

A Panel Data Analysis of Demand for Tourism in Africa¹

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This study examines the factors that determine the demand for tourism in Africa. It starts by analysing the trend in tourism across the globe, focussing particularly on Africa. There are several factors that influence the demand for tourism. This study has included both endogenous and exogenous variables in determining the factors that influence tourism demand in Africa. Using a dynamic Generalized Method of Moments panel data analysis, it was discovered that exogenous variables such as political instability, crime rate and endogenous variables such as exchange rate appreciation and consumer price index are significant factors which tourists consider when choosing Africa as their destination. The results of this study conform with Naude and Saayman (2004) and Eilat and Linav (2005) who contend that political upheavals, an increase in crime rate, among other factors, are responsible for the decline in the inflow of tourists to Africa. This paper concludes that the exogenous variables are the vital determinants of tourist choices with respect to African destinations. The author suggests that for Africa to benefit from the potentialities embedded in the tourism sector, African leaders must strive to maintain peace and political stability, as well as reduce the level of incessant crimes in their various countries.

Keywords: Tourism, generalised method of moments, tourist arrivals, Africa

Introduction

Tourism is one of the most flourishing and emerging industries in the world. International receipts have grown by over 10 per cent in the last ten years, while international tourism expenditure amounted to over US\$525 billion in 2003 (WTO, 2004). Besides its potential to create employment opportunities and foreign exchange in a country, it is also a means of providing infrastructure as well as promoting cooperation and understanding among people the world over. Tourism has become a means through which many countries, especially the developing countries, improve their income and at the same time showcase their traditional heritage.

On the African continent, tourism is viewed as a means of enhancing economic growth and development (Kester, 2003), as well as improving the image of the continent to the outside world. According to Christie and Crompton (2001), the contribution of the tourism

industry to the gross domestic products (GDPs) and exports of many African countries have increased over time. As identified by a WTO (2004) report, there has been a significant growth in the level of international tourist arrivals in Africa. The World Travel and Tourism Council (WTTC) also puts the value of US\$39.6 billion as the amount that was generated in 2003 from economic activities in the travel and tourism industry in sub-Saharan Africa. The report shows that tourism contributes about 2.5% of the GDP in the region, and accounts for about 5.5% of employment.

However, in spite of Africa's potential in tourism, the continent's tourism endowments are underdeveloped and underutilised. The WTO (2004) report indicates that Africa attracted less than 5% of international tourist arrivals in 2004, and received less than 3% of international tourism receipts. In 2001, Africa witnessed about 27.7 million international tourist arrivals and got an international tourism receipts of

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US\$11.7 billion (Naude and Saayman, 2004). This implies that there are 3.7 tourist arrivals for every 100 people. This result is very poor compared with the world average of 11 and 44 arrivals per 100 people in Europe.

There are limited empirical studies on tourism in Africa despite its potentialities and endowments. Christie and Crompton (2001) contend that the lack of empirical studies on tourism in Africa is largely responsible for the poor management of the industry. This study intends to contribute to the existing literature on tourism in Africa by including both endogenous and exogenous variables in explaining the factors that determine the demand for tourism on the continent, using the dynamic Generalized Method of Moments (GMM) of panel data analysis between 1995 and 2004 (an update of data points by Naude and Saayman, 2004).

Tourism in Africa

Tourism is believed to be an important ingredient for economic development due to its impact on employment generation, provision of infrastructure, generation of income, taxes, exports and the enhancement of global peace (Eilat and Einav, 2003). According to Sinclair (1998), tourism is now among the fastest growing industries in the world. Competition among destinations has also intensified to attract more tourists.

The growth in tourism has been impressive in recent years. This is revealed in the number of tourist arrivals the world over which showcased an unprecedented increase from 25.3 million in 1950 to 69.3 million in 1960 and later to 165.8 million in 1970. Despite the retardation in the growth rate of tourist arrivals since 1970, world tourist arrivals multiplied by a factor of about 27 between 1950 and 2000, (as shown in table 1). Thus, from 25.3 million in 1950, international tourist arrivals reached 763.2 million in 2004 at an average annual growth rate of 6.4 per cent. In terms of global tourism receipts, the world witnessed an increase from US\$2.1 billion in 1950 to US\$17.9 billion in 1970, it later rose to US\$106.5 billion in 1980. Due to the increase in tourist arrivals globally coupled with the expenditure, international tourism receipts increased from US\$106.5 billion in 1980 to US\$479.2 billion twenty years later. The trend continued till 2004 when the total global tourism receipts amounted to US\$622.7 billion. This has led to

a situation whereby many countries are setting targets to gain additional income, foreign investments, employment and tax revenues that the sector can provide.

Table 1. International tourist arrivals, 1950-2004 (million)

Year	World	Africa	USA	Asia & Pacific	Europe	Mid. East
1950	25.3	0.5	7.5	0.2	16.8	0.2
1960	69.3	0.8	16.7	0.9	50.4	0.6
1970	165.8	2.4	42.3	6.2	113.0	1.9
1980	278.2	7.3	62.3	23.6	117.5	7.5
1990	441.0	15.2	92.8	57.7	265.3	10.0
2000	680.6	28.2	128.2	114.9	384.1	25.2
2001	680.4	28.9	122.1	120.7	383.8	25.0
2002	700.4	29.5	116.6	131.1	394.0	29.2
2003	689.7	30.8	113.1	119.3	396.6	30.0
2004	763.2	33.2	125.8	152.5	416.4	35.4

Source: World Tourism Organisation, 2005.

Many African countries have started tapping into the potential benefits of tourism. According to Kester (2003), tourism has the potential to contribute significantly to economic growth and development in Africa. Naude and Saayman (2004), in the same vein, opine that Africa’s cultural and natural resource endowments are so numerous that it ought to be benefiting largely from tourism; while Christie and Crompton (2001) believe that Africa has exceptional tourism potential that could contribute to the continent’s GDP.

Table 2. International Tourism Receipt, 1950-2004 US\$ (billion)

Year	World	Africa	USA	Asia & Pacific	Europe	Mid. East
1950	2.1	0.1	1.1	0.04	0.9	0.03
1960	6.9	0.2	2.5	0.2	3.9	0.1
1970	17.9	0.5	4.8	1.2	11.0	0.4
1980	106.5	3.4	24.7	11.3	63.7	3.5
1990	273.2	6.4	69.3	49.7	145.6	5.1
2000	479.2	10.6	131.0	90.4	231.6	15.6
2001	467.0	11.5	119.8	93.5	226.7	15.5
2002	481.6	11.8	113.7	99.1	241.2	15.7
2003	524.2	15.5	114.1	94.9	282.9	16.8
2004	622.7	18.3	131.7	125.0	326.7	21.0

Source: World Tourism Organisation, 2005

International tourist arrivals to African destinations increased from just 500,000 in 1950 to over 15 million in 1990 (see table 1). The number of arrivals, which was 28.2 million in 2000, rose to 33.2 million in 2004.

This clearly shows that Africa's tourist arrivals have grown over time. According to WTO figures (2003), Africa's tourism has grown significantly since 1990, and in terms of the continent's receipts on global tourism, table 2 reveals that Africa's international tourism receipts rose from US\$100 million in 1950 to US\$3.4 billion in 1980 and to US\$6.4 billion in 1990. By 2000, Africa's tourism receipts had risen to US\$10.6 billion and US\$18.3 billion in 2004. Africa's tourist arrivals and receipts literally depicts Africa an increase, but its share is still small, increasing from 1.98 per cent in 1950 to 4.25 per cent in 2001. The latter figure fell in 2002 to 4.21 per cent and picked up in 2004 to 4.4 per cent of the global tourist arrivals (see fig.1). In terms of growth rate, the continent recorded a decline of about 42 per cent of the previous number arrivals in 1960.

Subsequently, there was a positive growth rate of about 81 per cent in 1980, which marked the peak of growth. Since then, there had been a drastic fall in the growth rate till 2001, after which there was a slight increase between 2002-2003 which fell again in 2004 (as shown in fig. 2).

The case of the growth rate of Africa's tourist arrivals is not different from that of its receipts. Figure 4 indicates that Africa experienced a negative growth rate

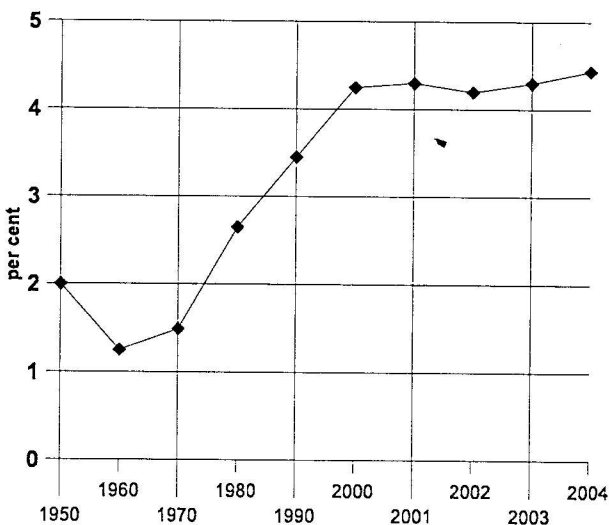


Figure 1. Africa's share of global tourist arrivals
Source: World Tourism Organisation, 2004

of 39 per cent in 1960 which reduced to -27 per cent in 1990 and later to -0.7 per cent in 2004.

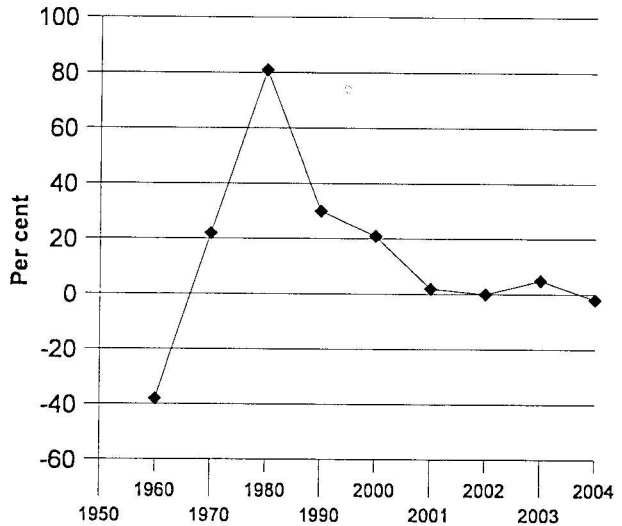


Figure 2. Growth in Africa's tourist arrivals market share
Source: Computed from World Tourism Organization, 2004.

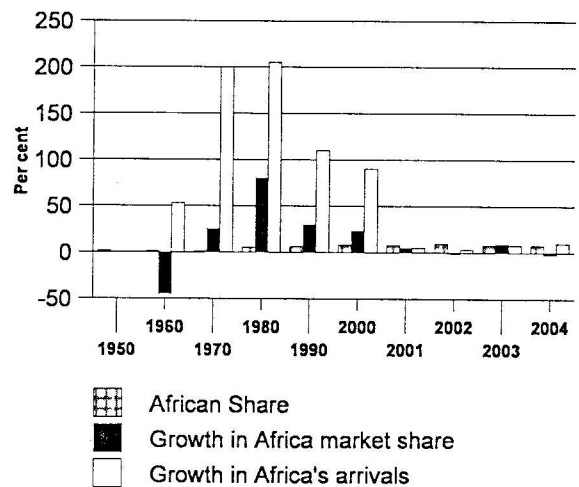


Figure 3. Africa's tourist arrivals performance
Source: Computed from World Tourism Organization, 2004

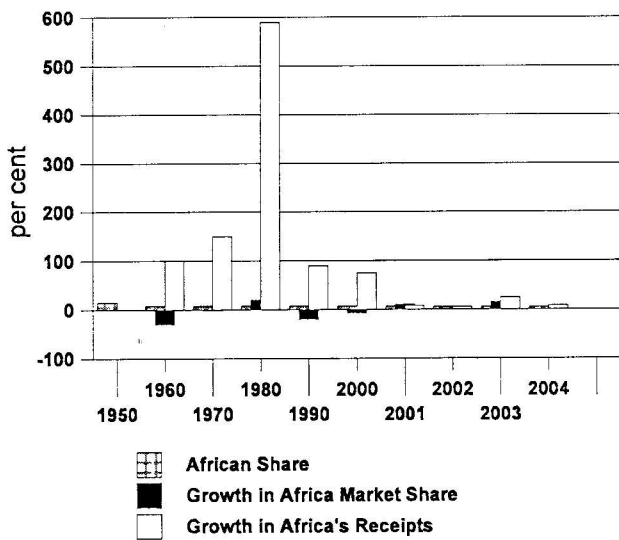


Figure 4. Africa Tourism Receipts Performance
 Source: Computed from World Tourism Organization, 2004.

Moreover, tourist arrivals in different regions of Africa vary. According to WTO figures (2003), there has been a considerable improvement in tourism in Africa, especially in 1990. Of particular interest is that of Southern Africa, which grew by almost 300% between 1990 and 2002 (as shown in table 3). North Africa, however, still remains the most attractive regional destination, capturing 1.5% of the total international tourism market share (Naude and Saayman, 2004). It is worthwhile to note that as the tourist arrivals in Africa increased in 2001 while that of the world tourism decreased during that period.

Table 3. Africa's International Tourist Arrivals by Region

	1990	1995	2000	2002	2003	2004	1995*	2004*
Africa	15,160	20,438	28,154	29,492	30,763	33,222	100	100
North Africa	8,398	7,271	10,202	10,407	11,092	12,791	35.6	38.6
West Africa	1,352	1,913	2,451	2,728	2,762	2,960	9.4	8.9
Cent. Africa	365	357	665	627	677	788	1.7	2.4
East Africa	2,842	4,906	6,600	6,927	7,251	7,483	24.0	22.5
South Africa	2,203	5,991	8,235	8,804	8,980	9,199	29.3	27.7

Source: World Tourism Organisation, 2004

* Denotes percentage increase to the previous year

Central Africa had the least tourist arrivals on the continent, followed by West Africa. This might be due to the inadequate infrastructures that are available for tourism in these countries compared to what obtains in the North, South and East African regions.

Literature Review

In general, reviews of existing literature have focussed on analyzing the impact of the determinants of tourism on the sector and the accurate forecast of future tourism demand. The present study pays particular attention to the underlying determinants of tourism demands. The comprehensive reviews of the literature on tourism demand by Crouch (1994a, 1994b, 1995), Witt and Witt (1995), Lim (1997, 1999) and Li et al. (2005) suggest a substantial agreement regarding both tourism demand measures and the variables that are important in explaining international tourism flows. A lot of these existing works have used tourist arrivals/departures and tourism receipts/expenditures as dependent variables. The number of tourists that stay overnight in their destinations and the average length of their stay have also been studied. As for the explanatory variables, models of tourism demand borrow heavily from the consumer theory, which predicts that the level of consumption depends on the consumer's income, the price of the good/service in question, the prices of related goods (substitutes and complements) as well as other demand shifters. As a result, income and prices are the most commonly used variables in terms of the major factors influencing tourism demand.

Given that leisure tourism is generally regarded as a luxury good, the income remaining after expenditures on necessities, or the so-called discretionary income, would be the preferred income variable. However, discretionary income is a subjective variable and is not precisely measurable. Therefore, most researchers have relied on the nominal or real (per capita) personal, disposable, or national income, as well as GDP as measures of income in origin countries.

The demand for tourism includes two price elements: the cost of travel to the destination and the cost of living in the tourist destination. Also, existing literature shows that the most often employed variables aimed at measuring the cost of living at the tourist destination relative to the origin country (and possibly to alternative destinations) have been relative consumer price indices. However, their deficiency comes from

the fact that the expenditure patterns of a tourist might be quite specific and therefore different from that of the average household in a certain country. As a result, some studies have used specific price indices such as hotel, drink and tobacco, shopping, meals, entertainment and other variables. However, the work of Martin and Witt (1987) has shown that such tourism-specific indices are no better than the overall price indices.

The exchange rate in the tourism demand model, in addition to/or combined with the relative price variables, are often employed in many studies. Some authors have argued that tourists respond to exchange rate movements much more than to changes in relative inflation rates when they make decisions on travel destinations (Artus, 1972). However, Martin and Witt (1987) argue that exchange rate alone is not an acceptable means of determining tourism costs. Most empirical works on tourism demand models have used the exchange rate adjusted for relative prices (ie, real exchange rate) to capture the substitution between domestic vacations and international travel. In this way, the impact of (relative) inflation and exchange rate movements are measured using a single variable.

Less attention has been paid to transportation costs due to the fact that there is lack data to accurately measure transportation costs. In countries where most of the tourists arrive by car, the proxies are usually oil or gasoline prices, while in the case of far-off destinations, airline fares is the preferable alternative. In the latter case, according to Mervar and Payne (2007), data problems arise due to the varied costs of airline tickets, which are difficult to collect and use for an empirical analysis. Furthermore, multicollinearity between the transportation cost and income variables presents an often cited reason for omitting the transportation cost variable from tourism studies (Lim, 1999).

Furthermore, the deleterious effects of supply constraints in form of shortages in hotel accommodation, passenger transportation capacity and trained staff, cannot be adjusted rapidly. Sometimes, a time trend is included to capture qualitative factors in tourist destinations. Also, dummy variables are employed in order to capture the impact of war, political crises or natural disasters, as well as seasonal variations.

The tourism demand model is usually estimated as a function of income of the tourists' origin country, transportation costs between destination and origin,

exchange rates, relative prices, dummy variables and the determining factors. In the past studies on tourism demand, annual data were often employed, but there has been an increasing use of quarterly data in recent literature which is in line with the growing interest in the seasonality of global tourism flows (Lim et al, 2005). In terms of the estimation techniques, the log-linear regressions are the most frequently employed functional forms, as the estimated coefficients can be interpreted as elasticities. However, while traditional econometric techniques dominated studies up to the mid-1990s, the use of cointegration, vector autoregressive models, almost ideal demand systems, and time-varying parameter models have since become familiar approaches. Thus, given the fact that the trend parallels the overall trend in applied econometric studies, it has since been shown that most time series data are not stationary. Therefore, the use of traditional econometric techniques may seriously affect the credibility of the results (Mervar and Payne, 2007).

Some studies, however, have attempted to forecast the demand for tourism at a particular period of time using various forecasting methods. Martin and Witt (1989) compare the accuracy of several quantitative methods in forecasting tourism demand in an international context; Johnson and Ashworth (1990) have survey articles on the determinants of tourism demand; Witt and Witt (1995) have reviewed about 65 empirical studies on tourism demand; while Sinclair and Stables (1997) make a synthesis of several tourism analyses, discussing particularly the use of different kinds of models, with explicit consideration of the single equation and system of equations approaches, and their respective advantages and disadvantages.

Studies on the determinants of tourism demand are subjected to specific problems. The reasons for the problems, according to Mello et al. (1999), are twofold: the special nature of the demand for tourism, which can be attributed to the complexity of the motivational structure underlying the decision-making process, and the scarcity of relevant data that are fundamental in econometric modelling. The quantitative studies of tourism demand require a formal mathematical model that can provide estimates of the sensitivity of demand to changes in the variables on which it depends. Econometric modelling can supply a good basis for an accurate forecast which is of

considerable value for policy making and an important element in public and private investment decisions.

However, tourism demand modelling is not easy due to the complexity of the decision-making process, the multiplicity and heterogeneity of the products and services specified, the fact that transportation plays a role in tourism consumption, the inter-temporal dependence of current demand on its past and future values, and the non-separability between leisure consumption and labour supply and/or between tourism demand and the demand for other goods and services. These difficulties in the specification of a comprehensive and reliable model of demand for tourism are compounded by the existence of unquantifiable factors influencing demand, as well as the inaccuracy or unavailability of data for those that are, in principle, measurable.

Thus, the conceptual and practical problems underlying the empirical studies in this area account for the simplifying assumptions made by researchers in their attempts to specify econometric models for explaining the behaviour of tourism demand. As long as the assumptions do not distort the estimated results, they perform an important role in facilitating the provision of information which can be useful for policy formation and decision making. When the assumptions are inadequate and questionable, they give rise to models that may embody misspecification bias, leading to inaccurate and unreliable estimation results that cannot be used for any sound inference and forecasting for policy purposes.

The major examples of this latter type of model can be found in the single equation approach within a static context. These ad hoc models lack the theoretical basis for which a reasonable testable hypothesis of consumer theory can be included, and generally neglect the possible interdependencies among competing destinations (Mello et al, 1999). These equations usually ignore the dynamic nature of demand for tourism, disregarding the possibility that the sensitivity to tourism demand by its determinants may differ between different time periods. Modelling procedures constrained by these theoretical faults lead to empirical inadequacies such as the omission of relevant variables and incorrect functional form that result in wrong models and biased estimates.

Thus, given the above, it has been discovered that in the empirical studies of tourism, there are two main

types of models. The first involves the studies that employ modern time series and cointegration techniques in the attempt to model and forecast the dependent variable between one or more countries (Song et al, 2000; Kulenderan and Witt, 2001; Seddighi and Theocharous, 2002; Song et al., 2003 and Dritsakis, 2004). The second type includes the studies that estimate the determinants of international tourism demand using classical multivariate regressions (Crouch, 1994b; Witt and Witt, 1995; and Lim, 1997).

This study will therefore explore these two models vis a vis the single equation and system of equation using annual panel data. The use of these two models is expected to provide a comparative analysis on the outcome of the two results so as to really know the model that suits the explanation of the demand for tourism.

Methodology

The model for specification in this study shall follow the empirical model of Halicioglu (2004), which examines the influence of world income, relative prices and transportation cost on tourist arrivals. In this model, the political dimension to tourism on the African continent, which was not considered in the Halicioglu's model (2004), is discussed. Thus, this model is readjusted to include a political dimension to tourism demand, it includes crime rate, political instability and terrorist attacks etc. (Naude and Saayman, 2004; Odularu and Karcem, 2007). Infrastructure variables such as the number of fixed and mobile telecommunication services available for tourists on the continent are also included. Thus, we specify the system equation model as follows:

$$\ln TA_{it} = \alpha_{i0} + \alpha_{i1} \ln WY_{it} + \alpha_{i2} \ln CPI_{it} + \alpha_{i3} \ln EXC_{it} + \alpha_{i4} \ln CR_{it} + \alpha_{i5} POL_{it} + \alpha_{i6} \ln TEL_{it} + \alpha_{i7} \ln TA_{it} - 1 + \varepsilon_{it} \quad \dots (I)_w$$

where, *TA* stands for the total tourist arrivals in Africa, *WY*; the real world income, *CPI*; the exchange rate adjusted to relative prices between Africa and the rest of the world, *CR*; the crime rate measured by the incidence of recorded crime in Africa, *POL*; the measure of political instability and *TEL*; the number of fixed and mobile telecommunication services. While

$i = 1, \dots, N$ represents the 20 countries that were selected for the study. We expect that $a_1, a_6 > 0$, and $a_2, a_3, a_4, a_5 < 0$. The study covers 1995 to 2003.

5. Estimation Technique

Panel data analysis is used in the study to estimate the demand for tourism in Africa. The use of panel data technique will enable us to address the local econometric problems in cross-country regression such as unobserved country effects, outliers, dynamics and model uncertainty. Its specification is given as:

$$X = Vb + a + N$$

X is the tourist arrivals of country j in period t . b is a $1 \times k$ vector of explanatory variables. a represents the fixed effect estimates. For $j = 1, \dots, Z$ and $t = 2, \dots, T$. The fixed effect estimator will allow us to show the short term and specific country/cross-section effects. Generalized method of moments (GMM) is used in order to deal with the problem of endogeneity that may arise.

Empirical Results

The GMM was adopted as the estimation technique in this study because it can correct endogeneity and heteroscedasticity problems that may arise from the use of other panel data estimation techniques. According to Greene (2004), dynamic GMM provides an estimation framework that involves a method of formulating models and implied estimators without making strong distribution assumptions.

Table 4 shows the result of the dynamic panel data techniques used in this study. The dynamic result gives four different outcomes of the technique vis a vis fixed effect, random effect, difference and the orthogonal deviation. The dynamic results show that in all the four outcomes of the model, consumer price index, which is a measure of relative price in the destinations, is inversely related to the number of arrivals. The significance of this variable in all the outcomes, with the exception of the difference model, indicates that price is an important factor that tourists consider in their choice of destinations in Africa, and the degree of responsiveness of tourists to changes in prices is inelastic in the models of the dynamic panel analysis.

Exchange rate in all these models is also inversely related to tourist arrivals, indicating that the value of destinations' currencies often discourages prospective tourists from coming to Africa. It is important to note that this variable is significant at 5 per cent level for all the models and it is highly inelastic.

The crime rate on the continent also has an inverse effect on tourist arrivals. As the incidence of crime increases in the destinations, there will be a reduction in the inflow of tourists to these destinations.

Table 6: Panel GMM Result - Dynamic

Variable	Fixed Effect	Random Effect	Difference	Orthogonal Deviation
Constant	-8.1934 (-1.94)*	-0.1205 (-0.54)	-	-
ln TA (-1)	2.2612 (2.93)**	1.0512 (34.66)***	2.6020 (2.53)***	2.2612 (2.62)***
CPI	-0.0024 (-2.47)**	-0.0007 (3.35)***	-0.0018 (-128)	-0.0024 (-2.62)**
Exc	-0.0002 (-2.36)**	-3.45E-05 (-2.05)**	-0.0002 (-1.94)**	-0.0002 (-2.45)**
lnCrime	-0.1486 (-1.61)	-0.0386 (-2.35)**	-0.0490 (0.43)	-0.1486 (-1.38)
lnTelnet	0.6588 (3.91)***	0.1187 (-2.80)***	0.6774 (5.74)***	0.6588 (5.91)***
Pol	-0.0782 (-0.68)	0.0322 (1.0081)	-0.0131 (-0.14)	-0.0782 (-0.60)
WY	0.0701 (1.10)	0.0157 (0.82)	0.0451 (0.77)	0.0701 (1.10)
Adj R2	0.94	0.86	0.84	0.86

Source: Author's calculation, 2007

Note: *, ** and *** denote 10%, 5% and 1% level of significant.

The lagged value of tourist arrivals (which is the number of previous tourist arrivals), the number of available telephone lines and world income all have an effect on the number of tourist arrivals. The number of telephone lines for the four outcomes are statistically significant. This indicates that it is an important factor that influences tourists' choice of destinations.

The same can be said of the previous number of tourist arrivals on the continent, as all the outcomes show that this variable is a relevant determinant of tourist demand. One interesting thing is that this autonomous variable reveals that if African countries do not make an effort to develop tourism through infrastructural development, reduced crime rate and stable political situations, there will be a reduction in the number of tourist arrivals in Africa.

Therefore, the dynamic panel data analyses are considered to be more reliable and realistic. Thus, they are better techniques in explaining the factors that influence tourism demand in Africa since it is usually employed to correct endogeneity problems, the issue of heteroscedasticity and dynamics of the variables.

Conclusion

We have attempted in this study to determine the factors that influence the demand for tourism in Africa. Analyses were carried out on the structure, pattern and trend of African tourism. Both the endogenous and exogenous variables were considered, that is, we have selected the economic variables as well as socio-political variables that influence tourists' choice of destinations.

Panel data analysis was adopted with the dynamic generalized method of moments estimation technique. The findings of the study indicate that political instability, crime rate, exchange rate appreciation and consumer price index serve as signals to prospective tourists to the continent. However, the previous tourist arrivals, number of telephone lines, a measure of infrastructure, and world income positively influence or determine tourist arrivals to Africa. Another interesting finding of the study is that the results of the dynamic GMM estimations are better than that of the pooled panel regression analysis that was used by Witt and Witt, 1995; and Lim, 1997. Thus, this study's results conform with the Naude and Saayman (2004) and Eilat and Einav (2003).

The study concludes that the exogenous variables such as political instability and crime rate in each African destination are the vital determinants of tourists' choice. This implies that for African destinations to realize the potentialities embedded in the tourism sector, African governments must be able to maintain peace and political stability as well as reduce the level of crime in their various countries.

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Biographical Note

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