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A Revisit of the Natural Resource Curse in the Tourism Industry

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Abstract

Despite a growing literature on the natural resource curse, existing studies are sparse on how real effective exchange rate, political stability and corruption shape the relationship between natural resources and tourism revenues. This study analyses both the direct and indirect effects of natural resources on tourism revenues using a panel 95 countries around the world from 1996 to 2018. First, our results indicate that natural resource dependence negatively impacts tourism revenues. Second, above certain thresholds, natural resources curse the tourism sector through the corruption of exchange rate. These results motivate recommendations aimed at maintaining political stability, reducing cumbersome regulations of tourism activities that generate corruption and the adoption of appropriate exchange rate regime is recommended but this requires further studies.

*Key words***:** Corruption, Dutch diseases, natural resource, political stability, tourism revenues
*JEL Classification***:** Q34, P28, L84

1. Introduction/Background

Theoretically, income from natural resources may provide the necessary revenues to stimulate growth. In fact, governments can use incomes provided by natural resources to fund investments (Brunnschweiler and Bulte, 2008; James, 2015) in infrastructures such as roads, exhibition halls, ICT and others that are attractive to leisure and business tourism. Unfortunately, decades of empirical research have revealed that, resource-dependent nations exhibit poor economic performances relative to those that are not contingent on natural resource (Sachs and Warner 1995; Chandan, 2021 and Pal, 2021). This situation has been

qualified as the curse of natural resources. The curse of natural resource hypothesis has been extended to various aspects of development for more than decades, including income inequality (Kim et al., 2020), happiness (Mignamissi and Kuete, 2021), health outcomes (Wigley, 2017), export diversification (Djimeu and Omgba, 2019), financial development (Bhattacharyya and Hodler, 2014) and many others.

Despite the abundant literature on the natural resource outcomes, little attention has been paid to international tourism demand. Tourism export and more specifically business tourism is an important sector that if properly developed and promoted could contribute to income diversification for countries, especially those that depend much on a single source of foreign exchange earnings. Tourism, while constituting an emerging industry is also particularly relevant for economic prosperity (Cornelissen, 2017). Moreover, the tourism industry is increasingly becoming a relevant fraction of the global economy, especially in the light of a growing population and higher disposable incomes (Poprawe, 2015). The contribution of the tourism industry to worldwide gross domestic product (GDP) rose from 6.1% in 2010 to 9.70% in 2019. Moreover, in 2019, there were over 2.2 billion tourist arrivals and tourism revenues represented about 7.56% of all exports in the world (World Bank, 2019). The business volume for the tourism industry has surpassed or matched that of prominent industries especially as it pertains to automobiles, food products and oil exports (United Nations, 2017). Tourism's exports represent over 41% of all services exports, putting the sector as the highest category of global trade (UNWTO, 2018). Thus, we find it not surprising that tourism has become a viable export-diversification strategy.

A substantial body of literature has examined the drivers of the demand for tourism highlighting the role of conflicts duration (Collier et al., 2009; Arezki and Gylfason, 2013), corruption (Lv and Xu, 2016), political stability (Adeola et al., 2017), digital tools (Kumar and Kumar 2020; Adeola et al. 2018) and exchange rate (Dogru et al., 2017; Habibi, 2017; Porto and al., 2018). However, two observations can be made: First, except Chandan (2021), Forsith (2014), Moyle et al. (2022) that focused most on mineral resources, the literature on the determinants of the demand for tourism has neglected the direct and indirect roles of other natural resources such as oil and Forest. Second, the relative abundant literature on Dutch disease in relation with tourism sector has focused on "tourism induced Dutch disease". In the present study, we support the perspective that, the role of natural resources has not been comprehensively articulated in the extant literature. Drawing the inspiration from the controversial literature on the natural resource curse, this study explores empirically the role

of institutions and exchange rate in the relationship between natural resources and tourism revenues.

The contributions of this study are fivefold. First, existing studies (Cohen and Neal, 2010; Lv and Xu, 2016; Saha and Yap, 2015; Poprawe, 2015; Thompson and Thompson, 2010), have not shed enough light on how corruption mediates the relationship between various natural resources and tourism revenues.

Second, while there is a substantial bulk of literature on the Dutch disease within the context of natural resources, the corresponding literature is sparse on the Dutch disease within the remit of the tourism industry. For instance, Forsyth et al. (2014) focused only on the nexuses among resource-exchange rate-tourism arrivals in Australia, while Chandan (2021) focused on the nexuses among natural resource-corruption-tourism industry across the world. They did not analyze the role of each specific natural resource on the curse, what the present research does.

Third, of the plethora of empirical studies analyzing the channels through which the curse of natural resources operates (Mehlum et al., 2006), most often it is posit that it is the quality of institutions that shapes the outcome of natural resource exploitation on the development of the economy. However, these suppositions have failed to consider that natural resources may rather influence the exchange rate, the first syndrome of the traditional Dutch disease as presented by Sachs and Warner (1995) as well as the quality of institutions (North, 1990; Collier and Hoeffler, 2004) which in turn can impact tourism industry.

Fourth, the abundant literature on Dutch disease symptoms in relationship with tourism has focused on “tourism induced Dutch disease”, that is crowding out the effect of exchange appreciation caused by an increase in tourism demand. This study instead focuses on the natural resource induced Dutch disease.

Fifth, most empirical analyses on the effects of natural resources on tourism industry are for a large majority applied to countries case studies and limited to mineral resources with no emphasis of other natural resources. This study integrates other natural resources in the analyses and adapt the panel method that will enable to formulate common tourism policies.

To achieve our objectives, the rest of this research is organized as follows. Section two presents the literature review. Section three exposes the methodological framework. Section four presents the empirical evidence and discussion. Section five provides concluding remarks and policy suggestions.

2. Literature review

Three visons emerge from the literature on the curse of natural resources. The first is the curse one defended by (Sachs and Warner, 1995). The second vision is the blessing one (Smith, 2015; Arin and Braunfels, 2018; Jaimes and Gerlagh, 2020; James, 2015). The third vision by Aspergis and Payne (2014) defends that the curse or the blessing of natural resources depend on various factors among which the quality of institutions (Acemoglu et al., 1997, Apergis et al. 2014 Collier et al., 2009; Arezki and Gylfason, 2013), the exchange rate (Arezki and Ismail, 2013, Van Der Ploeg and Poelhekke, 2017), the state capture by powerful groups (Tornell and Lane, 1999), the channel of employment (Sachs and Warner, 1995). From this third vision, dependence or abundance of natural resources can become a blessing or a curse, depending on the aforementioned factors. In fact, natural resources exploitation or dependence may breed authoritarianism, boosts risks, the duration of political power, conflicts and corruption (Collier et al., 2009; Arezki and Gylfason, 2013). According to the narrative, it may also lead to the appreciation of exchange rate that in turn can create an adverse effect on other sectors of the economy, by reducing for instance tourist attractiveness in these countries.

In this study, we focus on the channel of exchange rate known as the Dutch disease syndrome (Sachs and Warner, 1995; Apergis et al., 2014) and the channel of institutions (Acemoglu et al., 1997). The theoretical framework based on the role of exchange rate and institutions in the natural resource-tourism nexus is drawn in Fig. 1.

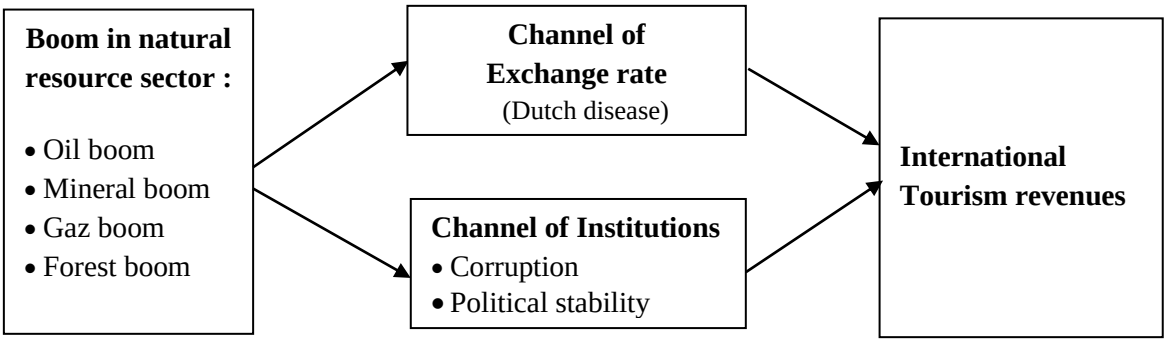

Fig. 1. Transmission mechanisms of the effects of natural resources on tourism demand

2.1 Dutch disease syndrome

Globally speaking, the Dutch disease symptom occurs within the traded goods sector and refers to the crowding out effect of a booming subsector-sector on a lagging sub-sector. The booming sub-sector may be tourism. In this case, an expansion in the tourism sector can create shock effects in the other sectors of the economy. This effect is called “tourism induced

Dutch disease". The booming sector may be instead natural resource. The expansion of natural resource creates shock effects on economy including tourism sub-sector. This effect is called "natural resource induced Dutch disease".

The tourism induced Dutch disease has been abundantly studied in the empirical literature, among other by Chao et al. (2006), Nowak and Sahli (2007), Capó et al. (2007), Holzner (2011), Burgisser and Carlo (2022), Deng and Ma (2014) and (Dwyer et al., 2014). In the same line, the aforementioned authors stress that, the tourism research literature almost totally ignored the situation where a destination's tourism industry is disadvantaged by an export boom in another sector of the economy such as natural resources. A boom within a country's natural resource sector may crowd-out industrial activities among which tourism.

Despite this scarcity, studies undertaken by Tourism Research Australia (2013) have certify the existence of Dutch disease symptom. Forsyth et al. (2014), Pham et al. (2015), Dwyer et al. (2014), Dritsakis (2004), Stauvermann et al. (2018) and Mironov and Petronenevich (2015) found an indirect negative and significant relationship between mineral resources and tourists arrivals mediated by the exchange rate.

The real exchange rate depreciation is positively associated with tourism arrivals and receipts. Chao et al. (2013) and Patsouratis et al. (2005) modelled the impact of Australia's mining boom on tourism and found evidence of the Dutch disease syndrome. Similarly, Karimi et al. (2015) have established that inflation and real exchange rates have negative nexuses with the demand for international tourism. Kamel (2016) in a study on Tunisia established that the real exchange rate is a relevant determinant in elucidating long-term overnight stays within the country while, Adeola et al. (2018) in a study on 44 African countries established that real exchange rate, is a significant driver of international tourism.

2.2 The institutional channel

The channel of institutions defended by Acemoglu et al. (1997), posits that natural resource weakens political stability and accentuates corruption which in turn may discourage tourists inflow. Corruption refers to the degree by which public power is exercised to extract private gain, involving state capture by elites as well as private interests. From an institutional perspective, further literature suggests that the discovery and the exploitation of natural resources engenders risks, increases political power duration, favors corruption, and conflicts duration (Collier et al., 2009; Arezki and Gylfason, 2013). According to Fors and Olsson (2007), there is reluctance by elites in countries that are wealthy in terms of resources to tailor institutions to oversee and sanction rent-seeking behavior. The only most recent study of

Chandan (2021) questions the relevance of Dutch disease to the tourism sector and finds the curse of natural resource on touristic income through corruption across the world.

Corruption and political stability may also have direct effects on the tourism industry. The empirical literature in the tourism field is not clear-cut on the relationship between corruption and tourism. Corruption can encourage business by increasing the exchange of money and stimulating the business environment which ends up improving the demand for tourism (Poprawe, 2015). Also, people can work harder when they know that they can get bribes as a result of their work (Saha and Yap, 2013). Bicchieri and Duffy (1997) argue that corruption can speed up processes and sidestep difficult and cumbersome regulations. Das and DiRienzo (2010) find that a country's image is negatively affected by corruption and the corresponding negativity directly affects the number of potential tourists. Corruption in the form of bribery is an extra cost, which acts as a tax that potential tourists do not want to pay (Lv and Xu, 2016).

Collier and Hoeffler (2004) and Collier (2009) found that the dependence oil and mineral resources is associated with political instability such as civil war. Later on, Adeola et al. (2017) in African countries found that political stability and the lack of violence are significant determinants of international tourism. The negative effect of political instability on exports is reported by many authors such as Khan et al. (2015). More precisely, political instability, civil unrest and war can boost the risk perception at a destination (Lepp, 2003) which generates negative publicity engendering inevitably, a reduction in the arrival of tourists (Thapa, 2003).

Moyle et al. (2022) found a direct negative relationship between natural resource intensity on tourism arrivals in a panel of 190 countries around the world. He also evidenced a negative indirect relationship mediated by governance.

2.3 Other drivers of tourism demand

Various other factors influence tourism demand. The positive effect of economic growth on tourism demand has been found by Panahi and Nasibpara (2018) Adeola et al. (2018) and Tavares (2020). Tourism demand is also positively influenced by the financial development (Tavares, 2020; Nyasha and Odhiambo, 2021, Khanna and Sharma, 2020; Gao et al., 2022; Ibrahim, 2021), the information communication technology (Kumar and Kumar, 2020; Adeola and Evans, 2020). Tsokota et al. (2017) draw the attention on the fact that, having ICTs without coordination, integration and collaboration will not sustain development

of tourism sector. Goldfarb and Tucker (2019) support that digital tools directly affect the tourism sector through three main types of costs: search costs, tracking costs and verification costs.

Inflation is also cited in the literature as a positive determinant of tourism demand(Dwyer and Forsyth, 2002; Adeola, 2018; Nyasha and Odhiambo, 2021). However, few years before, Schiff and Becken (2011) concluded that in the traditional segments such as those in the United States of America (USA) and Australia, tourism arrivals and consumption were less-price sensitive, whereas the Asian markets are comparatively more sensitive to prices.

To sum up this literature review, one can observe that the natural resource induced curse has not been empirically tested enough in the tourism industry. The effects of other natural resources on tourism demand have retain less or no attention in empirical analyses. Moreover, the role of the real effective exchange rate (REER), corruption and political stability as channels through which natural resources impact tourism demand is not yet clear-cut. The empirical analyses that follow complement the literature on the issue.

3. Empirical methodologies, data and descriptive statistics

3.1 Empirical methodologies

Three stages are adopted in our econometric strategy. In the first stage, the effect of the natural resource and REER on touristic income is estimated while controlling for the impacts of other variables identified in the literature. We decompose the overall natural resources into oil, mining and forest rents. We then use them as baseline results to detect the existence of the natural resource curse and the effects of REER appreciation or depreciation on the touristic income. In the second stage, we explore the possible mediating role of natural resource in the relationship between tourism income and REER on the one hand and the relationship between tourism income and institutions on the other hand. In the third stage, we run robustness analyses by the changing estimation approach as well as by using an alternative measure of natural resource wealth and alternative measure of tourism income

3.1.1 Estimating the direct effect of natural resource and REER on tourism revenues: The Baseline specification

We estimate the effect of the REER, political stability, corruption and natural resources on tourism revenues while accounting for the other variables identified in the

literature (Schiff and Becken, 2011; Goldfarb and Tucker, 2019; Adeola and Evans, 2020). The following Equation (1) is specified to investigate such effect:

$$Tour_{it} = \beta_0 + \beta_1 Rent_{it} + \beta_2 REER_{it} + \beta_3 Polstab_{it} + \beta_4 Cor_{it} + \beta_5 X_{it} + \boldsymbol{\theta}_t + \lambda_i + \boldsymbol{\varepsilon}_{it} \quad (1)$$

Where i = 1… n is any individual country that make-up the sample and t = 1…, t is the time period. β_0, β_1, β_2, β_3, β_4 and β_5 represent the parameters to be estimated. The error term ε_{it} is supposed to be white-noise identically and normally distributed. θ_t are time specific effects captured, λ_i are the country specific effect, and ε_{it} is the stochastic error term.

The dependent variable ($Tour_{it}$) is the tourism revenues in millions of US dollars. $Rent_{it}$ is the total natural resource rent.

From the concentration of production and income patterns, many authors make the difference between diffuse resources (forest resources) and point resources (oil and mineral resources). Only countries dependent on point resources face exacerbated economic and social divisions and diminished institutional capacity (Isham et al., 2005). Additionally, Tadadjeu et al. (2023a) support the perspective that dependence on point resources is negatively associated to access to water and sanitation when compared with dependence on diffuse resources. Other authors, namely Cockx and Francken (2016) and Yilanci et al. (2021) support the view that the resource curse is valid only when it concerns point resources. To account for these possible differentiated effects, natural resource rent is further divided into oil rent (Oil_{it}), mineral rent ($Mine_{it}$) and forest rent (For_{it}). Each type of natural resource respectively replaces total natural resource in Equation (1) to appreciate the effects on tourism revenues. Based on the curse of natural resource hypothesis, we posit that natural resources in general and more specifically point resources are negatively associated with tourism revenues while diffuse resources are positively associated to forest resource. $Reer_{it}$ is the real effective exchange rate, $Polstab_{it}$ is the political stability index and Cor_{it} is the control of corruption.

X_{it} is the vector of control variables documented in the extant literature covered in Section 2. This vector is composed of the financial institution efficiency (Fie_{it}), inflation ($inflation_{it}$) and internet penetration ($Internet_{it}$). Data are extracted from the World Development Indicators, the International Monetary Fund (IMF) and the World Governance Indicators (WGI) data bases.

3.1.2 Exploring transmission channels.

This paper also aims at exploring the role of natural resources in the tourism-REER, tourism-political stability and tourism-corruption nexuses. We can therefore model these

transmission channels by successively integrating interaction terms in Equation (1) and obtain the following regression models.

$$Tour_{it} = \beta_0 + \beta_1 Rent_{it} + \beta_2 REER_{it} + \beta_3 Polstab_{it} + \beta_4 Cor_{it} + \beta_5 (Rent_{it} \times REER_{it}) + \beta_6 (Rent_{it} \times Polstab_{it}) + \beta_7 (Rent_{it} \times Cor_{it}) + \beta_8 X_{it} + \theta_t + \lambda_i + \varepsilon_{itt} \quad (2)$$

Deriving Equation (2) with respect to REER ($Reer_{it}$), political stability ($Polstab_{it}$) and corruption (Cor_{it}) gives the following Equation (3) that represents the marginal effects of REER, political stability and corruption on tourism revenues:

$$\frac{\partial Tour_{it}}{\partial (Var_{it})} = \beta_i + \beta_j \times NRs_{it}, \quad (3)$$

Var_{it} = $Reer_{it}$, $Polstab_{it}$, Cor_{it} and NRs_{it} = $Rent_{it}$; Oil_{it}; $Mine_{it}$

The threshold values of natural resources can therefore be determined by solving equation (3). These threshold values of natural resources are:

$$NRs_{it} = \frac{\beta_i}{\beta_j} \qquad (i, j) = \{(2;5), (3;6), (4;7)\} \quad (4)$$

These are values below or above which the corresponding natural resource positively or negatively affects tourism demand.

The Dutch disease symptom is diagnosed if β_5 is negative. In other words, the appreciation of the REER reduces the effect of corresponding natural resource on tourism.

The natural resource curses tourism industry through political stability and corruption if β_6 and β_7 are negative. In other words, natural resource reduces the effect of the corresponding institutional variables on tourism.

3.2 Estimation procedures

Several panel regression techniques are employed to estimate Equations (1) and (2). We account for endogeneity of independent variables by conducting the two-step system Generalized Method of Moments (GMM) estimation technique. Roodman (2009) and Tchamyou (2019) stress that the GMM estimation technique is appropriate when the number of groups or countries (that varies from 27 to 105) exceeds the corresponding time interval within each group (i.e., 23). Additionally, the first lag and level series of the outcome variable or the tourism revenues are highly correlated. Finally, the involvement of time fixed effects accounts for the unobserved heterogeneity whereas the consideration of instruments tackles the corresponding issue related to simultaneity or reverse causality.

For robustness check, we complement the econometric analyses using the panel corrected standard error (PCSE) estimator that account for serial autocorrelation and heteroscedasticity. We also use alternative measures of natural resource wealth (the natural

resource abundance) and alternative proxy of tourism revenues that is the tourism revenue per tourist.

3.3 Data and descriptive statistics

Data are from various sources and related to 95 countries[1] around the world over the period 1996 to 2018. The list of countries is presented in Table 8. The choice of data and time period is dictated by their availability. Table 1 summarizes data sources, nature and descriptive statistics.

Table 1: Data sources and descriptive statistics

Variables	Codes	Source	Proxy	Signs	N	Min	Max	Mean	Std. Dev.
Tourism revenues	Treceipts	WDI	Tourism revenues in percentage of total exports	Na	2164	0.081	84.33	16.25	16.12
Tourism Revenues per tourist	Treceiptvisit	Author calculations from WDI data	Tourism revenues per tourists in thousands of US dollars	Na	2095	0.00446	96.865	0.8105	5.3470
Financial institutions efficiency	FIE	IMF	It evaluates the ability of financial institutions to provide financial services at low costs,	+	2932	0.08	0.87	0.58	0.12
Forest rent	Forent	WDI	Revenues from the export of forest resources as a percentage of total export earnings,	-	2973	0.00	40.40	1.99	4.26
Inflation rate	Inflation	WDI	Consumer price index	-	2836	-18.10	4145.10	9.52	83.07
Mineral rents	Minrent	WDI	Revenues from the export of minerals and metals, as a percentage of total export earnings,	-	2974	0.00	25.95	0.69	2.34
Oilrent	Oilrent	WDI	Revenues from the export of fuels as a percentage of total export earnings,	-	2974	0.00	58.24	2.86	7.59
Natural resource abundance	Rentabun	WDI	Value of Natural resources extracted divided by total population O'Connor et al. (2018)	-	2040	0.0980	26798.45	587.164	2262.57
Oil Resource abundance	Oilabun	WDI	Amount of oil resources extracted multiplied by the unite price divided by total population O'Connor et al. (2018)	-	1772	0.0031	26524.01	762.141	2546.393
Mineral resource abundance	Minabun	WDI	Value of mine resources extracted divided by total population O'Connor et al. (2018)	-	1078	0.0009	2551.58	67.445	245.820
Forest resource abundance	Forabun	WDI	Amount of forest resources divided by total population O'Connor et al. (2018)	-	2212	0.0009	555.36	34.316	57.2137
Real effective exchange rate	REER	IMF	a measure of the value of a currency against a weighted average of several foreign currencies	-	2978	32.88	6206.78	106.72	116.41
Total NR rent	Rent	WDI	Revenues from the export natural resources as a percentage of total export earnings,	-	2965	0.00	58.98	6.047	8.88
Corruption index	Cor	WGI	Corruption control index	+/-	2906	-1.72	2.46	0.025	1.02
Political stability	Polstab	WGI	Political stability index measures perceptions of the likelihood of political stability and/or absence of politically motivated violence, including terrorism.	+	2906	-2.84	1.76	-0.05	0.94
Internet penetration	Internet	WDI	Percentage of population with access to internet, It is a proxy of digital platform adoption	+	2883	0.00	102.43	27.40	28.96

Note: WDI is World Development Indicator, IMF is International Monetary Funds and WGI is World Governance Indicator; **Na = not applicable**

[1]List of countries :

Table 2 presents correlation coefficients between variables. For a large majority, correlation coefficients are weak (lower than 0.5). The absence of colinearity is confirmed by the determination of the variance inflation factor (VIF) for which values are lesser than 10 as recommended by Gujarati (1995). There is a negative and significant correlation between on one the hand, natural resource irrespective of the type and REER and on the other hand, between REER and touristic income: this enables us to suspect the Dutch disease syndrome. Results of Table 2 also indicate that, natural resources irrespective of the type, are negatively correlated with the tourism income, evidencing therefore the natural resource curse hypothesis.

Table 2: Correlation analyses

	Treceipt	Treceipvis	FIE	Reer	Cor	Polstab	Internet	Inflation	Rent	Forent	Oilrent	Minrent	Minabun	Oilabun	Forabun	Rentabun
Toureceipt	1															
Treceipvis	0.13	1														
FIE	-0.04	-0.14	1													
Reer	0.1	-0.05	0.02	1												
Cor	0.07**	-0.24	0.49**	-0.03**	1											
Polstab	0.18	-0.19	0.29	0.01*	0.76**	1										
Internet	-0.06**	-0.28	0.45**	0.07	0.58**	0.4	1									
Inflation	-0.04	-0.01	-0.04	-0.11	-0.07**	-0.09	-0.06**	1								
Rent	-0.28**	0.11**	-0.07**	0.04**	-0.32**	-0.23**	-0.16**	0.13**	1							
Forent	-0.07	0.37	-0.32**	0.03	-0.31**	-0.22	-0.32**	0.02*	0.19	1						
Oilrent	-0.25**	-0.09	0.03**	0.01**	-0.16**	-0.12	-0.02	0.14**	0.88	-0.12**	1					
Minrent	-0.07**	0.14	-0.09**	0.02*	-0.18**	-0.18	-0.13**	0,0001	0.11	0.26**	-0.07**	1				
Minabun	-0.04**	-0.01*	-0.02	0.001*	-0.09**	-0.08*	-0.03**	0,0001	0,0001	-0.01	-0.05**	0.58	1			
Oilabun	-0.16**	-0.06**	0.17	0.02*	0.07	0.08**	0.1	0,0001	0.63**	-0.11	0.73**	-0.06	-0.05	1		
Forabun	-0.12**	-0.06**	0.21	-0.06	0.31**	0.21**	0.24	-0.01	-0.1	0.14**	-0.09	-0.04	-0.04	-0.06	1	
Rentabun	-0.17*	-0.08*	0.2	0.02*	0.10*	0.1**	0.15	0,00	0.63	-0.12	0.72**	-0.06	-0.04	0.99*	-0.05	1

*Notes: Robust standard errors in parentheses, * Significant at 10%. ** Significant at 5%. *** Significant at 1%.*

4. Results and discussions

4.1 Baseline results

We first verify if REER and institutions affect the tourism industry. We therefore estimate Equation (1) using the GMM estimators. All our GMM estimates passed the standard statistical tests for this type of regressions as shown in Table 3. The Hansen test does not reject the null hypothesis on the validity of instruments while the AR (2) test does not show evidence of second-order autocorrelation.

A one-point appreciation of the REER results in 0.008-percentage point increase in tourism income. These results contradict those of Forsyth et al. (2014) and Pham et al. (2015)

who found that rapid appreciation of exchange rate resulted in the contraction of the tourism industry. The positive effect of REER on tourism income may be explained by the specificity of tourism service purchase. In fact, tourism expenditures are most often two steps decisions. In the first step, the decision and the choice to travel seems to be more sensitive to the exchange rate prevailing at the moment when the tourist decides on destination. Tourists are risk adverse and they generally pay 90 days in advance for the hotels and travel ticket once the destination is chosen (U.S. office of travel and tourism industries 2009). This first choice is more influenced by the exchange rate and inflation. Right after this first step, they anticipate the exchange rate appreciation of country destination currency by protecting themselves against exchange rate risk. They acquire in advance currencies of destination countries that tend to appreciate. Benefits enjoyed from this rational anticipation enable them to instead increase their expenditures in host countries. Also, as the business tourists number grows, they tend to spend more on hotels, restaurants and leisure activities (Clark, 2004). These expenditures are three times more with respect to an average leisure tourist (Campiranon and Arcodia, 2008) and furthermore, business tourists pay more for the same facility as the leisure tourists (Swarbrooke and Horner, 2001).

Coming to natural resources, a one percentage point increase in natural resource rent results in a 0.113 percentage point decrease in touristic income. We further appreciate the effects of each type of natural resource on tourist industry. We therefore use Equation (1) where the natural resource (Rent) is disaggregated into oil rent, mineral rent and forest rent. Table 3 summarizes the effects of each natural resource on tourist receipt. Results indicate that, a one percentage point increase in oil, mineral and forest rents results respectively in a 0.096 percentage point, 0.448 percentage point and 0.067 percentage point decrease in tourism revenues, respectively.

Table 3: Natural resource institutions and tourism revenues (GMM estimators)

Dependent Variable: Tourism revenues	Resource countries	Oil resource countries	Mine resource exporting countries	Forest resource exporting countries
TreceiptsL1	0.581***	0.525***	0.461***	0.589***
	(0.001)	(0.004)	(0.013)	(0.001)
Rent	-0.113***			
	(0.002)			
Oil		-0.096***		
		(0.005)		
Mine			-0.448***	
			(0.037)	
For				-0.067***
				(0.003)
REER	0.008***	0.001	-0.007**	0.021***
	(0.000)	(0.001)	(0.003)	(0.001)
Cor	-0.049***	-0.371*	-0.712	-0.665***
	(0.018)	(0.210)	(0.623)	(0.044)
Polstab	0.912***	0.315***	0.697***	0.934***
	(0.015)	(0.026)	(0.266)	(0.018)
FIE	1.074***	0.532**	1.217	-0.748***
	(0.084)	(0.239)	(1.076)	(0.116)
Internet	0.016***	-0.041***	0.0001	-0.002***
	(0.000)	(0.001)	(0.003)	(0.000)
Inflation	-0.005***	-0.005***	-0.007***	-0.007***
	(0.000)	(0.000)	(0.000)	(0.000)
Cons	5.143***	6.692***	7.554***	4.441***
	(0.154)	(0.239)	(1.194)	(0.212)
Nber of groups	95	54	29	91
Nber of instruments	71	48	22	70
AR(1)	0.000	0.000	0.013	0.000
AR(2)	0.57	0.450	0.558	0.763
Hansen	0.583	0.999	1.000	0.817
Wald	4213.26***	4939.50***	3874.60***	4450.83***
VIF	1.61	1.59	1.33	1.60

*Notes: Robust standard errors in parentheses, * Significant at 10%. ** Significant at 5%. *** Significant at 1%.*

Globally natural resources are negatively associated with the tourism income. The baseline results confirm the curse of natural resource in the tourism industry through oil mine and forest resources as presented by Sachs and Warner (1995). These results confirm the curse of natural resources applied to tourism industry as found by Kraal (2019), Moyle et al. (2022) in the mining sector but who used tourists' arrivals as outcome variable. The magnitude of the effects varies according to natural resources. Mine resource exploitation seems to be more harmful for tourism revenues than oil and forest resources.

We now focus on the effects of institutions on tourism industry. The quality of institutions is captured first by corruption. A one-point increase in the control of corruption index (that corresponds to reduction of corruption) reduces tourism income by 0.049 percentage point in natural resource countries. The same point increase in corruption also

reduces tourism revenues in oil countries by 0.371 percentage point and tourism revenues in forest countries by 0.665 percentage point. This means that corruption is a threat for tourism revenues and corroborate the views of Poprawe (2015), Saha and Yap (2015), Bicchieri and Duffy (1997). The results contradict the views of Das and DiRienzo (2010) and Lv and Xu (2016).

The quality of institutions also captured by political stability shows that a one-point increase in political stability results in a 0.912 percentage point increase in tourist receipts. These results are in line with those of Khan et al. (2015) and Adeola et al. (2017) and who found that political stability are significant determinants of international tourism.

We turn to the effects of other control variables on tourism industry. A one-point increase in financial intermediation efficiency increases the touristic income by 1.074 percentage point.

The internet also positively impacts tourism revenues in natural resource countries but its effects are negative in oil and forest resource countries. These findings are consistent with a strand of the extant literature (Goldfarb and Tucker, 2019; Adeola and Evans, 2020; Kumar and Kumar, 2020) which concludes on a positive effect of the internet use on the tourism industry.

A one percentage point increase in the inflation rate results in a 0.005 percentage point decrease in tourism revenues. The same point increase in inflation has the same positive effect on tourism revenues in oil countries (-0.005), mine resource countries (-0.007) and forest countries (-0.007). Once tourists arrive at chosen destinations, the high cost of living may constrain them to reduce their expenditures.

Having presented detailed evidence of the existence of the political and resource curses, we continue our analyses by further exploring the mechanisms underlying such a curse, hence the analysis of transmission channels.

4.2 The indirect effect of natural resource on tourism revenues: the marginal effects

4.2.1 The tourism industry-REER nexus: the role of **natural resource**

Although the previous results have enabled major advances in the understanding of the empirical effects of natural resources, institutions and REER on the tourism industry, it remains important to empirically explore the mechanisms through which natural impedes or improves the performance of the tourism industry. This is done through Equation (2). To simplify our presentations, the global results obtained from the regression in Equation (2) are presented in Table 9 of the Appendix. We restrict our comments to the marginal effects of

REER, natural resource, Oil, mine and forest rents extracted from Table 9 in the Appendix. These marginal effects presented in Table 4 are relevant in explaining the Dutch disease syndrome. Thresholds[2] of natural resources are calculated using Equation (3).

Concerning marginal and interaction effects which are our main concern in this study, the marginal effect of REER on tourist receipts in natural resource countries is 0.023 – 0.002×Rent. The coefficient of interaction effect of exchange rate and natural resource rent on tourism revenues is negative and significant (-0.002). This means that, the exploitation of natural resources reduces the positive effect of exchange rate appreciation on tourism revenues. In other words, the Dutch disease symptom (that is the negative effect of exchange rate appreciation on tourism revenues caused by natural resource exploitation) can occur if the natural resource rent exceeds the threshold value of 11.5% (0.023/0.002).

Table 4: Marginal and interactions effects of REER and the quality of institutions on tourism revenues (GMM estimator)

Dependent Variable: Tourism revenues	Marginal effects of exchange rate		Marginal effects of corruption		Marginal effects of political stability	
natural resource countries	Rent×REER	-0.002*** (0.000)	Rent×Cor	-0.070*** (0.010)	Rent×Polstab	0.037*** (0.003)
	REER	0.023*** (0.001)	Cor	1.226*** (0.095)	Polstab	0.553*** (0.026)
	Thresholds (%)	11.5	Thresholds	17.51	Thresholds	None
Oil exporting countries	Oil×REER	-0.001*** (0.000)	Oil×Cor	-0.045** (0.020)	Oil×Polstab	0.030*** (0.009)
	REER	0.008*** (0.001)	Cor	0.110 (0.432)	Polstab	-0.028 (0.079)
	Thresholds (%)	8	Thresholds (%)	None	Thresholds (%)	None
Mine exporting countries	Mine×REER	-0.001 (0.009)	Mine×Cor	0.093 (0.116)	Mine×Polstab	-0.021 (0.081)
	REER	-0.002 (0.009)	Cor	1.465 (1.141)	Polstab	0.030 (0.650)
	Thresholds (%)	Any value > 0	Thresholds (%)	None	Thresholds (%)	None
Forest resource exporting countries	For×REER	-0.003*** (0.000)	For×Cor	-0.028*** (0.006)	For×Polstab	0.016*** (0.000)
	REER	0.025*** (0.001)	Cor	0.318*** (0.024)	Polstab	0.737*** (0.023)
	Thresholds (%)	8.33	Thresholds (%)	11.35	Thresholds (%)	None

*Notes: Robust standard errors in parentheses, * Significant at 10%. ** Significant at 5%. *** Significant at 1%.*

We also analyze the differentiated effects of each type of natural resource on tourism income. The marginal effect of REER on tourism income in oil exporting countries is 0.008 – 0.001×Oil. The coefficient of interaction effect of exchange rate and natural resource rent on tourism revenues is also negative and significant (-0.001). The exploitation of oil resources

[2]Thresholds represent the maximum or minimum percentage of natural resources above or under which natural resources have a significant impact **on** the relationship between tourism and REER, corruption and political stability.

reduces the positive effect of exchange rate appreciation on tourism revenues. Dutch disease symptom can occur in oil countries if the natural resource rent exceeds the threshold value of 8%.

The marginal effect of REER on tourism revenues in mine exporting countries is not statistically significant. The Dutch disease is not evidenced as far as tourism revenues are concerned in mine exporting countries. These results contradict findings of forsyth (2014), Dwyer et al. (2014), Dritsakis (2004) Stauvermann et al. (2018) and Mironov and Petronenevich (2015) who found an indirect negative and significant relationship between mineral resources and tourists arrivals mediated by the exchange rate. It is not unimportant to note that their analyses were based on tourism arrivals not tourism revenues as it is the case of the present study.

The marginal effect of REER on tourism revenues in forest resource countries is 0.025 -0.003×For. The coefficient of interaction effect of exchange rate and forest resource rent on tourism revenues is once more negative and significant (-0.003). The exploitation of oil resources reduces the positive effect of exchange rate appreciation on tourism revenues. Dutch disease symptom can occur in forest resource countries if the forest rent exceeds the threshold value of 8.33%.

These findings suggest that relevant resource policy thresholds exist to mitigate the role of exchange rate appreciation on tourism demand. We can therefore conclude that tourism revenues in oil and forest resource countries may suffer from the Dutch disease syndrome as apparent in a strand of extant literature (Corden and Neary, 1982; Sachs and Warner, 1995; Apergis et al., 2014).

In the light of the above, it is important to note that the interactions are tailored such that the main moderator (i.e., Rent) is interacted with various channels (i.e., REER, Cor & Polstab). This procedure is consistent with extant contemporary interactive regressions literature (Asongu and le Roux, 2023; Tadadjeu et al., 2023b). Moreover, thresholds of the moderator are further computed in order to avoid the pitfall of interactive regressions documented in Brambor et al. (2006). In essence, other thresholds techniques do not require interactive regressions and are based on balanced panel data (e.g., Hansen, 1999). The unbalanced panel data of the study motivated the choice of interactive regressions from which thresholds are computed, consistent with contemporary interactive regressions literature (Asongu and le Roux, 2023; Tadadjeu et al., 2023b).

4.2.2 The tourism industry-corruption nexus: the role of natural resources

The marginal effect of the corruption on touristic income is 1.226 - 0.070×Rent. The coefficient of interaction effect of corruption and natural resource rent on tourism revenues is negative (-0.070). Said differently, natural resource mitigates the positive effect of corruption on tourism revenues. But when natural resource rent exceeds the threshold value of 17.51%, the effect of corruption on tourism revenues become negative. These results show that natural resource exploitation beyond the aforementioned threshold may exacerbate corruption that will be pernicious for tourism revenues. Fighting corruption when the natural resource rent is below the threshold will be counterproductive.

The marginal effect of corruption on tourism income in oil exporting countries is -0.045×Oil. The coefficient of interaction effect of corruption and oil rent on tourism revenues is negative and significant (-0.045). Oil resource aggravates with no limit, the negative effect of corruption on tourism revenues. There is therefore a need to tackle corruption in oil resource countries if they need to develop their tourism sector.

The marginal effect of corruption on tourism revenues is not significant in mining countries. Hence, mining rents do not shape the relationship between touristic income and corruption. These results once more contradict those of Moyle (2022), Joppe (2018), Venable (2016), Knutsen (2017) and Zhang and Moffat (2015) who found an indirect negative and significant relationship between mineral resources and instead tourists arrivals mediated by the governance.

The marginal effect of corruption on tourism income in forest resource exporting countries is 0.318 - 0.028×For. The coefficient of interaction effect of corruption and forest rent on tourism revenues is negative and significant. Forest rent therefore mitigates the positive effect of corruption on tourism revenues in forest resource countries. However, above the threshold value of forest rent of 11.35%, the effect of corruption on tourism revenues becomes negative.

To sum up, tourism revenues in resource rich countries and more specifically oil and forest resource countries may suffer from institutional curse. In other words, corruption is one of channels through which natural resources negatively impact tourism revenues. Globally, when the natural resource rent is less than the threshold value of 17.51%, fighting corruption will be counterproductive. This conclusion is consistent with findings of Bicchieri and Duffy (1997). But above the preceding threshold, corruption becomes pernicious to tourism revenues and this partially? the hypothesis of the “oil in the wheels” that defends the positive effect of corruption on development. Coming to each type of natural resource, we note that

corruption negatively mediates with no threshold, the relationship between oil resource and tourism revenues. Mineral rent does not mediate the relationship between mineral resource and tourism revenues. Therefore, relevant natural resource thresholds exist to mitigate the effects of corruption on tourism demand. We can therefore conclude that tourism revenues in oil and forest resource countries may suffer from institutional curse. These results align with those of Chandan (2021) who evidenced the curse of natural resource on touristic industry through corruption. The results are also in line with those of Das and DiRienzo (2010) who found that corruption negatively affects a country's image and in so doing, it directly affects the tourism income. They are also in line with findings of Lv and Xu (2016) who show that potential tourists do not want to pay the additional costs that corruption brings up.

4.2.3 The tourism industry-political stability nexus: the role of natural resources

The marginal effect of political stability on tourism revenue in natural resource exploiting countries is 0.553 + 0.037×Rent. The coefficient of the interaction effect of political stability and natural resource on tourism revenues is positive and significant (0.037). Therefore, the natural resource accentuates with no threshold, the positive effect of political stability on tourism revenues.

The marginal effect of political stability on tourism revenue in oil exploiting countries is 0.030×Oil. The coefficient of the interaction effect of oil rent and political stability on tourism revenues is positive and significant (0.030). The political stability positively mediates the relationship between oil resources and tourism revenues.

The marginal effect of the political stability on tourism income in forest resource countries is 0.737 + 0.016×For. The coefficient of the interaction effect of forest rent and political stability on tourism revenues is positive and significant (0.016). The political stability positively mediates the relationship between forest resource and tourism revenues.

Globally these results corroborate on the one hand, the views of Collier and Hoeffler (2004) and Collier (2007) according to which dependence on oil and mineral resources is associated with political instability such as civil war which later on may negatively affect exports including tourism industry (Adeola et al., 2017; Khan et al., 2015).

4.3 Robustness check

4.3.1 Robustness to alternative estimation techniques: The PCSE Estimator

As a first check for robustness, we use the Panel-Corrected Standard Error (PCSE) estimator to estimate regression coefficients of Equations (2). The PCSE estimator compared with OLS procedure deals with the issues of serial autocorrelation and heteroscedasticity. In

Table appendix 10, we present the results of OLS estimate. The results confirm the presence of heteroscedasticity as the Breusch–Pagan/Cook–Weisberg test for heteroskedasticity show. The results of Equation (2) estimations using PCSE estimation method are presented in Table 11 in the Appendix from which we extract and summarize the marginal effects presented in below Table 5. The signs of the coefficients associated to REER and political stability remain unchanged though the magnitudes of coefficients change. The marginal effect of REER on touristic income in natural resource countries is 0.109 – 0.005×Rent. The marginal effect of REER on tourism income in oil exporting countries is 0.034 – 0.003×Oil. The marginal effect of REER on tourism income in mining exporting countries is 0.140 – 0.022×Mining. The marginal effect of REER on tourism income in forest resource exporting countries is 0.033 – 0.002×For.

Table 5: Marginal and interactions effects of REER and the quality of institutions on tourism income (PCSE estimator)

Countries	Marginal effects of exchange rate		Marginal effects of corruption		Marginal effects of political stability	
natural resource exporting countries	Rent×REER	-0.005*** (0.002)	Rent×Cor	-0.265*** (0.045)	Rent×Polstab	0.370*** (0.049)
	REER	0.109*** (0.025)	Cor	5.373*** (0.441)	Polstab	8.377*** (0.710)
	Thresholds (%)	21.80	Thresholds (%)	20.28	Thresholds	na
Oil resource exporting countries	Oil×REER	-0.003*** (0.001)	Oil×Cor	-0.098*** (0.019)	Oil×Polstab	0.116*** (0.020)
	REER	0.034*** (0.014)	Cor	3.602** (0.302)	Polstab	4.426*** (0.353)
	Thresholds (%)	11.33	Thresholds (%)	36.76	Thresholds (%)	na
Mine resource exporting countries	Mine×REER	-0.022*** (0.006)	Mine×Cor	0.021 (0.125)	Mine×Polstab	-0.043 (0.156)
	REER	0.140*** (0.043)	Cor	-3.181*** (0.639)	Polstab	6.440*** (0.588)
	Thresholds (%)	6.36	Thresholds (%)	151.48	Thresholds (%)	149.77
Forest resource exporting countries	For×REER	-0.002 (0.002)	For×Cor	-0.068 (0.045)	For×Polstab	0.018*** (0.000)
	REER	0.033*** (0.005)	Cor	0.339* (0.194)	Polstab	0.030 (0.062)
	Thresholds (%)	16.50	Thresholds (%)	4.99	Thresholds (%)	na

*Notes: Robust standard errors in parentheses, * Significant at 10%. ** Significant at 5%. *** Significant at 1%. Na= not applicable*

All the interaction terms are negative, showing that natural resources irrespective of types, reduce the positive effects of REER appreciation on tourism income. In other words, above the respective threshold values of natural resource, oil, mining and forest rents of 21.8%; 11.33%; 6.36% and 16.5%, the effects of REER appreciation on touristic income are negative. These results confirm the existence of the Dutch disease syndromes.

Another robust conclusion is that oil resources exploitation generates political instability. In fact, the sign and statistical significance of interaction coefficients of oil and political stability are identical with the two estimators.

4.3.2 Robustness to alternative measure of natural resource*s wealth*

The robustness of our results is assessed with the employment of an alternative appreciation of natural resource wealth, namely oil abundance inspired by Ross and Mahdavi (2015) and O'Connor et al. (2018). The global results of regressions are presented in Table 12. We restrict our comments to the marginal effects summarized in Table 6 that broadly confirm the findings in Table 4, as it pertains to the negative interacting effects. These negative interacting effects are evidence for Dutch disease syndrome to occur if the corresponding natural resource is above these thresholds.

Table 6: Marginal and interaction effects of REER and the quality of institutions on tourism revenues using natural resource abundance

Countries	Marginal effects of exchange rate		Marginal effects of corruption		Marginal effects	
natural resource exporting countries	Rentabun×REER	-0.00004* (0.0000)	Rentabun×Cor	-0.00002 (0.0001)	Rentabun×Polstab	0.0001 (0.0001)
	REER	0.0018* (0.0012)	Cor	0.2298 (0.2143)	Polstab	0.9811*** (0.1309)
	Thresholds (USD)	45.00	Thresholds (USD)	11490	Thresholds (USD)	
Oil exporting countries	REER×Oilabun	-0.00008 (0.0000)	Oilabun×Cor	-0.00007*** (0.0000)	Oilabun×Polstab	0.00003 (0.0000)
	REER	0.00117* (0.0007)	Cor	-0.14331 (0.2216)	Polstab	0.39313*** (0.0842)
	Thresholds (USD)	14.62	Thresholds (USD)	na	Thresholds (USD)	na
Mine exporting countries	Minabun×REER	-0.0001*** (0.00001)	Minabun×Cor	0.0035*** (0.0004)	Minabun×Polstab	-0.0002 (0.0004)
	REER	0.0012*** (0.0002)	Cor	0.5133 (0.2233)	Polstab	1.11*** (0.1041)
	Thresholds (USD)	12.00	Thresholds (USD)	na	Thresholds (USD)	5500
Forest resource exporting countries	Forabun×REER	-0.0001*** (0.0000)	Forabun×Cor	-0.0055*** (0.0006)	Forabun×Polstab	0.0047*** (0.0013)
	REER	0.0185*** (0.0011)	Cor	1.0189*** (0.0744)	Polstab	0.8025*** (0.0468)
	Thresholds (USD)	185	Thresholds (USD)	185.25	Thresholds (USD)	na

*Notes: Robust standard errors in parentheses, * Significant at 10%. ** Significant at 5%. *** Significant at 1%. Na = not applicable*

4.3.3 Robustness to the use of alternative dependent variable (the receipt per tourist)

To further assess the robustness of our findings, an alternative measure of tourism revenues, namely, tourism income per tourists is employed. Indeed, tourism demand may also

be estimated using tourism arrivals as proxy. Therefore, the tourism income per tourists integrates the two components of tourism demand and can serve as an alternative measure of tourism income. Estimations are presented in Table 13 but we extract and summarize the marginal effects in Table 7. Results almost confirm those obtained in Table 4.

Table 7: Marginal effect of REER, corruption and political stability on touristic revenue per visitor

Countries	Marginal effects of exchange rate		Marginal effects of corruption		Marginal effects of political stability	
Natural resource exporting countries	Rent×REER	-0.0007 (0.00001)	Rent×Cor	-0.0033*** (0.00128)	Rent×Polstab	0.0103*** (0.00097)
	REER	0.0167*** (0.00005)	Cor	0.2041*** (0.00380)	Polstab	0.3226*** (0.00273)
	Thresholds (%)	23.85	Thresholds (%)	61.84	Thresholds (%)	na
Oil exporting countries	Oil×REER	-0.0001*** (0.0000)	Oil×Cor	-0.0009*** (0.0003)	Oil×Polstab	0.0009*** (0.0001)
	REER	0.0015*** (0.0000)	Cor	0.2387*** (0.0017)	Polstab	0.0578*** (0.0006)
	Thresholds (%)	15	Thresholds (%)	265.22	Thresholds (%)	na
Mine exporting countries	Mine×REER	-0.0008*** (0.0001)	Mine×Cor	0.0123* (0.0078)	Mine×Polstab	-0.0081*** (0.0025)
	REER	0.0015*** (0.0004)	Cor	-0.2379*** (0.0142)	Polstab	0.0008 (0.0113)
	Thresholds (%)	1.87	Thresholds (%)	1.934	Thresholds (%)	0.098
Forest resource exporting countries	For×REER	-0.0001*** (0.0000)	For×Cor	-0.0481*** (0.0010)	For×Polstab	0.0004*** (0.0000)
	REER	0.0110*** (0.0000)	Cor	0.2229*** (0.0028)	Polstab	0.2715*** (0.0016)
	Thresholds (USD)	110	Thresholds (%)	4.63	Thresholds (%)	na

*Notes: Robust standard errors in parentheses, * Significant at 10%. ** Significant at 5%. *** Significant at 1%. Na = not applicable.*

5. Conclusion

This paper looked into the direct and indirect impacts of natural resource on tourism industries worldwide. In order to make this assessment, a panel data set of 194 countries from 1996 to 2018 is employed. The results support the view that natural resources exploitation has a detrimental impact on tourism income. We realized from estimations that, a one-point percentage boost in the natural resource rent, mineral rent, oil rent, and forest rent reduces tourism revenues respectively by 0.113; 0.096; 0.448 and 0.067 percentage point. These results confirm that natural resource exploitation is a curse on tourism demand.

The analysis of transmission channels reveals that for total natural resource rent, oil rent, mining rent and forest rent that exceed the respective threshold values of 11.5%; 8%; 0% and 8,33%, the appreciation of REER will negatively affect touristic income. In other words, natural resource exploitation leads to an appreciation of the REER which in turn negatively affects touristic income. The Dutch disease syndrome may occur for the preceding respective threshold values.

Fighting corruption can produce better outcome on touristic income for thresholds of natural resource and forest rent that exceed the respective percentages of 17.51% and 11.35%. For natural resource and forest rents higher than these thresholds, fighting corruption will have a negative outcome on tourism income. Political stability has a positive outcome on tourism income, irrespective of the exploitation of natural resources.

The results motivate recommendations aimed at maintaining political stability. Also, policies aiming to fight corruption must be adopted in order to increase tourism revenues, especially when natural resource rents exceed the preceding thresholds. In the same vein policies designed to simultaneously fight corruption and to manage exchange rate appreciation should be put in place, especially when the natural resource rent exceeds 17.51%. This can be done by adopting among others, an appropriate exchange rate regime. But this requires further studies in order to determine the exchange rate regimes that are appropriate to each country. Also, the empirical analyses do not take each country's specificity in account. In fact, there are relevant specificities in the functioning of the tourism sector in each country. Thus, it is relevant to extend this study to country-specific cases in order to provide more insights into the effect of some countries' specificity on tourism demand. Further studies could extend this research by examining other transmission mechanisms via which natural resources affect tourism demand. For instance, cluster analysis could be performed in the light of specificities per country. Moreover, future studies should also be tailored to put emphasis on tax policy in the tourism sector in line with the extractive sector where the resource curse is a primary concern (see Adebayo et al., 2021; Das et al. 2023; Kraal, 2019) as well as on the co-existence of tourism and mining sectors (Moyle et al., 2018; Moyle et al., 2022).

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Appendix

Table 8: List of countries

South Africa	Botswana	Ecuador	Indonesia	Mali	Panama	Singapore
Albania	Brazil	Estonia	Island	Morroco	paraguay	Slovakia
Germany	Cameroon	Ethiopia	Israël	Mauritius	Netherland	Sudan
Angola	Capoverde	Fiji	Italy	Mexico	Perou	Switzerland
Armenia	Chile	Finland	Jamaica	Moldova	Philkipines	Eswatini
Australlia	Columbia	French	Japan	Mongolia	Poland	Thaïland
Azerbaïdjan	Cambodgia	Gabon	Jordan	Myanmar	Portugal	Togo
Bahamas	Korea	Gambia	Kazastan	Nepal	Rep Dominica	Trinity
Bahreïn	Croatia	Ghana	Kenya	Niger	Romania	Tunisia
Barbados	Czech Republic	Greece	Kuweit	Nigeria	Salvador	Uganda
Belarus	Danemark	Grenada	Laos	Norway	Saotome	Ukraine
Benin	Djibouti	Guatemala	Madagascar	Neozeland	Senegal	Uruguay
Bolivia	Dominica	Guinea	Malaisya	Oman	seychelles	USA
Bosnia	Egypt	Honduras	Malawi	Pakistan	Sierra Leonne	Venezuela

Table 9: Indirect effects of natural resource on tourism revenues (GMM estimator)

	Rent Countries	Oil exporting Countries	Mine exporting countries	Forest countries
TreceiptsL1	0.5720***	0.5240***	0.4790***	0.0290***
	(0.001)	(0.006)	(0.023)	(0.001)
REER×Rent	-0.002***			
	(0.000)			
REER×Oil		-0.0010***		
		(0.000)		
REER×Mine			-0.0010	
			(0.009)	
REER×For				-0.003***
				(0.000)
Rent×Cor	-0.0700***			
	(0.010)			
Oil×cor		-0.045**		
		(0.020)		
Mine×Cor			0.093	
			(0.116)	
For×Cor				-0.028***
				(0.006)
Rent×Polstab	0.0370***			
	(0.003)			
Oil×Polstab		0.0300***		
		(0.0090)		
Mine×Polstab			-0.0210	
			(0.0810)	
For×Polstab				0.0160***
				(0.0000)
Rent	0.0250**			
	(0.0130)			
Oil		-0.0030		
		(0.015)		
Mine			-0.2190	
			(0.890)	
For				0.2530***
				(0.010)
REER	0.0230***	0.0080***	-0.0020	0.0250***
	(0.001)	(0.001)	(0.009)	(0.001)
Polstab	0.5530***	-0.0280	0.0300	0.7370***
	(0.026)	(0.079)	(0.650)	(0.023)
Cor	1.2260***	0.110	1.465	0.3180***
	(0.095)	(0.432)	(1.141)	(0.024)
FIE	0.0150***	0.5700**	0.6450	-2.6860***
	(0.001)	(0.245)	(1.182)	(0.115)
Internet	-0.0050***	-0.0430***	0.0010	-0.0720***
	(0.000)	(0.001)	(0.004)	(0.001)
Inflation	0.4400***	-0.0060***	-0.0070***	0.0020***
	(0.051)	(0.000)	(0.001)	(0.000)
Cons	3.8580***	6.0540***	6.8220***	1.5280***
	(0.182)	(0.330)	(2.096)	(0.101)
Nber; of observations	2112	1188	638	2034
Nber of groups	96	54	29	91
Nber of instruments	72	51	26	89
AR(1)	0.0000	0.0040	0.0125	0.0740
AR(2)	0.5370	0.4490	0.5750	0.9138
Hansen	0.6170	0.999	1.0000	0.6454
Wald	4079.87***	4301.09***	4000.56***	5102.36***
VIF	8.3000	9.8500	9.9500	6.9400

*Notes: Robust standard errors in parentheses, * Significant at 10%. ** Significant at 5%. *** Significant at 1%.*

Table 10: Indirect effects of natural resource on tourism revenues (OLS estimator)

	Rent Countries	Oil Countries	Mine exporting countries	Forest resource exporting countries
REER×Rent	-0.003* (0.002)			
REER×Oil		-0.000 (0.002)		
REER×Mine			0.001 (0.010)	
REER×For				-0.013** (0.006)
Rent×Cor	-0.399*** (0.069)			
Oil×Cor		-0.141* (0.087)		
mine×Cor			0.178 (0.473)	
forent×Cor				1.489*** (0.345)
Rent×Polstab	0.465*** (0.067)			
Oil×Polstab		0.161** (0.087)		
Mine×Polstab			-0.244 (0.313)	
For×Polstab				-1.162*** (0.237)
Rent	-0.774*** (0.165)			
Oil		-0.430** (0.213)		
Mine			0.686 (1.001)	
For				-1.694*** (0.652)
REER	-0.001 (0.002)	0.000 (0.002)	0.000 (0,003)	0.000 (0.002)
Cor	-5.505 (0.651)	-3.216*** (0.612)	-1.948*** (0.604)	-3.336*** (0.647)
Polstab	8.695*** (0.680)	6.403*** (0.605)	5.817*** (0.597)	7.211*** (0.648)
FIE	0.122 (2.378)	0.069 (2.442)	-3.443 (2.476)	-5.227*** (2.492)
Internet	-0.056*** (0.014)	-0.049*** (0.014)	-0.060*** (0.015)	-0.068*** (0.014)
Inflation	-0.002 (0.004)	-0.001 (0.004)	-0.004 (0.004)	-0.004 (0.004)
Cons	20.602*** (1.510)	18.880*** (1.541)	20.293*** (1.577)	22.470 (1.653)
Number of obs F(10, 2197) Prob > F R-squared chi2(1)	2.208 41.66*** 0.0000 0.1594 269.97	2.208 29.47*** 0.0000 0.1183 245.04	2.208 15.55*** 0.0000 0.0619 203.43	2.208 20.34*** 0.0000 15.455 248.39

Prob > chi2	0.0000	0.0000	0.0000	0.0000

Table 11: Indirect effects of natural resource on tourism revenues (PCSE estimator)

	Rent Countries	Oil Countries	Mine exporting countries	Forest resource exporting countries
REER×Rent	-0.0050*** (0.002)			
REER×Oil		-0.0030*** (0.001)		
REER×Mine			-0.0220*** (0.006)	
REER×For				-0.0020 (0.0020)
Rent×Cor	-0.2650*** (0.045)			
Oil×Cor		-0.0980*** (0.019)		
mine×Cor			0.0210 (0.125)	
forent×Cor				-0.0680 (0.0450)
Rent×Polstab	0.3700*** (0.049)			
Oil×Polstab		0.1160*** (0.020)		
Mine×Polstab			-0.0430 (0.156)	
For×Polstab				0.0180*** (0.000)
Rent	-0.0060 (0.1930)			
Oil		-0.0680 (0.077)		
Mine			1.5561** (0.682)	
For				0.6100*** (0.179)
REER	0.1090*** (0.025)	0.0340*** (0.014)	0.1400*** (0.043)	0.0330*** (0.005)
Cor	8.6070*** (2.295)	3.6020** (0.302)	-3.1810*** (0.639)	0.3390* (0.194)
Polstab	8.3770*** (0.710)	4.4260*** (0.353)	6.4400*** (0.588)	0.0300 (0.062)
FIE	-0.058*** (0.017)	18.921*** (3.427)	-14.210*** (3.292)	-2.612*** (0.388)
Internet	-0.005*** (0.002)	-0.049*** (0.008)	-0.011 (0.015)	-0.0540*** (0.003)
Inflation	5.3730*** (0.441)	-0.0030*** (0.001)	-0.0080 (0.007)	0.0010*** (0.000)
Cons	4.2640 (3.181)	0.7460 (2.599)	11.5651*** (4.094)	-1.5091*** (0.512)
Nber of observations	2208	1242	667	2093
Nber of grps.	96	54	29	91
Nber inst.	70	51	23	89
R-squared	0.1728	0.159	0.168	0.9463
Wald hi2 (10)	81.701***	68.111***	56.183***	1809.126***
VIF	8.30	9.85	9.95	6.94

*Notes: Robust standard errors in parentheses, * Significant at 10%. ** Significant at 5%. *** Significant at 1%.*

Table 12: Indirect effects of natural resource on tourism revenues (resource abundance)

	Natural resource abundance	Oil abundance	Mine abundance	Forest abundance
Treceipts L1.	0.574***	0.5349***	0.6235***	0.5790***
	(0.0052)	(0.0040)	(0.0073)	(0.0026)
REER×Rentabun	-0.00004*			
	(0.0000)			
REER×Oliabun		-0.0001		
		(0.0000)		
REER×Minabun			-0.0001***	
			(0.00001)	
REER×Forabun				-0.0001***
				(0.0000)
Rentabun×Cor	-0.00002			
	(0.0001)			
Oliabun ×cor		-0.00007***		
		(0.0000)		
Minabun×Cor			0.0035***	
			(0.0004)	
Forabun×Cor				-0.0055***
				(0.0006)
Rentabun×Polstab	0.0001			
	(0.0001)			
Oilabun×Polstab		0.00003		
		(0.0000)		
Minabun×Polstab			0.0002	
			(0.0004)	
Forabun×Polstab				0.0047***
				(0.0013)
Rentabun	-0.0001			
	(0.0002)			
Oilabun		-0.00021***		
		(0.0001)		
Minabun			0.0101***	
			(0.0017)	
Forabun				0.0100***
				(0.0031)
REER	0.0018*	0.0012*	0.0012***	0.0185***
	(0.0012)	(0.0007)	(0.0002)	(0.0011)
Polstab	0.9811***	0.3931***	1.11***	0.8025***
	(0.1309)	(0.0842)	(0.1041)	(0.0468)
Corr	0.2298	-0.14331	0.5133	1.0189***
	(0.2143)	(0.2216)	(0.2233)	(0.0744)
FIE	0.3041*	0.3770	0.2855	-0.1175
	(0.1951)	(0.2714)	(0.2489)	(0.1261)
Internet	0.0143***	-0.04062***	0.0119***	0.0012
	(0.0017)	(0.0009)	(0.0011)	(0.0006)
Inflation	-0.0061***	-0.00596***	-.0069***	-0.007***
	(0.0002)	(0.0002)	(.0001)	(0.0002)
_cons	5.0190***	6.0290***	5.1620***	4.1400***
	(0.3728)	(0.2164)	(0.2449)	(0.2382)
Nber of observations	2112	1188	638	2034
Nber of groups	96	54	29	91
Nber of instruments	71	56	22	89
AR(1)	0.0000	0.0023	0.002	0.0000
AR(2)	0.3790	0.4292	0.529	0.6892
Hansen	0.2060	0.9998	0.97	0.2188
Wald	3949.64***	4047.92***	4449.91***	3850.70***
VIF	9.49	8.58	5.95	9.16

*Notes: Robust standard errors in parentheses, * Significant at 10%. ** Significant at 5%. *** Significant at 1%.*

Table 13: Indirect effects of natural resource on tourism revenues per tourist

	Natural resources	Oil	Mine	Forest
Treceiptvisit L1	0.568*** (0.00003)	0.782*** (0.0001)	0.249*** (0.0037)	.566*** (.00002)
REER×Rent	-0.0007 (0.00001)			
REER×Oil		-0.0001*** (0.0000)		
REER×Mine			-0.0008*** (0.0001)	
REER×For				-0.0001*** (0.000)
Rent×Cor	-0.0034*** (0.00128)			
Oil×Cor		-0.0009*** (0.0003)		
Mine×Cor			0.0123* (0.0078)	
For×Cor				-0.0481*** (0.0010)
Rent×Polstab	0.0103*** (0.00097)			
Oil×Polstab		0.0009*** (0.0001)		
Mine×Polstab			0.0081*** (0.0025)	
For×Polstab				0.0004*** (0.000)
Rent	-0.0782*** (0.00145)			
Oil		-0.0187*** (0.0005)		
Mine			0.0210*** (0.0066)	
For				0.0308*** (0.0010)
REER	0.0167*** (0.00005)	0.0015*** (0.000)	0.0015*** (0.0004)	0.0110*** (0.0000)
Polstab	0.3226*** (0.00273)	0.0578*** (0.0006)	0.0008 (0.0113)	0.2715*** (0.0016)
Cor	0.2041*** (0.00380)	0.2387*** (0.0017)	-0.2379*** (0.0142)	0.2229*** (0.0028)
FIE	0.1228*** (0.01875)	-0.2539*** (0.0025)	0.369*** (0.0365)	0.0388*** (0.0097)
Internet	-0.0096*** (0.00015)	-0.0034*** (0.0000)	-0.0049*** (0.0004)	-0.0089*** (0.0001)
Inflation	0.00004* (0.00002)	0.0002*** (0.0000)	-0.0001*** (0.0000)	-0.0004*** (0.0000)
Cons	2.184*** (0.02795)	0.461*** (0.0132)	-0.162*** (0.0406)	1.931*** (0.0304)
Nber of observations	2112	1188	638	2034
Nber of groups	96	54	29	91
Nber of instruments	89	42	26	86
AR(1)	0.0308	0.0132	0.0294	0.030
AR(2)	0.3161	0.3050	0.3565	0.316
Hansen	0.4085	0.2540	0.9844	0.781
Wald	7250***	2250***	1340***	7880***
VIF	8.30	9.85	9.95	6.94

*Notes: Robust standard errors in parentheses, * Significant at 10%. ** Significant at 5%. *** Significant at 1%.*