ESTIMATING THE TOURISM POTENTIAL IN NAMIBIA

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Abstract

This paper investigates the determinants of tourism in Namibia for the period 1996 to 2005. The results indicate that an increase in trading partners' income, depreciation of the exchange rate, improvement in Namibia's infrastructure, sharing a border with Namibia are associated with an increase in tourist arrivals. The results show that there is unexploited tourism potential from Angola, Austria, Botswana, Germany, South Africa and the United States of America. This suggests that it is important to exploit the tourism potential as this would help to accelerate economic growth and generate the much needed employment.

JEL classification: F170, C500, C230, C330, C590

Keywords: tourism potential, panel data, fixed effects

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1. Introduction

Tourism is the largest export earner in the world as it generates foreign exchange that exceed those from products such as petroleum, motor vehicles, textiles and telecommunication equipment since the late nineties. Giacomelli (2006) and Eilat and Einav (2004) indicate that tourism is a labour intensive industry. It employs about 100 million people around the world and this account for 8.3 percent of world employment. The World Travel and Tourism Council (WTTC) indicate that in 2005 tourism accounted for about 10 percent of world GDP. Tourism is important in economies as it generates revenues required to finance infrastructure and other projects that promote economic development. It also promotes international peace through the provision of incentives for peacekeeping and closure of the gap between different cultures.

The WTTC estimates that tourism accounts for a significant proportion of the GDP and employment of developing countries and this indicates that it is important for economic development. According to WTTC (2006) the direct impact of tourism in the Namibian economy in 2006 is estimated at 3.7 percent of GDP and 4.7 percent of total employment. Since tourism touches all sectors of the economy its real impact is higher. The total direct and indirect impact of tourism is that it accounts for 17.7 percent of total employment and 16 percent of total GDP. The sector also accounts of 21 percent of the total exports of goods and services.

Before and after independence in 1990, Namibia has depended on the extraction of mineral resources, agriculture and fishing for growth and development but high unemployment remains a challenge facing the government. The tourism sector is now regarded as the sector with real opportunities for employment creation and economic growth. The government of Namibia recognises the role of tourism in the economy and has recently identified it in Vision 2030 and the National Development Plans as a priority sector. Vision 2030 is a long-term national development framework reflecting the aspirations and objectives of the people of Namibia. The kernel of this is the desire to enhance the standard of living and improve the quality of life of the Namibian people. Vision 2030 calls for every Namibian to have the standard of living equal to those in the developed world. The development of the tourism sector is regarded as the key factor in the Broad Based Economic empowerment. Given its importance and role in the Namibian economy, it is important to investigate factors that determine tourism in Namibia. This will help to analyse if there is unexploited tourism potential among Namibia's trading partners. An econometric model is a useful tool in analysing tourism.

In light of the above discussion, the objective of this paper is to investigate factors which determine tourist arrivals in Namibia using an econometric model of international tourism. It then investigates whether there is unexploited tourism potential among Namibia's trading partners in this sector. The rest of the paper is organised as follows. Section 2 discusses the overview of tourism in Namibia. Section 3 discusses the literature and model. Section 4 discusses the methodology for estimation and Section 5 provides

univariate characteristics of the data. Section 6 presents the estimation results, while Section 7 discusses the tourism potential. The conclusion is presented in Section 8.

2. Overview of Tourism in Namibia

Namibia experienced a boom in the tourism sector between 1996 and 2005. The total number of tourist arrivals in Namibia between 1996 and 2005 is presented in Figure 1. Tourist arrivals in Namibia increased from 461310 in 1996 to 777890 in 2005.

Insert Figure 1. here

The composition of tourist arrivals in Namibia is presented in Table 1 and shows that African countries are the main source of tourists to Namibia. With the exception of Germany in third place in Namibia's overall tourist ranking, African countries occupy the top six positions. Angola and South Africa are leading source tourists for Namibia. Other European countries (United Kingdom, Netherlands, France, Italy, Switzerland, Scandinavia, and Austria) also account for a significant amount of tourist arrivals in Namibia. The United States of America is the seventh main source of tourists for Namibia.

Insert Table 1 here

According to the WTTC (2006), travel and tourism in Namibia is estimated to directly produce N$ (Namibia dollars) 1.6 billion or US$256.7 million and this is equivalent to 3.7 percent of the GDP in 2006. The broader travel and tourism (which include direct and indirect impact) is estimated to contribute N$ 6.8 billion or US$ 1.1 billion and this accounts for 16 percent of Namibia's GDP. The broader tourism and travel is also expected to generate about 71800 jobs (total of direct and indirect) in 2006. This represents 17.9 percent of the total employment in Namibia.

WTTC (2006) indicated that the travel and tourism sector plays an important role in generating foreign exchange. It is estimated that this sector contributed N$4.4 billion or US$715.9 million in 2006. This accounts for 21 percent of total exports of goods and services in Namibia.

3. Literature and the Model

There are two main groups of literature on the tourism industry. The first is international trade, which according to Eilat and Einav (2004) is a starting point because tourism is part of international trade. The second group is the empirical tourism literature.

The general starting point for theoretical and empirical literature on international trade is the Heckscher-Ohlin theory or pattern. It states that international trade depends on the relative factor endowments. This is important when factors of production are capital and labour as this makes it less necessary for tourism analysis. In the case of tourism, the

most important factors of production are unique to the specific country and not easy to measure, evaluate or compute. Eilat and Einav (2004) gave examples of the Eiffel Tower, Pyramids and nice beaches. In Namibia, sand dunes of the Namib Desert are good examples of these unique factors of production, and it makes the investigation of the determinants of international tourists to the country less attractive theoretically. The ability of unique factors of production such as Sand Dunes of the Namib Desert to attract tourists to Namibia is best measured by the number of international visitors who visit them. An investigation of the variables that have an impact on the demand for tourism is very important when dealing with this sector of the economy. The variables that have an effect on tourism will be discussed later in this paper.

There are two groups in the empirical literature of tourism. The first group comprises of studies that use time series and cointegration econometric techniques to investigate the determinants of tourism demand and forecast the future tourist arrivals (among others, Katafono and Gounder, 2004; Narajan, 2005; Durbarry, 2002; Divisekera, 2003; Cheung and Law, 2001). The second group involves studies that deal with determinants of tourism using panel data econometric techniques (such as Eilat and Einav, 2004; Luzzi and Flückiger, 2003; Walsh, 1997; Roselló *et al*. 2005; Naude and Saayman, 2004). This current study falls within the second group of the empirical tourism literature. Following the review of the second group of the empirical tourism literature and theory, the demand for tourism from country *i* to country *j* is specified as:

$$T_{ij} = f(Y_j, P_i, ER_{ij}, TC_{ij}, INFRA_i, INFRA_j, A_{ij}) \qquad (1)$$

where T_{ij} is the number of tourist arrivals in country i from country j, Y_j is the income of country j, P_i is price or cost of living in country i, ER_{ij} is the exchange rate measured as units of country i's currency per unit of country j's currency, TC_{ij} is the transport costs between country i and country j, $INFRA_i$ and $INFRA_j$ are the measure of infrastructure in country i and j, and A_{ij} represents any other factor that determines the arrival of tourists from country i to country j. Equation (1) is specified in log form as for estimation purpose as:

$$
\begin{aligned}
\ln T_{ij} = \gamma_0 &+ \gamma_1 \ln Y_j + \gamma_2 \ln P_i + \gamma_3 \ln ER_{ij} + \gamma_4 \ln TC_{ij} + \gamma_5 \ln INFRA_i \\
&+ \gamma_6 \ln INFRA_j + \gamma_7 \ln A_{ij} + \varepsilon_{ij}
\end{aligned}
\tag{2}
$$

The income of the source of tourism country is the most widely used variable. As Lim (1997) states, travelling to another country is generally expensive and is regarded as a luxury good and therefore disposable income is an appropriate variable as it affects the ability of tourists to travel. Since disposable income data are hard to find, many studies uses real GDP per capita, nominal or real GDP or GNP. This study uses GDP of the tourism country as a proxy for income. An increase in income is positively related to the number of tourist arrivals, and hence γ_1 is expected to be positive.

The price of tourism is another most commonly used explanatory variable for tourism arrivals in many studies (such as Naude and Saayman, 2004; Katafono and Gounder, 2004; Walsh, 1997; Luzzi and Flückiger, 2003). It is the cost of tourism services which

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tourists pay at their destinations. A tourist price index which comprises of goods purchased by tourists is appropriate, but since this index is not available, most studies use the consumer price index as a proxy for price of tourism services. A rise in price at destination means that the cost of tourism service is increasing and this discourages tourist arrivals ($\gamma_2 < 0$).

The exchange rate variable is added to the list of explanatory variables in addition to the price. This is the nominal exchange rate defined as the currency of the tourist destination country per currency of tourist source country. A depreciation of the exchange rate makes tourism goods and services cheaper and encourages tourist arrivals ($\gamma_3 > 0$).

The cost of transport between the source and destination countries can be an important part of the cost of tourism goods and services. According to Luzzi and Flückiger (2003), the cost of transport should take into account the costs of an air ticket and the cost of the whole journey. The cost of transport should comprise all components of costs to the destination. The cost of transport to the destination could probably be measured as weighted average price of air, sea and land. It is difficult to get data on all components of transport costs between the source and destination countries, and most studies have used distance in kilometres between the tourism source and tourism destination countries. This current study also uses distance in kilometres between the source and destination countries as a proxy for transport costs. An increase in transport costs causes a decrease in the number of tourist arrivals, and this means that $\gamma_4 < 0$.

A measure of infrastructure variable was added in recent research to explain tourism flows. Studies such as Naude and Saayman (2004) used the number of hotel rooms in the country as an indicator of tourism infrastructure. The number of hotel rooms available in the country is an appropriate indicator of the capacity of the tourism sector in the country. According to Naude and Sayman, the higher the number of rooms the greater the capacity of the tourism sector and this implies that the country is highly competitive. The other measure of infrastructure used by Naude and Sayman is the number of telephone lines per employees. An increase or improvement in infrastructure in both the destination and source countries attracts the number of tourist arrivals, hence γ_5 and $\gamma_6 > 0$.

This study introduced a dummy variable to represent countries that border Namibia. After introducing the dummy variables, Equation (2) is re-specified as:

$$
\begin{aligned}
\ln T_{ij} = \gamma_0 &+ \gamma_1 \ln Y_j + \gamma_2 \ln P_i + \gamma_3 \ln ER_{ij} + \gamma_4 \ln DIS_{ij} + \gamma_5 \ln INFRA_i \\
&+ \gamma_6 \ln INFRA_j + \gamma_7 BORDER + \varepsilon_{ij}
\end{aligned}
\tag{3}
$$

where DIS_{ij} is the distance in kilometres between Namibia and its trading partners and is a proxy for transport costs. Countries which border Namibia are given the value of 1 and 0 for otherwise. It is expected that being a neighbour to Namibia is associated with an increase in tourist arrivals. That means the coefficient of γ_7 is expected to be positive.

4. Estimation Procedure

There are different models in panel data estimation and these are pooled, fixed and random effects. The pooled model assumes that countries are homogeneous, while fixed and random effects introduce heterogeneity in the estimation. A decision should be made whether to use random or fixed model because individual effects are included in the regression. A random effects model is appropriate when estimating the model between a country and its randomly selected sample of trading partners from a large group (population). A fixed effects model is appropriate when estimating the model between a country and predetermined selection of trading partners (Egger, 2000). Since this study deals with tourism arrivals in Namibia from 11 selected trading partners in the tourism sector, the fixed effects model will be more appropriate than the random effects model. The top 11 trading partners were selected based on the tourism data for the period 1996 to 2005. In addition, the study uses the Hausman test to check whether fixed effects is more appropriate than the random effects model. The fixed effects model will be better than the random effects model if the null hypothesis of no correlation between individual effects and the regressors is rejected.

The fixed effects model cannot directly estimate variables that do not change over time because inherent transformation wipes out such variables. Martinez-Zarzoso and Nowak-Lehmann (2001) suggested that these variables can be estimated in the second step by running another regression with individual effects as a dependent variable and the dummies as explanatory variables. This is estimated as:

$$IE_{ij} = \gamma_0 + \gamma_1 DIS_{ij} + \gamma_2 BORDER + \varepsilon_i \qquad (4)$$

where IE_{ij} is individual effects.

5. Univariate Characteristics of the Variables

The study uses annual data and the estimation covers the period 1996 to 2005. Detailed data description and their sources are given in the Appendix. Before estimating Equation (3), univariate characteristics of the data are analysed and this involves panel data unit root tests. Testing for unit root is the first step in determining a potentially cointegrated relationship between variables. If all variables do not contain a unit root, the traditional estimation methods can be used to estimate the relationship between variables. If variables are nonstationary, a test for cointegration is required. The literature identifies three types of unit root tests. The first test is Levin, Lin and Chu (2002) and it is referred to as the LLC test. The second test is that of Hadri (2000). These two types of panel unit root test assume that the autoregressive parameters are common across cross-sections. The LLC uses the null hypothesis of a unit root while Hadri uses the null hypothesis of no unit root.

Im, Pesaran and Shin (2003) developed a third type of panel unit root test called IPS. This test allows for autoregressive parameters to differ across cross-sections and also for individual unit root processes. It is computed by combining individual cross-section unit root tests in order to come up with a test that is specific to the panel. This test has more power than the single-equation Augmented Dickey-Fuller (ADF) by averaging N

independent regressions (Strauss and Yigit, 2003). The ADF specification may include intercept but no trend or may include an intercept and time trend. It uses the null hypothesis that all series have a unit root and the alternative hypothesis is that at least one series in the panel has a unit root. This test is one-tailed or lower tailed based on the normal distribution. This study uses LLC and the IPS to test for unit root. The results for unit root test are presented in Table 2. According to the IPS test statistic only tourist arrivals and electricity generated in Namibia are stationary and the remaining variables are not stationary. However, the LLC indicates that the null of the unit root is rejected for all variables, meaning that all variables are stationary. This study uses at least one test to assume a verdict of stationarity. Since all variables are stationary, traditional estimation techniques can be used to estimate Equation (3) and the test for cointegration is not required.

Insert Table 2 here

6. Estimation Results

The results for the pooled, fixed effects and random effects models are presented in Table 3. The results in the second Column are those of the pooled model. The pooled model assumes that there is no heterogeneity among countries and no fixed effects are estimated. It therefore assumes homogeneity for all countries. It is a restricted model because it assumes that the intercept and other parameters are the same across all trading partners.

The results of the fixed effects model are in the third Column. The fixed effects model assumes that countries are not homogeneous, and introduces heterogeneity by estimating country specific effects. It is an unrestricted model as it allows for an intercept and other parameters to vary across trading partners. The F-test is performed to test for homogeneity or poolability of countries. It rejects homogeneity of countries even at 1 percent significance level and this means that a model with individual effects must be selected.

The results of the random effects model are in Column 4. This model also acknowledges heterogeneity among countries, but it differs from the fixed effects model because it assumes that the effects are generated by a specific distribution. It does not explicitly model each effect, and this avoids the loss of degrees of freedom which happens in the fixed effects model. The LM test is applied to the null hypothesis of no heterogeneity. The LM test also rejects the null hypothesis of no heterogeneity in favour of random specification.

In order to discriminate between fixed effects and random effects models, the Hausman specification test is used to test the null hypothesis that the regressors and individual effects are not correlated. If the null hypothesis is rejected the fixed effects model will be the appropriate model. Failure to reject the null hypothesis means that the random effects model will be the preferred. The Hausman test rejects the null hypothesis and this

indicates that country specific effects are correlated with regressors and suggests that the fixed effects model is appropriate. The random effects model will be inconsistent.

Insert Table 3 here

The results for all three models are consistent with the theoretical expectations. The interpretation of the results focuses on the fixed effects model because it is the appropriate one. All coefficients are statistically significant, except the Namibia dollar/Euro exchange rate. The results of the fixed effects model shows that an increase in trading partner's GDP income causes tourist arrivals to Namibia to increase. An increase (depreciation) in the Namibia dollar/Euro exchange rate attract tourist to Namibia. Increase in electricity generated in Namibia is associated with an increase in tourist arrivals. This means that it is important to improve infrastructure in order to increase tourist arrivals. These results compares favourably with other tourism studies in the literature.

Table A1 in the Appendix presents country specific effects. The country specific effects show the effects that are unique to each country but not included in the estimation. They show that tourist arrivals in Namibia differ from country to country and each country is unique. There are unique features in some countries which promote tourist arrivals in Namibia from countries such as Botswana, Germany, South Africa, Zambia and Zimbabwe. These are countries with positive effects and are shaded in Table A1. The country specific effects also show that there are countries' characteristics (unobservable)

that discourage tourist arrivals in Namibia from countries with negative fixed effects and not shaded in Table A1. An investigation of the factors which discourage tourist arrivals in Namibia from countries with negative fixed effects is important for policy making, as this would help to identify constraints to the tourism sector.

Some factors which may explain the fixed effects in Table A1 in the Appendix are included in the second stage regression. The second stage regression results as specified by Equation (4) are given by Table 4. Table 4 shows that as expected, having a border with Namibia encourages tourist arrivals. The coefficient of distance which represents transport cost is negative and also significant, and this means that transport costs discourages tourist arrivals. This suggests that it is important for those in the transport sector to reduce their prices in order to promote tourism.

Insert Table 4 here

7. Tourism Potential

The fixed effects model estimated in Equation (3) is simulated in order to determine the within sample tourism potential. The actual tourist arrivals are then compared to the potential tourist arrivals in order to see if there are countries with unexploited tourism potential. The trade potential results are presented in Figure 2. Figure 2 shows that among others, Angola, Austria, Botswana, Germany, South Africa and United States of America have unexploited trade potential. It is important to promote Namibia tourism to these

countries in order to exploit the unexploited tourism potential. A further analysis of each country to identify possible constraints to Namibia's tourism is required.

8. Conclusion

This paper investigates the determinants of tourist arrivals in Namibia for the period 1996 to 2005 using a model of international tourism and analysed if there are some markets with unexploited tourism potential. The study revealed that the main source of tourist arrivals in Namibia is African countries, mainly neighbouring countries. Neighbouring countries account for the largest number of tourists followed by Germany, USA and other European countries.

The model was estimated for 11 main trading partners in the tourism sector. The estimation results show that trading partners' income has a positive effect on tourist arrivals in Namibia. A depreciation of the Namibia dollar/Euro exchange rate and increase in electricity generated in Namibia attract tourists. Transport costs increase the cost of travelling and therefore discourage tourist arrivals. Having a border with Namibia is associated with an increase in tourism arrivals in Namibia. The estimated model was simulated to determine if there is unexploited tourism potential. The results revealed that there is unexploited tourism potential in Angola, Austria, Botswana, Germany, South Africa and United States of America. The results suggest that it is important to promote tourism to markets where there is unexploited trade potential. Factors which inhibit the

tourism sector in Namibia need to be investigated. This can contribute to increase in economic growth and employment generation.
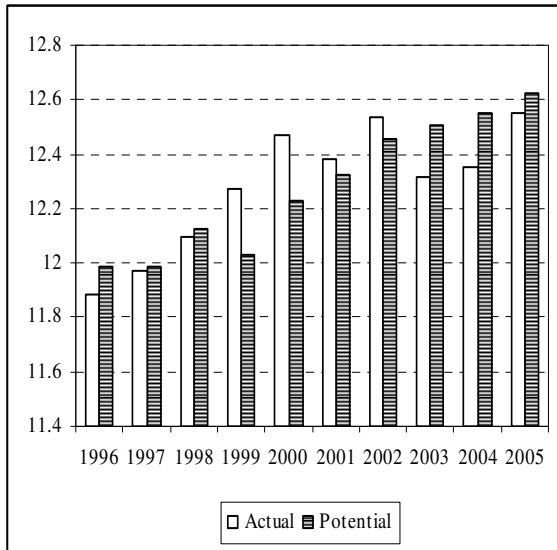
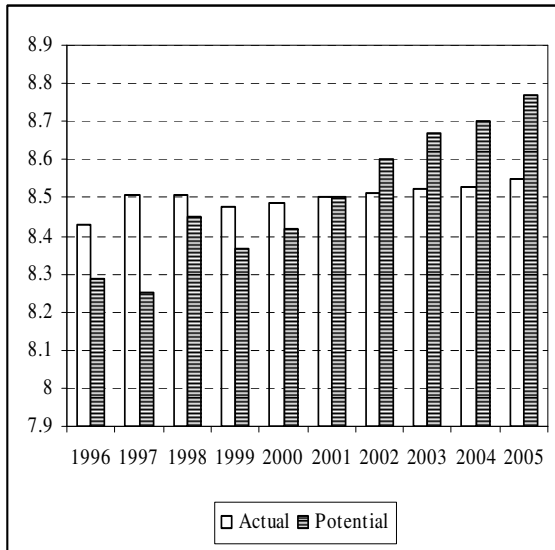**Figure 1. Total number of tourist arrivals in Namibia**
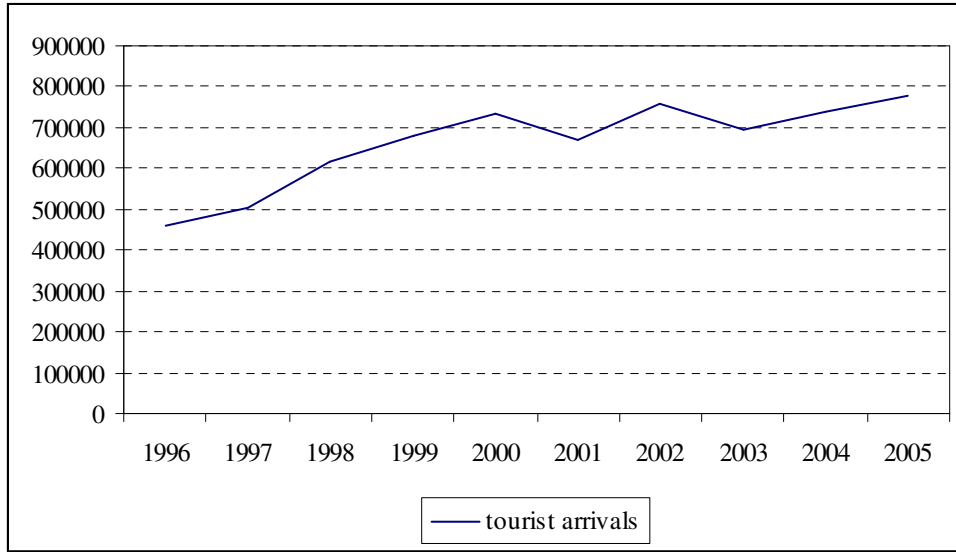
Source: Data obtained from Namibia Tourism Board and Ministry of Environment and Tourism of Namibia.
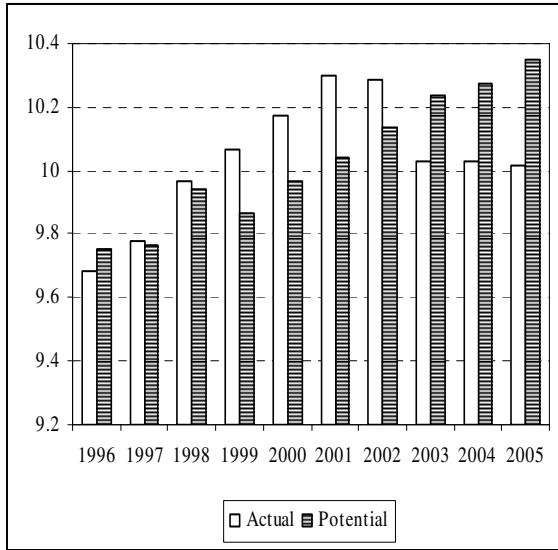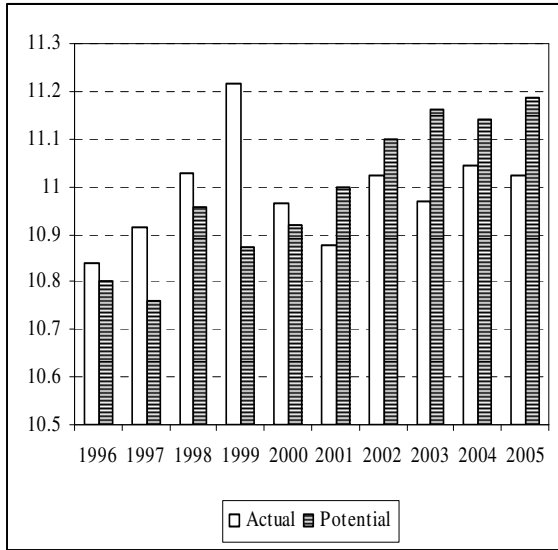
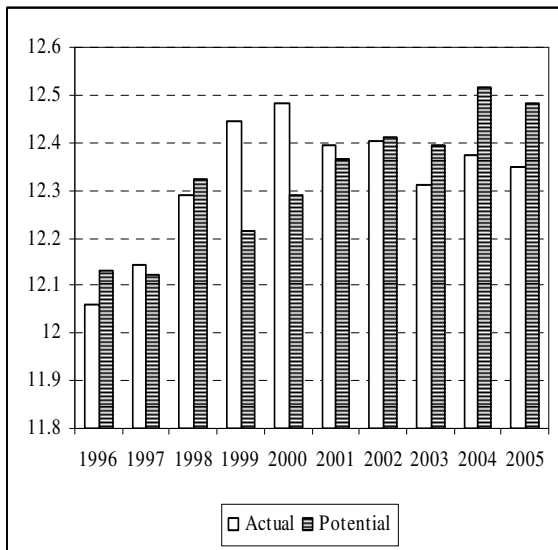**Figure 2. Trade Potential (in logs)**

Angola

Austria

Botswana

Germany

South Africa

United States of America
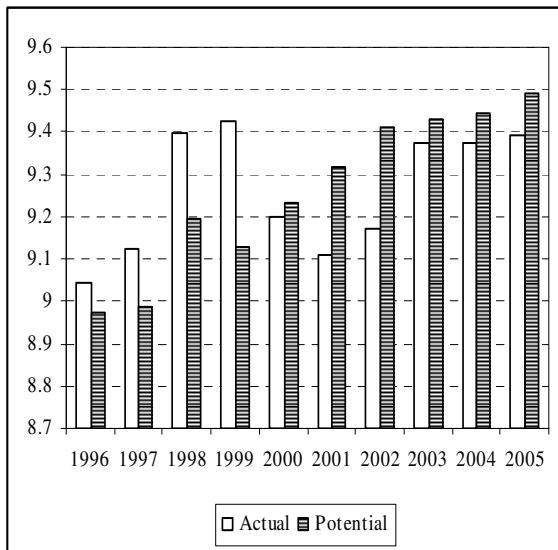
Table 1. Top sources of tourist arrivals for Namibia

Market	Tourist arrivals
Angola	281365
South Africa	230949
Germany	61222
Zambia	35782
Zimbabwe	22765
Botswana	22333
United Kingdom	20978
United States of America	11979
Netherlands	11569
France	9959
Italy	8557
Switzerland	8363
Scandinavia	6327
Austria	5160
Australia	4274
Total including others	777890

Source: Namibia Tourism Board and Ministry of Environment and Tourism of Namibia

Table 2. Panel Unit root test

Variable	IPS test statistic	LLC test statistic
GDP of trading partner	0.794 (0.786)	-3.530 (0.000)***
Namibia dollar/Euro exchange rate	2.187 (0.986)	-2.519 (0.006)***
Tourist arrivals	-1.713 (0.043)**	-3.989 (0.000)***
Electricity generated in Namibia (Namibia's infrastructure)	-1.484 (0.069)*	-9.543 (0.000)***

Notes: ***/**/* significant 1%/5%/10% level.

Probabilities are in parentheses.

Table 3. Estimation results

Variables	Pooled Model	Fixed Effects model	Random Effects model
Constant	-5.055 (-0.586)	-8.094 (-3.298)***	-5.775 (-0.445)
Trading partner's GDP	0.575 (7.215)***	0.296 (2.534)**	0.333 (3.060)***
Namibia dollar/Euro exchange rate	0.231 (0.452)	0.138 (1.042)	0.151 (1.142)
Electricity generated in Namibia	0.810 (0.738)	1.316 (3.830)***	1.248 (3.726)***
Border with Namibia Dummy	2.326 (3.108)***		2.066 (0.743)
Distance	-0.924 (-2.265)**		-0.453 (-0.318)
Adjusted R-squared	0.502	0.969	0.9573
F-test statistic		158.633***	
LM test statistic			430.592***
Hausman test statistic		104.26***	

Note: ***/**/* significant at 1%/5%/10% significant level

      t-statistics are in parentheses

Table 4. Second stage regression

Independent variables	Coefficient (t-statistics)
Constant	3.997 (2.148)**
Distance	-0.594 (-2.901)***
Border with Namibia	1.442 (3.330)***
Adjusted R-squared	0.874

Note: ***/**/* significant at 1%/5%/10% significant level

      t-statistics are in parentheses

APPENDIX

Table A1. Country specific effects

Fixed Effects	
ANGOLA	3.144784
AUSTRIA	-1.568071
BOTSWANA	1.039468
FRANCE	-1.591343
GERMANY	0.253790
ITALY	-1.744874
SOUTH AFRICA	2.412924
UK	-0.940050
USA	-1.923599
ZAMBIA	0.635535
ZIMBABWE	0.281436

Data description and sources

The study uses annual data and the estimation covers the period 1996 to 2005. Eleven countries are included in the estimation. The number of tourist arrivals in Namibia is used as a dependent variable. These data were obtained from the Namibia Tourism Board and Ministry of Environment and Tourism of Namibia.

GDP of Namibia's trading partners in the tourism sector is taken as a proxy for income. The data for this variable in USA$ were obtained from the World Bank Development Indicators and the IMF's International Financial Statistics. The Namibia dollar/Euro exchange rate was obtained from various issues of the Quarterly Bulletin of the Bank of Namibia. An attempt was made to include Namibia's consumer price index as a an additional variable but this did not yield good results.

The study also attempted to include a proxy of the infrastructure variables. Data for appropriate variables such as the number of roads, railways, building completed are not available for trading partners. The study uses electricity generated (hours of kilowatts) as a proxy for Namibia's infrastructure, and were sourced from http://www.ippr.org.na. Distance in kilometres between Windhoek and capital cities of trading partners in the

tourism sector is used as a proxy for transport costs and were obtained from http://www.timeanddate.com.

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