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SUSTAINABLE TOURISM, DEFORESTATION AND GROWTH: A CASE FOR MALAYSIA

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Abstract: Sustainable tourism perceived as a significant driver of income and creates job opportunities for local communities, which, as a result, deliver significant incentives to preserve biodiversity. Preserving the quality of environment becomes the prime concern to attract more tourists, which as a result, increase funds for biodiversity conservation. Massive increase in tourism together with limited environmental resources capacity, there is an urgent need to raise the awareness on the issue of biodiversity for tourism development. For the purpose of this research, we examine the impact and economic growth on sustainable tourism for the period 1996 – 2012 in Malaysia. For the purpose of this study, we construct a Sustainable Tourism Index (STI) and employed few methods which are the Ordinary Least Squares (OLS), Canonical cointegrating regression (CCR), Dynamic OLS (DOLS) and Fully-Modified OLS (FMOLS) methods to test the long-run model of sustainable tourism. Generally, our results found that economic growth and mitigating do contribute to sustainable tourism in Malaysia.

KEYWORDS: Sustainable tourism index, deforestation, economic growth, cointegration, Malaysia

Introduction

Tourism has been an essential sector to both the developed and the developing economies. Apart from significantly contributes to government revenues, national income and foreign exchange earnings, tourism sector also create job opportunities as well as business opportunities for the communities. Year 2013 proved to be a remarkable worldwide record where the number of international tourist arrivals reached 1.1 billion arrivals, coupled with international tourism receipts at USD1.2 billion. International tourism receipts are define as the earnings generated in destination countries from expenditure on accommodation, food and drink, local transport, entertainment, shopping and other services and goods. Relatively, the Asia and the Pacific region (+8%) recorded the largest increase in receipts, followed by the Americas (+6%) and Europe (+4%) (World Trade Organization (WTO), 2014).

Among the Asia and Pacific countries, international tourist arrivals in Malaysia ranked third after China and Thailand; and ranked fifth after China, Macao, Thailand, and Hong Kong in terms of international tourism receipts in 2013 (WTO, 2014). Nevertheless, for the record, Malaysia has been ranked tenth in the world's top ten tourism destinations in 2012; ninth in 2011, 2010 and 2009 (WTO, 2010, 2011, 2012, 2013). This has been probably achieved as a result of the great effort by the Malaysian government in promoting tourism to the world, and taking this sector seriously as it has substantial contributions to foreign exchange earnings and government revenues.

The establishment of the Tourist Development Corporation in 1972 marked the important steps taken by the government to recognize the critical role played by the tourism sector in Malaysia. Thereafter, the Malaysian government has played critical role in planning, gearing and developing the tourism industry by proposing and implementing various initiatives through its various five-year economic plans. For example, during the Sixth Malaysia Plan (1991-1995), the first National Tourism Policy (NTP) was adopted and serves as the guiding principles for planning, developing and promoting the

tourism industry in Malaysia. The National Eco-Tourism Plan (1996) was introduced during the Seventh Malaysia Plan (1996-2000); the Rural Tourism Master Plan (2001), and the Second National Tourism Policy (2003-2010) during the Eight Malaysia Plan (2001-2005). Recently, in the government effort to drive Malaysia as a high income nation in 2020, tourism has long been identified as one of the growth potential that can realise this vision. Tourism has also been perceived as one of the national important economic areas (NKEAs) to propel this transformation (Malaysia, 2010) in the Economic Transformation Programme (ETP). Towards this end, the aim to reach the targets of receiving 36 million international tourists and to have RM168 billion tourist receipts was formulated by the Malaysia Tourism Transformation Programme (MTTP) (United Nations World Trade Organization (UNTWO), 2013).

Nevertheless, since the tourism industry is important to the Malaysian economy and the communities, we endeavour to answer our main research questions: In order to sustain the Malaysian tourism sector what does Malaysia can offer the tourist to be their favourite destination country to visit? Despite the fact that Malaysia can provide heritage sites, natural resources, waterfalls, wildlife, resorts, sands and beaches, hotels, mobile and internet equipment, and conditions of physical environment such as weather, water and air quality, and other tourism related infrastructures, but at the same time environmental degradation has resulted in biodiversity loss. In the long-run tourism will destroy itself. Thus, how responsive is the tourism sector towards deforestation or biodiversity loss is an important question to be answered, in order to make plans for biodiversity conservation for achieving sustainable tourism in this country.

The main purpose of this study is to investigate the impact of national income, deforestation rate and institutional factors on sustainable tourism in Malaysia for the periods1996 to 2016. As far as the authors are concern and to best of our knowledge, this is the first study to attempt to investigate the determinants of sustainable tourism using time series data for Malaysia. Since the available data is short, in this study we include only three regressors; and the model is regressed using four estimators – Ordinary Least Squares (OLS), Canonical Cointegrating Regression (CCR), Dynamic OLS (DOLS) and Fully-Modified OLS (FMOLS) for robust results. All three estimators – CCR, DOLS and FMOLS are efficient in small sample. To measure sustainable tourism we endeavour to construct the sustainable tourism indicator for further analysis. Our results suggest that income, deforestation and institutional factors are important variables impacted sustainable tourism in Malaysia.

Sustainable Tourism

Despite the great benefits in stimulating national income, tourism also can have an adverse effect on the economy, especially to the environment. The negative consequences from the outcome of increased tourism activities can have significant threats to the biodiversity loss. The loss in terms of the numbers and types of living organisms in the ecosystem, region as well as the environment will lead to degradation of the environment and ultimately to biodiversity loss (Butler, 2006). The healthy ecosystems enable to meet human requirements for their daily consumption and help them to live such as food, clean air, and water. The rainforest, accounted for more than 50 percent shelters wide variety of plants and animals which support the greatest diversity of living organisms on Earth even though it cover not more than 2 % of Earth's surface(Butler, 2014). As stated by United Nations Environment Programme (UNEP, 2014), the biodiversity loss among other things; affect food production, reduces the productivity of ecosystems, interferes with essential ecological functions, reduce ecosystem stability and increase its vulnerability to natural disasters (e.g. floods, droughts, hurricanes etc). Thus, the existence of humanity depends on biodiversity; and biodiversity depends on the rainforest to provide shelter and protect their habitat for survival.

Christ *et al.* (2003) stated in a study led

by the Conservation International (CI) and UNEP on the threats of tourism on biodiversity conservation, and argued that biodiversity loss are resulted from tourism activities that causes: (i) habitat interruption cause by change in the total landscape from massive and uncontrolled manner to develop tourism infrastructure and facilities which, in turn, led the wetlands to be drained and increase deforestation; (ii) exhaustion of limited natural resources for the nation (e.g. water and electricity consumption); (iii) the issue of littering and water pollution; (iv) sewage pollution from tourism-related facilities such as hotels, recreation and other facilities; and (v) coral reefs damage as a results of careless tourists. On the other hand, Briguglio and Briguglio (2002) reveal that tourism perceived as a stimulus to preserve the environment. For example, tourism raises the awareness of a country to maintain its attractiveness, clean air and minimize sea pollution. However, tourism can destroy itself - with inappropriate guiding policies and incentives in the long-term which aims to reduce an adverse effect on the environment from tourism activities. National policies for tourism have been design two decades ago to achieve both economic growth and social development while preserving the environmental aspect of a nation (World Commission on Environment and Development (WCED, 1987).

To adhere for "sustainable tourism", UNWTO (2004) strongly suggest nations to utilize the environmental resources which are essential to develop tourism sector while preserving essential ecological processes and help the natural heritage and biodiversity conservation (Greenidge & Greenidge, 2011). The WTO has adopted three types of criterion of sustainable tourism development: (i) the protection of environmental resources; (ii) beneficial in terms of economic and quality of life for local communities; and (iii) quality experience for visitors. Butler (1993) for instance expresses sustainable tourism as "tourism which is developed and maintained in such a manner and scale that it remains viable in the long-run and does not degrade the environment in which it exists to such an extent that it prohibits the successful development of other activities." Generally, according to the World Travel and Tourism Council – World Trade Organization -Earth Council (WTTC-WTO-EC, 1995), "sustainable tourism development meets the needs of present tourists and host regions while protecting and enhancing opportunity for the future". It is viewed as leading the management of all type of resources that can satisfied in the aspect of economic, social and aesthetic requirements as well as preserving cultural integrity, essential ecological processes, life support and biological diversity at the same time.

Therefore, sustainable tourism highlights, preserving biological process coupled with natural heritage conservation using environmental resources. It respects the socio-cultural authenticity of host communities and delivers socioeconomic advantages such as higher income, stable job opportunities, poverty reduction together with social services. It gives informed and meaningful participation of all stakeholders – especially local and indigenous communities, and satisfied tourist needs (WTO, 2004).

In Malaysia, sustainable tourism development has been emphasized in the Malaysian National Tourism Policy designed in 1992 (NTP). This policy combined the required guiding principles and management practices especially to develop tourism destination, and eco-tourism is included in the sustainable tourism activities. As far as sustainable ecotourism is being concern, NTP has emphasized its development in several natural areas such as highlands, coastal areas, marine parks, islands, national and state parks, geological sites, wetlands and Ramsar sites, turtle landing sites and firefly habitats. In Malaysia, the wetlands listed under the Ramsar wetlands of international importance include Bera Lake, Pulai River, Kukup Island, Tanjung Piai, Trusan Kinabatangan forest reserve, Kulamba wildlife reserve, Kuala Maruap forest reserve, Kuala Segama forest reserve, and lower Kinabatangan Segama wetlands.The Malaysian government

has been serious on the effort of preserving the environment, social and cultural heritage of the country; and different steps have been taken to preserve the natural environment and resources for the purpose of tourism development, by formulating several acts and policies to assure best execution for sustainable tourism. Among these include: the Protection of Wildlife Act 1972; National Parks Act 1980; the National Forestry Act 1984; the Fisheries Act 1985; the Environmental Quality Order 1987; and the Marine Parks Malaysia Order 1994.

Materials and Methods

In this study, we follow the supply side proponents such as Smith (1994), Seyidov and Adomaitiene (2016), Kao *et al.* (2008), Klenosky (2002), and Xu (2010) by specifying the following tourism demand model as,

$$sustourism = f(income, deforestation, institutional) \quad (1)$$

For estimation purposes, Equation (1) is our long-run model and is specify in a stochastic form as,

$$lsustourism_t = \alpha + \beta lincome_t + \theta ldeforestation_t + \gamma linstitutional_t + \varepsilon_t \quad (2)$$

where *α, β, θ* and *γ* represent the parameters to be estimated, and ε indicates the error term. The error term is assumed to exhibit mean zero and constant variance. It is expected a priori that *β, γ > 0,* and *θ < 0*. $lincome_t$ is the level of economic development (or economic growth) and/or national income (wealth of the nation) which is proxy by using real gross domestic product; $ldeforestation_t$ is the deforestation rates (proxy using the cumulative of the changes in forest area); $linstitutions_t$ is the institutional variables compiled by the International Country Risk Guide (ICRG). The twelve institutional variables considered in this study include government stability, socio-economic conditions, investment profile, internal conflict, external conflict, corruption, military in politics, religious tensions, law and order, ethnic tensions, democratic accountability and bureaucracy quality. In all cases, the lower (higher) is a given risk rating, the higher (lower) is the associated risk. In this study, we also construct an index to measure sustainable tourism labeled as $lsustourism_t$. Furthermore, in this study all the variables are converted into natural logarithm and denoted by *l*.

Recent tourism development plans not only seek to deliver the economic benefits to the local community, but also to minimize both environmental and social costs (Reddy, 2008). Nevertheless, the concept of sustainable tourism has no significant meaning without proper indicators to proxy the tourism impact (Hunter, 1997; Wheeller, 1993; Torres-Delgado & Saarinen, 2014). As claimed by Yunis (2004), HwangSuk and Sirakaya (2006) and Reddy (2008) in a study led by UNWTO (2004), sustainable tourism indicators are time series information which is likely to react to economic, social, cultural, environmental, institutional, technological, management issues, both within and tourism sector as well as wider travel places.

The sustainability indicator variables – ratio of tourist arrival to total number of population (touristpop), carbon dioxide (CO_2) emissions per capita (*co2pc*), oil palm planted hectarage (*oilpalmha*) and protected forest (*protect*), (Greenidge & Greenidge, 2011; McCool *et al.,* 2011; Blancas *et al.,* 2010; Herrera-Ulloa *et al.,* 2003) to one (Din *et al.,* 2014): have been selected in this study to create an index for sustainable tourism for Malaysia. The variables *touristpop* and *protect* reflected the driving forces indicator representing the social dimension, whereas co2pc and oilpalmha symbolize the pressure indicators representing the environment dimension (Torres-Delgado & Saarinen, 2014; Herrera-Ulloa *et al.,* 2003). Using factor analysis and following Herrera-Ulloa *et al.* (2003), we choose the first principal component and the following sustainable tourism index (*sustourism*) is constructed by normalizing the sum of the loading factor equal to one (Din *et al.,* 2014):

$$lsustourism_t = \log (0.2573touristpop_t + 0.2502co2pc_t + 0.2590oilpalmha_t + 0.2328protect_t) \quad (3)$$

In modeling Equation (2) we consider the "pull" factor rather than the "push" factor that drives people to travel to a destination country. In fact, Goodall (1991) reiterate that the pull factors, not the push factors that are critical to tourism demand (Mehmetoglu, 2001). Although the inclusion of the supply factors or the pull factors is rare in estimating tourism demand; however, these factors from the point of view of the host country could be important in attracting more tourist arrivals to a destination country (Tsounta, 2008) and to sustain the tourism industry. Nevertheless, in a tourism demand model, wealth of a nation or the level of economic development has been one of the most significant variables affecting the tourism sector, in particular the inbound tourism. A wealthy destination country will have the impression that transportation system, facilities and accommodation, public health services, tour operators, banking and communication facilities are excellent and efficient compared to less developed countries (Naude & Saayman, 2005). Wealth of income or the level of economic development can be proxy by using either the real gross domestic product or the real gross national product per capita (Tan *et al.,* 2002; Covington *et al.,* 1994; Crouch *et al.,* 1992). Since tourism is considered as normal goods, it is expected that the income effect on the tourism industry is positive, that is, higher income will lead to increase in inbound tourists and thus enhance in the growth of the tourism sector. Similarly, we would expect that higher income will also enhance sustainable tourism.

Saleem (2010) point out that deforestation or forest cover loss is an important indicator of biodiversity loss. Thus, the rate of deforestation can be a good proxy for biodiversity loss for a nation. Biodiversity is vital for tourism since the coastal areas, mountains, rivers and forests are main tourist attractions around the globe (UNWTO, 2010). For example, biodiversity may significantly help the ability of the destination to maintain the attractiveness as well as the quality of the place. Moreover, biodiversity can act as a primary attraction for nature-based tourism including scuba diving, wildlife watching, or tourism in protected areas. Thus, the clearance of land for tourism developments has contributed to these losses, and consequently a decline in tourism as a destination become less attractive for visitors. It is expected that the relationship between sustainable tourism and deforestation is negative.

The institutional indicators – government stability, socio-economic conditions, investment profile, internal conflict, external conflict, corruption, military in politics, religious tensions, law and order, ethnic tensions, democratic accountability and bureaucracy quality provided by the ICRG measure the risk that the tourist would endure if a country is registered as high risk or low risk. A country with low risk will ensure political stability and the absence of violence, social conflict, corruption and religious and ethnic tensions. Neumayer (2004) found that human rights violations, conflict and other political motivated violent events negatively affect tourist arrivals, and the most vulnerable to the impact of political violence are those countries mildly dependent on tourism revenue as their source of income. As cited in Steiner (2007), studies by Hollier (1991), Meyer (1996), and Sonmez (1998) suggest that violent political instability resulted in a decrease in the number of tourist arrivals in the MENA region. Thus, a destination country with "good institutional standing" will make visitors feel safe and secured from any unwanted events or tragedies.

The data for deforestation rate, measured as the cumulative rate of change in the forest area for the period 1996 to 2016 was obtained from United Nation Food and Agriculture Organization. On the other hand, data on oil palm planted hecterage was taken from the

Department of Statistics Malaysia; and data for real gross domestic product and tourism related variables were taken from World Development Indicators (WDI) downloaded from the World Bank database (https://data.worldbank.org/indicator?tab=all). The sample period for this study is limited by the availability of data on international tourist arrivals that is available from WDI.

Results and Discussions

The main interest of this paper is to determine the impact of economic growth and deforestation on sustainable tourism in Malaysia. We hypothesize that higher economic growth will lead to increased sustainable tourism and this will implies that higher income will enable the nation to stimulate the growth of the tourism industry for example in terms of better infrastructures and facilities related to tourism as well as better governance by promotion and enforcement to mitigate environmental degradation and other negative impacts related to the tourism industry. On the other hand, we would expect that deforestation impacted sustainable tourism negatively. In other words, the uncontrollable cutting of forest area will lead to biodiversity loss. Destroying the fauna and flora, endangered the lives of the mammals, birds, reptiles, fishes and other living organism will impacted negatively on the tourism industry. Furthermore, deforestation will also lead to floods and landslides that could destroy tourist area and turn away the tourists from the tourist destination and as a result will affect the tourism industry negatively. Furthermore, besides income and deforestation, we also infer the impact of institutional factors on tourist travel to a destination country.

In estimating Equation (2), by employing Ordinary Least Square (OLS) is not without problems. The estimated parameters can be biased in the presence of dynamic effects as well as in small samples, where the bias differ inversely with the sample size and the calculated R^2. According to Granger and Newbold (1974) estimating Equation (2) will lead to spurious regression results when the variables are non-stationary. Likewise, the endogeneity issue inhibits OLS to estimate the true values of the parameters.

Apart from estimating Equation (2) using OLS, we endeavor to employ three other estimators for checking the robustness of the results. These estimators are more efficient and robust especially in small samples. Stock and Watson (1993) propose the dynamic OLS (DOLS); Park (1992) presents the canonical cointegrating regression (CCR); while Phillips and Hansen (1990) recommend the fully-modified OLS (FMOLS). The possible simultaneity bias and small sample bias among the regressors can be corrected through DOLS procedure by regressing one of the I(1) variables on other I(1) variables, the I(0) variables, and lags and leads of the first difference of the I(1) variables. Taking the variables with first difference and the associated lags and leads will eliminate simultaneity bias and small sample bias inherent among regressors. In contrast, FMOLS procedure was developed to eliminate bias in small sample as well as to correct endogeneity and serial correlation effects. The CCR is almost identical to FMOLS, however engage with stationary transformation of the time series data to obtain least squares estimates to eliminate the long-run dependence between the cointegrating equation and stochastic regressors innovations. Park (1992) reveals that the endogeneity problem from the long-run correlation of the cointegrating equation errors and stochastic regressors innovations, as well as asymptotic bias caused by the contemporaneous correlation between the regression and stochastic regressor errors can be removed and corrected by the transformations of the CCR.

Before we can proceed with estimating Equation (2) for further analysis, we are required to check for the order of integration in both levels and first differences of the series involved in the analysis by using the standard Augmented Dickey-Fuller (ADF) unit root test popularized by Dickey and Fuller (1981). Table 1 provides the outcome of the unit root tests and it shows that all the variables are statistically significant at the 5 percent level in first differences, except

for religious tensions, law and order, ethnic tensions, and bureaucracy quality which are stationary in levels. The variable military in politics is considered stationary in level as the rating does not change for the period under study. Therefore, we can conclude that all variables in Table 1 that are said to be integrated of order one, that is, they are $I(1)$ variables needs to be difference once to achieve stationarity, that is, $I(0)$.

Table 1: Results of ADF unit root tests.

Variables	Level:		First differnce:	
	Constant	Constant+trend	Constant	Constant+trend
	t-values (lag)	*t*-values (lag)	*t*-values (lag)	*t*-values (lag)
$lsustourism_t$	0.0211 (1)	-2.9890 (0)	-3.6244** (1)	-5.3602** (0)
$lrealgdp_t$	-0.6516 (0)	-3.5097 (0)	-4.6978** (0)	-4.6011** (0)
$ldeforestation_t$	-2.6555 (0)	-1.5247 (0)	-5.3540** (0)	-6.0912** (0)
$lgovstab_t$	-0.9628 (0)	-2.3219 (0)	-4.3798** (0)	-4.3683** (0)
$lsocioecon_t$	-1.3019 (0)	-2.7523 (1)	-3.5836** (0)	-3.7668** (1)
$linvest_t$	-1.7717 (0)	-1.3799 (0)	-5.5263** (0)	-5.7654** (0)
$linconflict_t$	-1.7971 (0)	-2.1699 (0)	-4.5146** (1)	-4.3473** (1)
$lexconflict_t$	-2.4372 (1)	-2.9379 (0)	-4.7933** (3)	-4.7907** (3)
$lcorrup_t$	-1.8259 (0)	-1.2796 (0)	-4.9874** (0)	-5.2826** (0)
$lreligious_t$	-8.1567** (0)	-7.3518** (0)	-	-
$llaworder_t$	-5.1097** (4)	-4.9492** (4)	-	-
$lethnic_t$	-4.7084** (2)	-5.3840** (4)	-	-
$ldemoacct_t$	-1.4950 (0)	-1.9489 (0)	-3.8996** (0)	-3.8313** (0)
$lbureau_t$	-9.3818** (4)	-7.0734** (4)	-	-

Notes: Asterisk ** denotes statistically significant at 5% level. Figures in parentheses are *p*-values. Critical values are from MacKinnon (1996).

Having determine that all variables are of the same order of integration, that is, they are all $I(1)$, we can than proceed with the cointegration test on Equation (2). The validity of the long-run model as per Equation (2) is very much dependent on the results of the cointegration test. According to Granger and Newbold (1974), when estimating an equation or model involving non-stationary variables in levels, and if the linear combination of these variables is non-stationary, then the regression results is said to be spurious. A spurious regression results imply that inferences and hypotheses testing are invalid. For a non-spurious regression, the linear combination of the variables involved in the model must be stationary, in other words, they are cointegrated (Engle & Granger, 1987). A cointegrated variables indicate that there is long-run relationship between sustainable tourism and its determinants – income and deforestation rate.

Table 2 provides the outcome of estimating Equation (2) using OLS, CCR, FMOLS and DOLS. In this study, for the OLS estimated regression, we test for cointegration using the standard Engle-Granger (EG) two steps procedure (Engle & Granger, 1987), where the cointegrating regression (Equation 2) is estimated and the residual is saved; the saved residual is then tested for non-stationarity using the ADF unit root test (without a constant and trend). The EG test procedure test the null hypothesis of no cointegration. On the other hand, to test for cointegration when using the FMOLS, DOLS and CCR estimators, we employ the Hansen (1992) instability test. According to Hansen (1992), the L_c statistics is a *LM* test statistic and can be used to test for the null hypothesis of cointegration against the alternative of no cointegration.

Table 2: Long-run model for sustainable tourism in Malaysia.

Estimators\Variables	Constant	Income	Deforestation	Institutional
Panel A. Institutional=Government stability				
OLS (Robust std error)	-60.522**	2.4858**	-0.3936	-0.6953
	(-8.8808)	(10.739)	(-0.8706)	(-1.9035)
	R^2 = 0.903	*EG* test = -3.354**		
FMOLS	-44.611**	1.8843**	-0.2697	-1.1923**
[lag=1]	(-3.8038)	(3.5715)	(-0.4672)	(-2.5198)
	R^2 = 0.882	L_c = 0.339[>0.20]		
CCR	-47.725**	1.9242**	-0.0515	-0.9672
[lag=1]	(-3.6904)	(3.1878)	(-0.0874)	(-2.0517)
	R^2 = 0.893	L_c = 0.395[>0.20]		
Panel B. Institutional=Socioeconomic condition				
OLS (Robust std error)	-62.895**	2.4497**	-0.5720	1.4355**
	(-12.995)	(9.9968)	(-1.5743)	(3.5427)
	R^2 = 0.925	*EG* test = -4.370**		
FMOLS	-62.651**	2.4898**	-0.8553**	1.7794**
[lag=2]	(-11.360)	(8.7313)	(-2.5423)	(4.6994)
	R^2 = 0.920	L_c = 0.584[0.156]		
DOLS	-77.474**	3.2596**	-1.8830**	2.7123**
[lead=2,lag=0]	(-5.6810)	(4.7060)	(-2.4772)	(3.2394)
	R^2 = 0.918	L_c = 0.061[>0.20]		
CCR	-64.443**	2.5666**	-0.8703**	1.7347**
[lag=2]	(-10.275)	(7.7511)	(-2.4587)	(4.5166)
	R^2 = 0.920	L_c = 0.621[0.132]		
Panel C. Institutional=Investment profile				
OLS (Robust std error)	-71.735**	2.9563**	-1.3011	1.8266**
	(-16.724)	(11.702)	(-1.9912)	(2.5196)
	R^2 = 0.908	*EG* test = -4.311**		
FMOLS	-73.186**	3.0917**	-1.8800**	2.7727**
[lag=0]	(-10.323)	(8.1917)	(-2.8495)	(3.0077)
	R^2 = 0.901	L_c = 0.335[>0.20]		
DOLS	-71.346**	3.0785**	-2.9946	5.7770**
[lead=1,lag=1]	(-4.4920)	(3.7126)	(-2.2216)	(2.9959)
	R^2 = 0.923	L_c = 0.031[>0.20]		
CCR	-73.034**	3.1113**	-2.1400**	3.3158**
[lag=0]	(-8.3976)	(6.7909)	(-2.8856)	(2.9155)
	R^2 =	L_c = 0.318[>0.20]		

Notes: Asterisk ** denotes statistically significant at the 5% level. Figures in the round brackets (.) are t-statistics, while figures in the square brackets [.] are *p*-values.

In Table 2, we present the results involving each the institutional variables - government stability, socio-economic conditions, investment profile, internal conflict, external conflict, corruption, and democratic accountability, respectively in Panels A to G. In each panel we provide four estimations with respect to four estimators, OLS, FMOLS, DOLS and CCR. For each estimator we test the cointegrating regression for cointegration using the EG two-steps (EG-test) for OLS and the Hansen's L_c-statistic for FMOLS, DOLS and CCR. Interestingly, we observe that in each panel the long-run equation (2) is valid and not spurious. In all cases, the EG-tests indicate significant at the 5 percent level; while the Hansen's L_c-

statistics are not significant thus suggesting that the model exhibit cointegration among the variables. These results imply that there is long-run relationship between sustainable tourism in Malaysia and its determinants such as income, deforestation and institutional variables for the period under study.

Table 2: Long-run model for sustainable tourism in Malaysia (continued).

Estimators\Variables	Constant	Income	Deforestation	Institutional
Panel D. Institutional=Internal conflict				
OLS (Robust std error)	-87.096**	3.2232**	-0.2967	2.2212**
	(-17.737)	(12.288)	(-0.7421)	(5.1872)
	R^2 = 0.922	*EG* test = -4.091**		
FMOLS	-91.887**	3.3467**	-0.2581	2.7814**
[lag=0]	(-10.814)	(9.0526)	(-0.5765)	(3.4144)
	R^2 = 0.919	L_c = 0.399[>0.20]		
DOLS	-112.35**	3.9611**	-0.2638	4.7314**
[lead=1,lag=0]	(-9.2093)	(8.3950)	(-0.5036)	(3.4734)
	R^2 = 0.916	L_c = 0.097[>0.20]		
CCR	-91.646**	3.3379**	-0.2523	2.7591**
[lag=0]	(-10.203)	(8.1159)	(-0.5324)	(3.5077)
	R^2 = 0.919	L_c = 0.410[>0.20]		
Panel E. Institutional=External conflict				
OLS (Robust std error)	-82.592**	2.8998**	-0.2510	3.7308**
	(-12.165)	(7.4809)	(-0.5743)	(6.3752)
	R^2 = 0.939	*EG* test = -3.181**		
FMOLS	-82.495**	2.8546**	-0.1785	3.9717**
[lag=0]	(-11.434)	(8.2282)	(-0.4001)	(3.5586)
	R^2 = 0.939	L_c = 0.642[0.119]		
DOLS	-85.749**	2.7442**	0.0862	5.7744**
[lead=0,lag=1]	(-8.1812)	(5.2995)	(0.1463)	(2.5414)
	R^2 = 0.929	L_c = 0.048[>0.20]		
CCR	-82.109**	2.8356**	-0.1681	3.9879**
[lag=0]	(-10.113)	(6.9958)	(-0.3578)	(3.4604)
	R^2 = 0.939	L_c = 0.417[>0.20]		
Panel F. Institutional=Corruption				
OLS (Robust std error)	-78.312**	2.7981**	0.5684	1.3136**
	(-13.677)	(13.576)	(1.1035)	(2.5092)
	R^2 = 0.906	*EG* test = -3.773**		
FMOLS	-76.799**	2.7202**	0.6351	1.3593**
[lag=0]	(-10.856)	(7.8626)	(0.9860)	(2.1395)
	R^2 = 0.905	L_c = 0.217[>0.20]		
DOLS	-135.32**	4.6205**	1.2388	3.8461**
[lead=3,lag=0]	(-10.719)	(6.0170)	(0.8009)	(3.6385)
	R^2 = 0.942	L_c = 0.100[>0.20]		
CCR	-76.264**	2.6752**	0.7187	1.4009**
[lag=0]	(-9.7313)	(6.4696)	(0.9943)	(2.0419)
	R^2 = 0.718	L_c = 0.295[>0.20]		

Notes: Asterisk ** denotes statistically significant at the 5% level. Figures in the round brackets (.) are t-statistics, while figures in the square brackets [.] are *p*-values.

The long-run model in Table 2 clearly suggests that income is significant and positively related with sustainable tourism as presented in all seven panels of estimated cointegrating regression equations. The income variable is statistically significant at the 5 percent level in all estimated equations, thus suggesting that higher income will lead to higher sustainable tourism. Our results indicate that sustainable tourism is responsive to changes in income. A 1 percent increase in income will increase sustainable tourism by more than 1 percent, in this case, by only 1.8 percent (in Panel A) to 4.6 percent (in Panel F). On the other hand, similar to income, sustainable tourism is also quite responsive to changes in the deforestation rate. As shown in Table 2, the deforestation variable is negative and statistically significant at the 5 percent level in Panels B, C and G. This result suggests that a 1 percent decrease in the deforestation rate will enhance sustainable tourism by almost 0.8 percent (in Panel B) to 2.3 percent (in Panel G), on average. Thus, it is very clear from these results that mitigating deforestation or biodiversity loss will promote and elevate the growth in the tourism industry in Malaysia.

Table 2: Long-run model for sustainable tourism in Malaysia (continued).

Estimators\Variables	Constant	Income	Deforestation	Institutional
Panel G. Institutional=Democratic accountability				
OLS (Robust std error)	-64.781**	2.5332**	-0.2661	0.5022**
	(-14.662)	(12.995)	(-0.6591)	(2.3844)
	R^2 = 0.911	*EG* test = -3.825**		
FMOLS	-65.792**	2.6113**	-0.4398	0.6581**
[lag=0]	(-8.0568)	(6.1734)	(-0.8813)	(2.7003)
	R^2 = 0.907	L_c = 0.289[>0.20]		
DOLS	-98.476**	4.3679**	-2.3514**	0.8201**
[lead=2,lag=0]	(-7.0637)	(6.0669)	(-3.2057)	(3.1834)
	R^2 = 0.930	L_c = 0.067[>0.20]		
CCR	-63.580**	2.4995**	-0.3495	0.7231**
[lag=0]	(-7.6429)	(5.6506)	(-0.7183)	(3.6558)
	R^2 = 0.905	L_c = 0.400[>0.20]		

Notes: Asterisk ** denotes statistically significant at the 5% level. Figures in the round brackets (.) are *t*-statistics, while figures in the square brackets [.] are p-values.

On the other hand, our results show the important role played by the institutional factors to attract visitors to Malaysia. As the results in Table 2 suggest, except for government stability in Panel A, all the other remaining institutional factors overwhelmingly indicate that country with low risk as to socio-economic conditions, investment profile, internal conflict, external conflict, corruption, and democratic accountability are favorable tourist destination country. All the institutional variables, except government stability are positive and significant at the 5 percent level. Nevertheless, our results suggest that sustainable tourism in Malaysia is more responsive to external conflict and less responsive to democratic accountability.

Conclusion

The importance of the tourism sector can be seen from its contribution to the nations in terms of increase in foreign exchange earnings, and reduce unemployment. Latest strategy for tourism development is to keep the stability between beneficial gains from tourism activities without continuously degrade the environment and bring unfair opportunities for the people. Policies aim for sustainable tourism that helps to stimulate the tourism sector and reducing the number of biodiversity loss at the same time where tourism activity is a key cause.

The main interest of this research is to investigate the long-run relationship between

sustainable tourism and its determinants – income and deforestation rate for the period 1996 to 2016. We construct an index for sustainable tourism using four sustainability indicators - ratio of tourist arrival to population, protected forest area, carbon dioxide emissions per capita and oil palm planted hectarage.

The short time series data which consist of 21 observations were tested by using the OLS, CCR, DOLS and FMOLS which were found to be effective to correct for simultaneity and biases in small sample. Overwhelmingly, the result suggests that national income has positive impact on sustainable tourism while deforestation rate show negative impact on sustainable tourism in Malaysia. Furthermore, also important is the role of the institutional factors in affecting sustainable tourism in Malaysia. A "good institutional standing" of a country will attract international tourist arrivals as their destination country. However, sustainable tourism in Malaysia is more responsive to changes in income compared to the deforestation rates, but, on the other hand, sustainable tourism is very responsive to the changes in the external conflict but less on democratic accountability. Nevertheless, how wealthy and how "good institutional standing" a country is, protecting biodiversity in Malaysia has a tremendous positive impact on the tourism industry and the nation.

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