between economic freedom and income inequality in Africa over the period 2000-2020.

Table2. Correlation matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
(1) net (post-tax/transfer Gini index)	1														
(2) market (pre-tax/transfer Gini index)	0.994***	1													
(3) Tour1	0.368***	0.403***	1												
(4) Tour2	0.516***	0.547***	0.745***	1											
(5) Investment freedom	-0.0238	-0.00592	0.291***	0.206***	1										
(6) Financial freedom	0.271***	0.278***	0.396***	0.363***	0.598***	1									
(7) Trade freedom	0.222***	0.219***	0.259***	0.264***	0.298***	0.313***	1								
(8) Business freedom	0.229***	0.260***	0.601***	0.454***	0.505***	0.461***	0.176**	1							
(9) Government integrity	0.214***	0.241***	0.471***	0.353***	0.445***	0.416***	0.270***	0.544***	1						
(10) Economic growth	0.334***	0.357***	0.637***	0.472***	0.243***	0.324***	0.0432	0.572***	0.546***	1					
(11) Industry	0.313***	0.322***	0.211***	0.370***	-0.0238	0.247***	0.0754	0.107	0.135*	0.365***	1				
(12) Internet penetration	0.262***	0.266***	0.498***	0.367***	0.140*	0.124*	0.326***	0.306***	0.432***	0.686***	0.0931	1			
(13) Financial development	0.289***	0.332***	0.702***	0.534***	0.285***	0.354***	0.315***	0.521***	0.549***	0.657***	0.124*	0.553***	1		
(14) Foreign aid	0.119*	0.116*	0.121*	0.330***	-0.139*	-0.0484	0.238***	-0.236***	-0.255***	-0.453***	0.0475	-0.198***	-0.170**	1	
(15) Inflation	-0.00985	-0.00696	-0.0315	0.0635	-0.0760	-0.208***	0.00815	-0.109	-0.120*	-0.0392	0.0867	0.000535	-0.135*	0.0908	1

From the correlation matrix presented in Table 2, the results indicate that tourism is positively and significantly correlated with the two income inequality indicators. Moreover, the results show that income inequality is positively correlated with the five economic freedom indicators.

4.2. Effects of economic freedom and tourism on income inequality

The empirical results of this research obtained by the panel corrected standard errors (PCSE) estimation techniques are disclosed in Table 3. The results show that while economic growth is positively correlated with income inequality, its square term is negatively correlated with income inequality. This result is in line with the Kuznets theory developed by Kuznets (1955) who argued that at the early stage of economic development, income inequality seems to be worsened and after a turning point, economic development contributes to hasten income distribution due to the improvement of democracy, the promotion of industry and urbanization. Similar outcomes were found by Dossou, Toyo Amègnonna (2023) who used 46 African countries from 1996 to 2020 and GMM estimation technique to assess the relationship between economic growth and income inequality under the Kuznets theory. Moreover, our findings are in line with Nguyen et al. (2021) who used the panel corrected standard errors (PCSE) estimation to examine the income inequality-economic growth relationship under the Kuznets theory. Similar results were found by Dossou et al. (2023) who have explored the economic growth-income inequality linkage for a panel of 42 sub-Sahara African countries over the period 1996-2020.

Internet penetration is negatively and significantly connected with income inequality, meaning that an increase in internet penetration provokes a decline in income inequality. This is in line with the argument of Dzator et al. (2023) who argued that ICT has the power to improve living standard, social welfare and propel income distribution. Our finding is Consentient with Dossou et al. (2023) who emphasized the role of ICT in improving healthcare which can propel economic growth and induce income distribution. Very recently, Awad and Albaity (2022) have supported our finding by pointing out the positive effect of internet penetration on economic growth and income distribution through reducing information and tariff barriers. Similarly, our result has been recognised by Asongu and Le Roux (2017) who pointed the positive impact of internet penetration on inclusive human development. Also, our finding is in line with Kouladoum et al. (2022) who documented that internet penetration can improve financial development which has the potential to improve social welfare and income distribution. Moreover, our finding is corroborated by Afzal et al. (2022) who discovered that internet penetration induce financial development which can contribute to eradicate poverty and minimize income inequality. Moreover, our finding is consistent with Dumor et al. (2023) who documented that internet has the power to improve education system, which in turn can improve income distribution. Similarly, our result is consistent with the argument of Dossou et al. (2023) who posited that internet can contribute to the improvement of institutional quality, which by extension can induce

economic growth and income distribution. In the same vein, our finding is in line with the argument of Adeleye et al. (2020) who posited that internet has the potential to boost e-business, which by extension can improve income distribution.

In Table 3, it is shown that the estimated coefficient foreign aid is positive and statistically significant. It is meant that an increase in foreign aid is associated with the increase in income inequality. It supports Herzer and Nunnenkamp's (2012) results that foreign aid is worsened income inequality in developing countries. similar outcomes were found by Maqbool and Ali (2022) who used 78 recipient countries to investigate the corruption and international aid on income inequality. Also, our finding is consistent with the argument of Doucouliagos and Paldam (2009) who pointed out the ineffective effect of foreign aid on income distribution as it has failed to achieve the primary aim which is to promote economic growth.

Regarding the first objective of this study, tourism is found to be associated with the exacerbation of income inequality. It means that an increase in tourism lead to the increase in income inequality by 0.0203 % at 1 % level. This result is consistent with the argument of Incera and Fernandez (2015) who argued that tourism can heighten income inequality through inflation. In the same account, our finding is corroborated by Dossou et al. (2023) who assessed the tourism-income inequality linkage in Asia. However, their study has failed to look at how economic freedom can affect the relationship between tourism and income inequality. Similarly, the finding is in line with the finding of Jiaqun et al. (2024) found that tourism worsens income inequality in sub-Saharan African countries. Nonetheless, they have failed to examine the moderating role of economic freedom on the relationship between tourism and income inequality. Similar results were found by Chi (2023) who examined the nexus between tourism and income inequality in OECD countries. Although Chi (2023) examined the tourism-income inequality relationship, he failed to look at how economic freedom moderates the tourism-income inequality nexus. In the same account, our finding is consistent with the findings of Camacho and Ramos-herrera (2024) who have assessed the relationship between tourism and income inequality in both developing and developing countries. However, they failed to investigate whether economic freedom interacts with tourism reduce or worsen income inequality in Africa. Our finding is inconsistent with Ofori et al. (2021) who have examined the moderating impact of governance quality on the tourism-income inequality relationship in Africa. However, their study has failed to consider economic freedom as moderator in this relationship. Similarly, our finding disagreed with the trickle-down hypothesis which stipulate that tourism can affect economic growth and income distribution through employment opportunities (Dossou et al, 2023). In the same vein, our finding disagreed with Ehigiamusoe's (2020) argument

which posited that the increasing level of tourism has the power to improve education system, which by extension can improve income distribution.

Table3. The impact of economic freedom and tourism on income inequality (Dependent variable: market (pre-tax/transfer Gini index))

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Economic growth	0.498***	0.630***	0.542***	0.523***	0.662***	0.602***	0.610***	0.728***	0.713***	0.868***	0.748***	0.803***
	(0.0556)	(0.0821)	(0.0611)	(0.0684)	(0.0750)	(0.0671)	(0.0814)	(0.0909)	(0.0943)	(0.0938)	(0.0940)	(0.105)
Square of economic growth	-0.0270***	-0.0372***	-0.0274***	-0.0269***	-0.0341***	-0.0321***	-0.0321***	-0.0410***	-0.0401***	-0.0479***	-0.0422***	-0.0459***
	(0.00297)	(0.00445)	(0.00344)	(0.00389)	(0.00431)	(0.00382)	(0.00475)	(0.00536)	(0.00558)	(0.00556)	(0.00547)	(0.00602)
Internet penetration	-0.0101**	-0.00678	-0.0115***	-0.00861**	-0.0232***	-0.00916**	-0.0129**	-0.00698	-0.00509	-0.0210***	-0.00532	-0.00979
	(0.00507)	(0.00797)	(0.00441)	(0.00413)	(0.00455)	(0.00433)	(0.00481)	(0.00597)	(0.00587)	(0.00563)	(0.00645)	(0.00621)
Foreign aid	0.0124***	-0.00974	0.0237***	0.0223***	0.0175***	0.0211***	0.0222***	-0.00928	-0.00512	-0.00855	-0.00351	-0.00636
	(0.00333)	(0.00622)	(0.00424)	(0.00396)	(0.00456)	(0.00433)	(0.00431)	(0.00876)	(0.00791)	(0.00764)	(0.00822)	(0.00775)
Industrialization	0.000512	0.0260**	0.0108	0.0103	0.00363	0.0234***	0.0161**	0.0592***	0.0547***	0.0319**	0.0665***	0.0657***
	(0.00715)	(0.0102)	(0.00892)	(0.00734)	(0.00959)	(0.00787)	(0.00828)	(0.0139)	(0.0108)	(0.0137)	(0.0152)	(0.0139)
Inflation	0.000753	0.00121	-0.00197	-0.000311	0.000394	-0.00132	-0.00114	-0.00341	-0.00187	0.000202	-0.00276	-0.00190
	(0.00218)	(0.00244)	(0.00135)	(0.00195)	(0.00178)	(0.00167)	(0.00142)	(0.00205)	(0.00164)	(0.00204)	(0.00172)	(0.00166)
Tourism arrivals		0.0203***						0.0547***	0.0498***	0.0532***	0.0507***	0.0483***
		(0.00424)						(0.00608)	(0.00587)	(0.00624)	(0.00536)	(0.00555)
Investment freedom			-0.00975					0.0721				
			(0.0129)					(0.0448)				
Financial freedom				0.0581***					0.142***			
				(0.0110)					(0.0319)			
Trade freedom					0.196***					0.344***		
					(0.0463)					(0.0686)		
Business freedom						0.0872***					0.180***	
						(0.0207)					(0.0442)	
Government integrity							0.0404**					0.150***
							(0.0152)					(0.0369)
Tourism × investment freedom								-0.00474***				
								(0.00140)				
Tourism × financial freedom									-0.00515***			
									(0.00130)			
Tourism × trade freedom										-0.00622***		
										(0.00120)		
Tourism × business freedom											-0.00588***	
											(0.00140)	
Tourism × government integrity												-0.00504***
												(0.00147)
Constant	1.312***	1.012***	0.789***	0.686**	-0.424	0.241	0.399	0.0212	-0.156	-1.560***	-0.484	-0.501
	(0.247)	(0.341)	(0.283)	(0.308)	(0.437)	(0.323)	(0.409)	(0.402)	(0.348)	(0.478)	(0.374)	(0.480)
Economic Freedom Threshold or Tourism Turning Point	na	na	na	na	na	na	na	11.540	9.669	8.553	8.622	9.583
N	549	464	440	445	445	445	445	336	341	341	341	341
R^2	0.779	0.721	0.791	0.712	0.739	0.702	0.799	0.768	0.774	0.717	0.773	0.765

In the same spirit, our finding disagreed with the argument of Nguyen et al. (2020) who documented that the increasing level of tourism can spur international investment which have the power to hasten economic growth and improve income distribution through job opportunities.

Economic freedom has been found to exacerbate income inequality, meaning that an increasing the level of economic freedom is associated with the increase in income inequality by 0.0581 for financial freedom; 0.196 for trade freedom; 0.0872 for business freedom and 0.0404 for government integrity. The positive coefficient of economic freedom suggests that economic freedom contributes a little to economic growth and income distribution (Ahmed et al., 2023). Our result is consistent with Ahmad (2017) who used the GMM estimation technique to examine the impact of economic freedom and democratic on income inequality using a panel of 115 countries over the period 1970–2014. Similarly, our finding agreed with Huynh (2022) who used the generalized method of moments (GMM) estimation technique to investigate the influence of economic freedom on income inequality for a panel of 35 Asian countries over the period 2000-2018. Similar outcomes were found by Pérez-Moreno and Angulo-Guerrero (2016) who argued that government size is associated with the increase in income inequality.

Interestingly, our results show that economic freedom has mitigated the harmful impact of tourism on income distribution. This means that economic freedom interacts tourism to improve income distribution in Africa. Our finding supports the view of Jiang (2023) who argued that economic freedom seems to boost property rights enforcement by extension can propel tourism development. Note that increasing tourism development can improve income distribution. It is important to note that no study has investigated the moderating effect of economic freedom on the tourism-income inequality nexus. Moreover, the author has documented that improving economic freedom can promote regulatory efficiency which can improve tourism development. Similarly, it has been argued that economic freedom seems to promote open market which can help to propel tourism development, which by extension can improve income distribution (Saha et al., 2017). It is important to note that the moderation of economic freedom on the relationship between tourism-income inequality has not been investigated by Saha et al. (2017).

4.3. Robustness check

4.3.1. Robustness check 1

In evaluating the robustness check, we replace market (pre-tax/transfer Gini index)) with market (post-tax/transfer Gini index)). The results are disclosed in Table 4. The results show that the coefficient of economic growth is positive and statistically significant while its square term is negative and statistically significant, meaning that economic growth and income inequality have an inverted U-shaped relationship. Moreover, we find that while industrialization and foreign aid hamper income distribution, internet penetration improves income distribution. Considering our variable of interest, we find that while tourism and economic freedom undermine income distribution, the interaction of these two variables improves income distribution.

4.3.2. Robustness check 2

The robustness check has been evaluated by replacing international tourism arrivals with the international tourism receipts. The results remained unchanged in terms of sign and significance.

4.3.3. Robustness check 3

Further to examine the robustness check we use the generalized method of moment (GMM) estimation technique. The results remained unchanged in terms of sign and significance.

Table 4. The impact of economic freedom and tourism on income inequality (Dependent variable: market (post-tax/transfer Gini index))

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Economic growth	0.412*** (0.0553)	0.562*** (0.0789)	0.450*** (0.0630)	0.430*** (0.0724)	0.569*** (0.0759)	0.516*** (0.0675)	0.525*** (0.0836)	0.648*** (0.0895)	0.633*** (0.0932)	0.782*** (0.0933)	0.667*** (0.0917)	0.728*** (0.102)
Square of economic growth	-0.0213*** (0.00295)	-0.0328*** (0.00429)	-0.0214*** (0.00355)	-0.0209*** (0.00412)	-0.0281*** (0.00437)	-0.0266*** (0.00380)	-0.0266*** (0.00487)	-0.0362*** (0.00533)	-0.0354*** (0.00558)	-0.0427*** (0.00560)	-0.0374*** (0.00541)	-0.0415*** (0.00590)
Internet penetration	-0.00975 (0.00503)	-0.00780 (0.00782)	-0.0113** (0.00465)	-0.00834 (0.00442)	-0.0230*** (0.00468)	-0.00869 (0.00458)	-0.0130*** (0.00505)	-0.00798 (0.00580)	-0.00619 (0.00568)	-0.0214*** (0.00568)	-0.00641 (0.00625)	-0.0107 (0.00599)
Foreign aid	0.0176*** (0.00341)	-0.00880 (0.00587)	0.0279*** (0.00441)	0.0264*** (0.00415)	0.0217*** (0.00469)	0.0249*** (0.00442)	0.0262*** (0.00447)	-0.0104 (0.00917)	-0.00643 (0.00828)	-0.00944 (0.00795)	-0.00482 (0.00853)	-0.00767 (0.00793)
Industrialization	0.000960 (0.00785)	0.0260** (0.0103)	0.0116 (0.00954)	0.0107 (0.00786)	0.00410 (0.0100)	0.0254*** (0.00846)	0.0171 (0.00879)	0.0611*** (0.0141)	0.0577*** (0.0113)	0.0354** (0.0139)	0.0690*** (0.0153)	0.0689*** (0.0140)
Inflation	0.000132 (0.000211)	0.000184 (0.000237)	-0.000149 (0.000132)	0.0000181 (0.000196)	0.0000838 (0.000177)	-0.0000799 (0.000172)	-0.0000602 (0.000144)	-0.000299 (0.000206)	-0.000147 (0.000159)	0.0000491 (0.000200)	-0.000234 (0.000169)	-0.000144 (0.000163)
Tourism arrivals		0.0250*** (0.00402)						0.0595*** (0.00613)	0.0542*** (0.00587)	0.0576*** (0.00622)	0.0551*** (0.00537)	0.0523*** (0.00553)
Investment freedom			-0.00739 (0.0134)					0.0572 (0.0456)				
Financial freedom				0.0599*** (0.0110)					0.124*** (0.0329)			
Trade freedom					0.196*** (0.0473)					0.321*** (0.0706)		
Business freedom						0.0992*** (0.0215)					0.162*** (0.0444)	
Government integrity							0.0457** (0.0163)					0.132*** (0.0366)
Tourism × investment freedom								-0.00408*** (0.00140)				
Tourism × financial freedom									-0.00432*** (0.00131)			
Tourism × trade freedom										-0.00554*** (0.00120)		
Tourism × business freedom											-0.00509*** (0.00138)	
Tourism × government integrity												-0.00403*** (0.00145)
Constant	1.582*** (0.249)	1.256*** (0.323)	1.100*** (0.293)	1.009*** (0.326)	-0.0992 (0.440)	0.500 (0.329)	0.681 (0.427)	0.375 (0.404)	0.200 (0.341)	-1.154** (0.485)	-0.119 (0.364)	-0.166 (0.462)
	na	Na	na	na	na	na	na	14.583	12.546	10.397	10.825	12.977
N	549	464	440	445	445	445	445	336	341	341	341	341
R^2	0.992	0.944	0.900	0.921	0.945	0.914	0.909	0.983	0.987	0.923	0.986	0.987

5. Conclusion and policy recommendation

The tourism industry plays an important role in contributing to economic growth, propelling inclusive growth and enhancing income distribution. This study contributes to the literature on tourism, economic freedom and income inequality by looking at whether economic freedom interacts with tourism to improve income distribution in sub–Sharan African countries, which, to the best of our knowledge, is quite inexistent. The present study is motivated by the need to mitigate the socio-economic consequence of income inequality in the wake of COVID-19 and achieving the ST-EP (Sustainable Tourism - Eliminating Poverty) programme of the UNWTO, which presents tourism as backbone for sustainable development in both developed and developing countries. According to the ST-EP (Sustainable Tourism-Eliminating Poverty) programme of the UNWTO, tourism has the power to propel economic growth, reduce poverty and income inequality and improve inclusive growth. In this regard, we examine the joints impact of economic freedom, including its sub-components (government integrity, investment freedom, business freedom, financial freedom, trade freedom) and tourism on income inequality in sub-Saharan African countries. This study used the panel corrected standard errors (PCSE) and generalized method of moment (GMM) estimation technique for a panel of 37 sub-Saharan African countries to account for the cross-sectional dependence and endogeneity issues, respectively. We find that tourism undermines income distribution. This result might be attributed to the fact that Africa still presents some structural and operational limitations, namely poor infrastructure, vulnerability to external shocks and environmental risks. Moreover, we find that economic freedom worsens income inequality. Moreover, the results reveal that economic freedom interacts tourism to improve income distribution. It means that the role of economic freedom as driver of the tourism-income distribution linkage in Africa remained important throughout.

The forgoing results have some policy implications which might contribute to improve income distribution in Africa. First, Africa leaders should diversify tourism offering by promoting domestic and rural tourism. Moreover, African policymakers should implement a comprehensive policy that can help to improve transport and tourism infrastructure, which by extension can help to attract more tourists. It is important to note that improve transport and tourism infrastructure can help to improve the quality of life for local populations. Further, policymakers should adopt pro-poor tourism initiatives. As the tourism sector requires some skills, African policymakers should invest in education and skills training, which in turn could improve the quality of life for local populations. Policymakers should implement some policies that support local businesses and ensure that economic benefits issued from the tourism industry are

equally distributed within local regions. Moreover, African leaders should commit to good institutional quality as it have the power to promote local business. institutional reforms which could contribute to improve African market in order to attract more tourists and international investment which by extension can improve income distribution through job employments. Second, African leaders should fight again corruption which seems to undermine the market's efficiency. Third, African leaders should improve regulatory quality which plays an important role in attracting international tourist arrivals.

Despite the novelty of the current study, it presents some limitations, which may lead to a further investigation. Due the difference in terms of technology, the amount of tourism receipts, level of income inequality, quality of institutions and level of economic freedom observed among the regions across the globe, we encourage other scholars to examine the moderation of economic freedom on the tourism-income inequality nexus in Asia, Latin America and developed countries.

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Appendix

Table 1A. Cross-sectional Dependence test

Variables	Statistics	p-value
net (post-tax/transfer Gini index) (log)	58.937***	0.000
market (pre-tax/transfer Gini index) (log)	58.941***	0.000
Tour1 (log)	38.880***	0.000
Tour2 (log)	36.803***	0.000
Investment freedom(log)	19.348***	0.000
Financial freedom (log)	10.8438***	0.000
Trade freedom (log)	37.867***	0.000
Business freedom (log)	2.382***	0.000
Government integrity(log)	22.785***	0.000
Economic growth (log)	45.645***	0.000
Industry (log)	4.472***	0.000
Internet penetration (log)	91.353***	0.000
Financial development (log)	34.453***	0.000
Foreign aid (log)	83.327***	0.000
Inflation	12.617***	0.000