Modelling International Tourism Demand for Zimbabwe

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Abstract

This paper uses the autoregressive distributed lag (ARDL) approach to cointegration to estimate the coefficients of the determinants of international tourism demand for Zimbabwe for the period 1998 to 2005. The results show that taste formation, transport costs, changes in global income and certain specific events have a significant impact on international tourism demand. This implies that the improvement of international tourism infrastructure (in order to reduce travel costs and enhance the quality of services to tourists) so as to reinforce taste formation are important for attracting more international tourists to Zimbabwe. Furthermore, the authorities can potentially increase international tourism demand for the country by promoting pleasant events in the country.

KEYWORDS: International tourism demand, ARDL, Zimbabwe.

1 Introduction

Tourism is an important sector in most developing economies. It is a major source of foreign currency and its labour intensive nature makes a huge contribution to employment. As such, tourism has been identified as a key sector for the achievement of shared economic growth and poverty alleviation in Africa (Mitchell and Ashley, 2006; World Bank, 2006). While the determinants of domestic tourism demand are likely to be easily understood within any particular country, it is highly unlikely that authorities naturally comprehend the determinants of international tourism demand in the country. Consequently, understanding the factors underlying international tourism demand is important for enhancing the economic contribution, hence poverty reduction effects, of international tourism in developing countries, in general, and Africa, in particular. Yet until recently, empirical research on international tourism demand has focused on tourism in developed countries while Africa has received very little attention (Xiao and Smith, 2006; Rogerson, 2007).

This paper makes a contribution to research on international tourism demand in Africa. This is important because international tourism demand elasticities vary across destinations (Crouch, 1995) and international tourism demand remains under-researched in Africa. The paper uses time series data and applies the autoregressive distributed lag (ARDL) approach to cointegration to investigate the determinants of international tourism demand for Zimbabwe. The rest of the paper is arranged as follows: Section 2 provides a background to international tourism in Zimbabwe. Section 3 provides the theoretical foundations for investigating the determinants of international tourism demand. Section 4 outlines the methodology used in this investigation while Section 5 presents the empirical results. Section 6 concludes the paper by drawing policy implications.

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2 International Tourism in Zimbabwe

Zimbabwe is host to one of the Seven Wonders of the World, the Victoria Falls. Other attractions include wildlife diversity in its system of protected areas, one of the largest man-made lakes in the world (i.e., Lake Kariba), scenery and eco-diversity in the Eastern Highlands, ancient ruins of Great Zimbabwe and a favourable warm climate. Given the nature of its attractions and the fact that it is landlocked, Zimbabwe has historically been easily classified as a "wanderlust" destination. This explains why tourism has historically been an important sector in the Zimbabwean economy. In 1996, international tourism receipts comprised 57.2% of commercial services exports (Christie and Crompton, 2001). At its peak in 1997, international tourism receipts comprised 7.3% of total exports of goods and services. However, since then, international tourism receipts have been declining, reaching as low as 3.3% of total exports in 2003. With the drying up of other sources of foreign currency, such as agricultural and mining exports, the tourism sector assumed an important role as the only remaining major source of foreign currency. Since tourism has remained a vital sector in the economy, its rejuvenation in the short-run will contribute significantly to the economy because the other sectors, such as agriculture and mining, will only find their feet in the medium-term and beyond, because of the drastic structural changes which are needed to revive them.

Figure 1 shows the trends and growth rates in international tourism arrivals to Zimbabwe from 1994 to 2005. During this period, international tourism arrivals to the African continent were rising. However, for Zimbabwe, international tourist arrivals rose rapidly after 1990, and then started to decline in 2000. In fact, the growth rates in international tourist arrivals show that arrivals to Zimbabwe were growing at a faster rate than the continent until 1997. The highest growth rate was in 1995, when Zimbabwe hosted the All Africa Games, which saw a 35% increase in tourist arrivals. Average growth for the pre-2000 decade was above that of the continent. According to the United Nations World Tourism Organisation (UNWTO) (2006), international tourist arrivals to Zimbabwe grew at an average annual rate of 12.0% compared to 6.4% for the continent between 1990 and 2000.

Zimbabwe's tourism fortunes started changing in 2000, the same year political instability emerged in the country. The sources of political uncertainty in Zimbabwe in 2000 can be attributed to three events, namely:

1. the process surrounding the referendum on the draft new constitution which failed to be adopted;
2. the spontaneous "fast-track" land reform programme which was implemented immediately after the defeat of the draft new constitution, and
3. the heavily polarised parliamentary election in which the opposition won a significant number of seats for the first time in Zimbabwe's history.

Since then, international tourist arrivals to the country have generally continued to decline with the exceptions occurring in 2001 and 2002. In 2001, there was the first total solar eclipse of the Third Millennium which was visible from within a narrow corridor traversing the Southern Hemisphere and could be conveniently seen from Zimbabwe. This attracted a large number of visitors and saw a 12.7% annual increase in international arrivals for 2001. However, this increase was not sustained in subsequent years.

There was also a rise in international arrivals in 2002, when there was a presidential election that the opposition alleged was stolen by the ruling party. The West responded by imposing sanctions on key figures in the ruling party and government. However, in the same year, Zimbabwe hosted the semi-finals and finals of the continental beauty pageant, Miss Malaika 2002, and another solar eclipse could be partially viewed from Zimbabwe in December. International arrivals declined at an average annual rate of 4.5% for the period 2000 to 2005 with the largest annual declines of 14.7% and 15.9% in 2003 and 2005 respectively. In contrast, international tourist arrivals to the continent as a whole grew by 5.7% between 2000 and 2005. Of course, the average annual growth in international arrivals to the continent between 2000 and 2005 was lower than the 6.4% average annual growth between 1990 and 2000. This slowdown could be attributed to the September 11 terror attacks in the United States which caused global tourism to slow down (Gauci *et al.*, 2004).

Even more disaggregated data corroborate the poor performance of international tourism in Zimbabwe. Figure 2 shows the monthly international holiday visits to Zimbabwe. The data shows fluctuations around a downward sloping linear trend.

The sharp peak observed in June 2001 relates to the influx of visitors to witness the total solar eclipse that could be observed from Zimbabwe. Another peak is observed in September 2002, the month in which the country hosted the semi-finals for the Miss Malaika pageant. The final pageant was also held in Zimbabwe in December, the same month as another solar eclipse that could be partially viewed from Zimbabwe. The other peaks reflect seasonality in international holiday visits to Zimbabwe, with massive inflows every December. A trough is observed immediately after the September 11 terror attacks and another in the March 2002 presidential election period. Modelling international tourism demand for Zimbabwe requires paying attention to these specific events.

The change in the fortunes of international tourism in Zimbabwe is also visible in changes in its share of the African international tourism market relative to substitute destinations such as East Africa (i.e., the sub-region classified by UNWTO (2006)). As shown in figure 3, the Zimbabwean share of the African international tourism market matched the trends of East Africa until 2002. Since then, Zimbabwe's share of the market declined faster than the East African market share. Zimbabwe's market share fell from a peak of 8.1% in 1997 to a low of 4.2% in 2005, while East Africa's share declined by only 3.9 percentage points from its 2001 peak of 25%. Thus, Zimbabwe ceded its position among the 20 most promising destinations in Africa. Although its market share in 2005 still places it among the top five destinations in Africa, its share is by far smaller than the top four destinations which have continued to grow. This indicates that Zimbabwe has fared badly against other destinations in Africa. As mentioned earlier, international tourism has an important role in the Zimbabwean economy. Its recent decline is a cause for concern, hence the need to investigate the determinants of international tourism demand for Zimbabwe. Once the key drivers of international tourism demand are understood, policies can be formulated to enhance this important sector.

3 Determinants of International Tourism Demand

Several thorough reviews on the determinants of international tourism demand have been published (e.g., Crouch, 1994a, 1994b; Lim, 1997; Li *et al.*, 2005). As such, this paper shall only give a brief review of the determinants of international tourism demand. The standard theory of demand forms the theoretical foundations for modelling international tourism demand. The traditional literature on this subject rarely offers explicit theoretical models. Traditionally, analysis has been carried out using single equation models in which authors select explanatory variables based on intuition from standard demand theory. The approach has been criticised for failure to take into account the interdependence of budget allocations to different tourist destinations and what some call an *ad hoc* selection of variables (Li *et al.*, 2005). Therefore, some researchers propose a systems approach as the appropriate framework for modelling international tourism demand. The Almost Ideal Demand Systems (AIDS) is an attractive approach in this framework because it is based on utility maximisation, hence it has a strong theoretical underpinning (Syriopoulos and Sinclair, 1993; Mello *et al.*, 2002). Nonetheless, the single estimation framework remains the more dominant approach.

In the different models, price of tourism, the income of the country of origin, and taste formation emerge as critical determinants of international tourism demand. However, the magnitude of their influence varies widely, and Crouch (1995) uses meta-analysis to show that the differences are a function of destination.

As mentioned above, international tourism demand is expected to follow the law of demand. An increase in price reduces international tourism demand. The price of tourism includes the cost of commodities consumed by tourists in the destination country and the cost of access to tourism facilities. Transport cost is also included in the price, but empirical studies typically treat it differently. Empirical estimation normally uses consumer prices of the destination country relative to consumer prices of the country of origin. Some studies adjust these prices for the exchange rate while others model the exchange rate as a separate variable. The latter approach is based on the argument that tourists have relatively more up-to-date information on exchange rates than commodity prices in destination countries, hence the exchange rate is likely to have a different impact from that of commodity prices. The estimated own price elasticities have, when grouped by region of destination, an estimated mean of -0.63 (Crouch, 1995). This is lower than the exchage rate elasticity's estimated mean of -1.0 (*ibid*). However, in line with the other approach, Webber (2001) modelled exchange rate volatility in long-run demand for outbound tourism for Australia and concluded that exchange rates are likely to have the same impact as relative prices (see also Tan *et al.*, 2002).

The price response of tourism can either be elastic or inelastic with "wanderlust" destinations expected to have inelastic responses while "sun lust" destinations have an elastic response (Crouch, 1994a). Indeed, price responsiveness is destination specific, and generally varies by income category as confirmed by Crouch's (1995) finding that Northern Europe destinations are price elastic while the Mediterranean region is price inelastic. Crouch (1995) attributes this to high prices in highly developed countries compared to the other regions. This is further confirmed by Eilat and Einav (2004) who find that the price elasticity is unity and significant for high Gross National Product (GNP) countries but insignificant for low GNP countries.

As mentioned earlier, transport cost is also usually considered to be a component of price but is always treated separately in empirical studies. As noted in Lim (1997), this is one of the most omitted variables in the estimation of international tourism demand. This could be attributed to the difficulty in measuring transportation costs. These arise from the use of different modes of transport as well as differences of types of travel in each mode. A general finding among a few studies that use a proxy for transport cost is that it is insignificant (Martin and Witt, 1987; Witt and Witt, 1992; Kim and Song, 1998). Li *et al.* (2005) also note that the use of proxies for transport costs yielded significant coefficients only in a very few cases, mostly in long-haul destinations, while Crouch (1996) concludes that omission of the travel cost variable is of little consequence to estimated income and price elasticities.

Income is one of the most important determinants of international tourism demand, frequently providing higher explanatory power than other variables. The general finding is that international tourism is a luxury good (Crouch, 1994b) hence the increase in international tourism in the 21^{st} century is attributed to higher global income. Similarly, Gauci *et al.* (2004) attribute the slowdown in global tourism, prior to 2001, to a slowdown in global economic activity. Estimated income elasticities range from 1.0 to 2.0 indicating that international tourism is a luxury good. However, this also implies that international tourism is pro-cyclical, hence countries in which tourism makes a significant contribution to the economy are the worst affected by recessions.

International tourism is subject to changes in tastes over time. This has been generally captured by using a time trend. General magnitudes fall in the range of 0.045 – 0.565. However, there is scepticism about the interpretation of the time trend coefficient as a measure of taste formation, since it assumes a constant rate of change in tastes (Lim, 1997). Li *et al.* (2005:88) also argue that the coefficient of the deterministic trend is "too restrictive to be realistic" since it implies a steady-state format. The time trend also captures a host of other variables (observed and unobserved) that increase over time thus further clouding the precise interpretation of its coefficient.

An alternative measure of taste formation, used especially in dynamic models, is the lagged value of the international tourism demand variable. This is based on the notion that once tourists like a destination, they will return to it and will surely recommend it to family, friends and colleagues.

The latter course of action may be more effective than advertising. A positive coefficient implies that tourists either return or encourage others to visit the destination. Song *et al.* (2003) find a significant effect of the lagged dependent variable in their estimates of demand for Hong Kong tourism. Their coefficients also varied by the country of origin from 0.412 for Australians to 1.151 for Indians. Naude and Saayman (2004) find a negative coefficient for total tourist arrivals to Africa. This suggests a need to improve the quality of facilities and standards of hospitality for tourists, if destinations are to attract more visitors.

From consumer theory, the price of complements or substitutes affects international tourism demand. These are featured prominently in empirical models based on the AIDS whose major criticism of the traditional approach is that it does not consistently capture cross price effects (Divisekera, 2003). However, as noted in Mello *et al.* (2002: 518), "clear conclusions about the complementarity or substitutability among destinations are not usually obtained in studies using the AIDS model..." Their findings, however, show general substitutability among European destinations by United Kingdom tourists.

Just like the demand for any commodity, the demand for international tourism is subject to both positive and negative shocks, hence specific events and political risk are also important determinants of international tourism demand. For example, Leiper and Hing (1998) attributed Malaysia's negative growth in international tourism during 1997 to the Asian financial crisis and outbreaks of forest fires. These findings are confirmed in Tan *et al.* (2002) who find that the Asian financial crisis and the gulf war had a negative impact on international tourism to Indonesia.

Changes in political risk also contribute to tourism demand shocks. High political risk discourages visits to that destination, except by the adventurous. A general impact can also be observed from the 11% global decline in tourists registered in the last quarter of 2001 in the aftermath of the September 11 terror attacks. The most affected destinations were the Middle East, with a 30% decline and the Americas, with a 24% drop (Gauci *et al.*, 2004). Eilat and Einav (2004) include a destination risk index in their estimation of determinants of international tourism. They find that a one point improvement in the risk index increases incoming tourists by 4% and the magnitude of this effect is the same for both low and high income destinations. This is particularly important in the context of international tourism in Africa where risk perceptions are lower than the Middle East.

4 International Tourism Demand for Zimbabwe

In modelling international tourism demand for Zimbabwe, this paper focuses on international holiday visits to Zimbabwe instead of total international visits. This distinction is made because an aggregation of all types of visits is problematic since the explanatory variables differ by purpose of visit and the same explanatory variable's influence may also vary by purpose of visit. For example, a destination's economic performance should certainly affect business visitors while its effect on holiday visitors may not be so obvious. Also, price variability is likely to have a greater impact on business visitors than holiday visitors in a "wanderlust" destination. Thus, the aggregation of all kinds of visits clouds the influence of explanatory variables.

In the modelling of international tourism demand for Zimbabwe, a choice has to be made between single-equation and multiple-equation system estimation. Multiple-equation system estimation is more appropriate for modelling an origin country's outbound tourism demand for various destinations rather than a single destination's total tourism demand aggregated across different countries of origin. Thus, multiple-equation system estimation is applicable in a three dimensional analysis. Notwithstanding the advantages of multiple-equation system estimation highlighted above, it is not appropriate for the purposes of this study. This paper models international tourism demand for Zimbabwe from all countries rather than from a particular country of origin. Moreover, data availability is a problem since there is no monthly data disaggregated by both purpose of visit and country of origin for tourists to Zimbabwe. Single-equation estimation still provides useful insights to factors that influence international tourism demand and remains the most widely used estimation framework. Therefore, this study also uses a single-equation framework to analyse international tourism demand for Zimbabwe.

4.1 Data and Variables

The study uses monthly time series data from 1998 to 2005 thus providing 96 data points. As mentioned above, the dependent variable is international holiday visits to Zimbabwe. The data for this variable was obtained from the Central Statistical Office (CSO) of Zimbabwe's annual bulletins of tourism statistics.

From the literature, taste formation, domestic prices, foreign prices, income of the country of origin, and transport costs are identified as important determinants of international tourism demand. The paper uses proxies to capture these variables. Taste formation is captured by the lagged value of international holiday visits instead of the time trend. This avoids problems associated with interpreting the coefficient of the time trend as the impact of taste formation.

The consumer price index (CPI) of Zimbabwe is used as a proxy for domestic prices. However, Lim (1997) advocates for the use of a tourist price index. Such an index has never been computed for Zimbabwe. Furthermore, earlier studies such as Martin and Witt (1988) did not find sufficient differences in explanatory power of the tourist price index over the CPI. A number of studies also use the CPI (Webber, 2001; Tan *et al.* 2002; Eilat and Einav, 2004). Some models use CPI adjusted for the exchange rate while others separate these two prices. Separation occurs on the basis that tourists have more up-to-date information about the exchange rate than prices of commodities in the destination country (Eilat and Einav, 2004; Webber, 2001), hence the responsiveness of international tourism demand to the exchange rate is bound to be different to responsiveness to CPI. However, Tan *et al.* (2002) concluded that a model of relative prices adjusted for the exchange rate performs better. Therefore, we shall use the CPI divided by the exchange rate.

After the year 2000, there were two foreign currency exchange rates in operation in the country, the official exchange rate and the parallel market rate. The official exchange rate is overvalued while the parallel market rate is market determined. The paper uses the parallel market rate since the majority of residents in the country use this rate. Moreover, international tourists can potentially also use this rate except for expenses associated with hotel accommodation and areas of attraction which must be paid for in foreign currency due to foreign exchange control regulations. Thus, the use of an overvalued official exchange rate could inflate Zimbabwean prices when compared to other countries, hence the parallel market rate is more appropriate. The CPI, with 2000 as a base year, was obtained from the International Monetary Fund (IMF) (2008), while the parallel market rate was constructed from observed end of month parallel market rates.

Foreign prices are proxied by prices from South Africa since most tourists come to Zimbabwe via South Africa. It is captured by the CPI, with 2000 as the base year, also obtained from IMF (2008). Transport costs are proxied by international oil prices since it is a major driver for both road transport price and air fares. Monthly data on income is not available. However, since the trends in global income have tended to follow the United States economic activity, the monthly United States unemployment rate is used as a proxy for changes in income. This data was also obtained from IMF (2008).

As we argued earlier in the background section, dummies for the solar eclipse, Miss Malaika 2002, September 11 terror attacks and the festive season are also included. Since the post-2000 period was generally plagued by political instability, a dummy taking a value of one in this period is also included.

4.2 Estimation Technique

The Autoregressive Distributed Lag (ARDL) approach to cointegration is used to estimate the international tourism demand function for Zimbabwe. This approach allows the estimation of both short-run and long-run elasticities of international tourism demand. Unlike other single-equation estimation frameworks, it offers explicit tests for identifying a unique cointegration vector rather than assuming it. However, like the other single-equation cointegration approaches, the ARDL suffers from the weakness that it is only valid when there is a unique cointegration vector. There is no guarantee that there will always be a unique cointegrating vector. As long as the ARDL model is appropriately augmented to allow for contemporaneous correlation, valid asymptotic inference can be made under least squares estimates of the ARDL (Pesaran *et al.*, 1996). As such, the ARDL is applicable even when some explanatory variables are endogenous. Furthermore, the existence of a long-run relationship is independent of the variables order of integration provided that none of the variables are integrated of order 2.

The paper opts for a log-linear model since it has been found to outperform the linear specification (Crouch, 1992; Crouch, 1994b). This was supported by Vanegas and Croes (2000) who compared linear and log-linear models from US demand for tourism in Aruba and concluded that the log-linear model fares better. There is a general agreement in the literature that a log-linear model provides better fit (see, for instance, Tan *et al.*, 2002; Song *et al.*, 2003).

The ARDL (p,q,r,s,m) is given by equation (1), where Visits is the natural log of international holiday visits to Zimbabwe, D_i are dummies for specific events (i.e., solar eclipse, Miss Malaika 2002, September 11 terror attacks, festive season), Zimprice is the natural log of CPI for Zimbabwe divided by the exchange rate, Saprice is the natural log of CPI for South Africa adjusted for the exchange rate, Unemploy is the US unemployment rate and Oilprice is the natural log of international oil prices and the disturbances ε_t are assumed to be serially uncorrelated.

$$\begin{aligned} Visits_t = \alpha_0 + \sum_i^{\alpha_i D_i + \sum_i^p \gamma_i} Visits_{t-i} + \sum_{i=0}^{q} \beta_{1i} Zimprice_{t-i} + \sum_{i=0}^{r} \beta_{2i} Saprice_{t-i} \\ + \sum_{i=0}^{s} \beta_{3i} Unemploy_{t-i} + \sum_{i=0}^{m} \beta_{4i} Oilprice_{t-i} + \varepsilon_t \end{aligned} \tag{1}$$

Equation (1) can also be presented as in equation (2), where $C(L)$ and $B_i(L)$ are lag operator polynomials.

$$\begin{aligned} C(L)Visits_t = \alpha_0 + \textstyle\sum_i \alpha_i D_i + B_1(L)Zimprice_{t-i} + B_2(L)Saprice_{t-i} \\ + B_3(L)Unemploy_{t-i} + B_4(L)Oilprice_{t-i} + \varepsilon_t \end{aligned} \tag{2}$$

$$\begin{aligned} Visits_t = \mu + \textstyle\sum_i \varsigma_i D_i + \xi_1 Zimprice_{t-i} + \xi_2 Saprice_{t-i} + \xi_3 Unemploy_{t-i} \\ + \xi_4 Oilprice_{t-i} + \nu_t \end{aligned} \tag{3}$$

If the long-run relationship is given by equation (3), then one can obtain the long-run coefficients from the ARDL as follows

$$\mu = \frac{\alpha_0}{C(L)}; \varsigma_i = \frac{\alpha_i}{C(L)}; \xi_i = \frac{B_i(L)}{C(L)} \tag{4}$$

Since the variables, other than dummies and the unemployment rate, are in natural logs, the coefficients ξ_i are long-run elasticities of international tourism demand. The coefficient of the dummies can be translated into percentage changes in average holiday visits after (or with) the specific event when compared to the average before (or without) the event. Thus the impact of the solar eclipse (captured by D_1) will be a change in average monthly international holiday visits of $[\exp(\varsigma_1) - 1] \times 100\%$.

4.2.1 Bounds test for cointegration

Like the other single-equation cointegration approaches, the ARDL is valid only when there is a unique cointegration vector. Pesaran *et al.* (1996) suggest a way of testing for the existence of a unique cointegration vector in the ARDL framework. This test proceeds as follows:

First, we estimate the error correction model (ECM) in equation (5) where the lag length (p) is such that the error term is not serially correlated.

$$\begin{aligned} \Delta Visits_t = \alpha_0 + \sum_{i=1}^{p} \gamma_i \Delta Visits_{t-i} + \sum_{i=0}^{p} \beta_{1i} \Delta Zimprice_{t-i} + \sum_{i=0}^{p} \beta_{2i} \Delta Saprice_{t-i} + \\ \sum_{i=0}^{p} \beta_{3i} \Delta Unemploy_{t-i} + \sum_{i=0}^{p} \beta_{4i} \Delta Oilprice_{t-i} + (\zeta_0 Visits_{t-1} + \zeta_1 Zimprice_{t-1} \\ + \zeta_2 Saprice_{t-1} + \zeta_3 Unemploy_{t-1} + \zeta_4 Oilprice_{t-1}) + \upsilon_t \end{aligned} \quad (5)$$

The second step involves testing $H_0 : \zeta_0 = \zeta_1 = \zeta_2 = \zeta_3 = \zeta_4 = 0$ against the alternative that at least one $\zeta_i \neq 0$. The test statistic is the standard F-Statistic ($\hat{F}$). However, its distribution is non-standard. The critical values are provided in Pesaran *et al.* (2001). The critical value has a lower bound (F_L) and an upper bound (F_U). If $\hat{F} < F_L$ no cointegration relation exists and when $\hat{F} > F_U$, a cointegration relation exists. However, when $F_L < \hat{F} < F_U$, the test is inconclusive and knowledge of the order of integration of the underlying variable(s) is needed to proceed further.

In the third step, the ECM in equation (5) is re-estimated but with Zimprice as the dependent variable and then a test for the joint significance of the lagged level coefficients is conducted as in the second step. The procedure is repeated several times with each of Saprice, Unemploy and Oilprice as the dependent variable. The number of significant F-statistics shows the number of cointegrating vectors. For us to proceed with estimating the ARDL model given in equation (1), we require that only one F-statistic be significant.

5 Results

The results of the bounds test for cointegration, as described above, are presented in Table 1. There is only one cointegrating vector at the 5% level of significance. This vector corresponds to the equation with Visits as the dependent variable. This means that the ARDL approach to cointegration is applicable.

Given that the existence of a unique cointegration vector has been established, estimation can then proceed using the ARDL model given in equation (1). However, two important factors need to be considered in such estimation. First, the most appropriate lag specification is needed. This paper uses the Akaike Information Criterion (AIC) to establish the appropriate lag specification. Second, one should ensure that residuals do not suffer from serial correlation. The LM test for serial correlation can be used in this regard.

In estimating equation (1), we had two specifications capturing the September 11 terror attacks differently. The first specification includes a dummy for the period from September 2001 onwards. This is meant to capture a permanent effect of the September 11 terror attacks on international holiday visits. The second specification includes a dummy for the immediate period following the terror attacks, i.e., September to December 2001. This captures a temporary effect of the terror attacks on international holiday visits.

For the two specifications capturing the permanent and temporary treatments of the terror attacks, and based on the AIC, the ARDL (1,1,0,0,0) and ARDL (1,1,1,0,0) models respectively were selected as showing the appropriate lag specifications. There is no serial correlation in both models. The ARDL estimation results for the two models, model 1 and 2 respectively, are presented in Table 2. The estimated long-run coefficients, computed using the formula in equation (4), are also given therein.

In both specifications, taste formation (proxied by lagged visits), domestic prices in Zimbabwe, the December festive season and specific events such as the solar eclipse, Miss Malaika 2002 and the September 11 terror attacks have significant long-term effects on international holiday visits to Zimbabwe. In model 2, changes in income (proxied by the negative of US unemployment) and transport costs (proxied by oil prices) also have a significant impact on international holiday visits to Zimbabwe. Of the two specifications, model 2 has a higher explanatory power. Therefore, we shall concentrate on the interpretation of its results but also make reference to model 1, where necessary.

In model 2, doubling of the previous year's visits increases current visits by 18.5% and this impact is fairly robust since it is also significant in model 1. The low magnitude of the coefficient of the lagged visits implies that there is still room for improvement of the tourist experience so that a larger proportion of visitors would return to the country or recommend the country to others. Since the experiences that visitors have in the country are important in determining the future visits to the country, high quality of infrastructure and tourist facilities is important for attracting future visitors. This observation is also made by Kester (2003) who indicates that deficiencies in facilities, lack of image and poor perceptions are among the major obstacles to international tourism arrivals in Africa. The immediate impact of special events like the solar eclipse and Miss Malaika 2002 was to increase holiday visits to Zimbabwe. The solar eclipse increased visits by 512% above the normal monthly average. Miss Malaika's immediate effect was to increase visits by 125.8% above the monthly average. The impact of these events is significant and their coefficients are close in both specifications.

The immediate effect of a 10% price increase in Zimbabwe is a decline in international holiday visits of 5.16%. However, the long-run elasticity of 0.145 in model 2 is insignificant. Thus holiday visits to Zimbabwe are price insensitive. International holiday visits to the country are also insensitive to changes in prices in South Africa since its long-run elasticity is also insignificant. Since Zimbabwe's main attraction is the Victoria Falls, a unique tourist attraction, the price insensitivity result is not surprising. This result is robust across both specifications.

Changes in income and transport costs have significant long-term effects on international holiday visits to Zimbabwe. The long-run transport cost elasticity is -0.55% while an increase in income growth of 1 percentage point in the long-run increases holiday visits to Zimbabwe by 13.8%. This implies that holiday visits are luxury goods and pro-cyclical. However, the effect of changes in income is only significant at the 10% level of significance. The impact of both the change in income and transport cost variables is not robust across both specifications.

There is evidence of seasonality in holiday visits to Zimbabwe. Dummies for months other than November and December were excluded after a failure to reject tests for their exclusion. The long-run estimates from model 2 show that international holiday visits increase by 135% above the long-term monthly average in December and an immediate increase of a 98.9% above the other months' average. This result is also robust. In recent times, the effect of December on international holiday visits may actually be capturing non-resident Zimbabweans visiting relatives and friends during the festive season – more so after increased emigration to other countries since 2000. The dummy for November is not significant.

The short run effect of the September 11 terror attacks was to reduce international holiday visits to Zimbabwe in the last four months of 2001 by 52%. Both models 1 and 2 indicate a significant long-run effect of the September 11 terror attacks on international holiday visits to Zimbabwe. From model 1, where the dummy captures a permanent effect of the September 11 terror attacks, the terror attacks bring about a 37.1% decline in international holiday visits. In model 2, the terror attacks bring about a 59.5% decline in international holiday visits. However, the effect of terror attacks in model 1 is only significant at the 10% level of significance. The results, with respect to the September 11 terror attacks, should be interpreted with caution, since the dummy also captures a period of increased political instability in the country. The view in this paper is that the periods with local political instability and global political instability (due to September 11 terror attacks) coincide. Both factors should be included in the model otherwise there will be specification error.

However, including both factors in the model renders one of them insignificant due to their high correlation. So the insignificance of the local political instability dummy does not necessarily mean it does not have any effect. Instead, its effect is likely to occur through the September 11 terror attacks. It is felt that, of these two mutually exclusive evils (multicollinearity and specification error), multicollinearity is better, hence both factors are included with the resulting insignificance of the local political instability dummy.

Table 3 shows the ECM representation of the ARDL model. In both specifications in Table 3, the error correction term is significant and has the correct sign. Model 1 estimates that 78.2% correction in a deviation from the long-run equilibrium is made in the first month while this correction is 81.7% in model 2. Thus, the results confirm the existence of a long-run relationship and indicate a fairly quick speed adjustment.

6 Conclusion

Despite the potential international tourism has of contributing towards shared economic growth and poverty alleviation in Africa, international tourism demand for Africa is under-researched. This paper makes a contribution to that research by modelling international tourism demand for Zimbabwe. The ARDL approach to cointegration was used to estimate the coefficients of the determinants of international tourism demand for the period 1998 to 2005. The results showed that taste formation, transport costs, changes in global income, solar eclipse viewable from the country, the hosting of the continental Miss Malaika 2002 pageant and the September 11 terror attacks in the United States have significant impacts on international tourism demand for Zimbabwe. At the same time, consistent with the notion that tourism demand for "wanderlust" destinations is price insensitive, international tourism demand for Zimbabwe is insensitive to both domestic and foreign prices. International tourism demand for Zimbabwe visits is seasonal, increasing in December every year. The results imply that the improvement of international tourism infrastructure in order to reduce travel costs and the enhancement of the quality of services to tourists so as to reinforce taste formation are important for attracting more international tourists to Zimbabwe. These should be the priority areas for policy intervention. Furthermore, the authorities can potentially shape international tourism demand for the country by promoting pleasant events in the country. The results confirm the existence of a long-run equilibrium and indicate a fairly quick speed of adjustment.

References

[1] CENTRAL STATISTICAL OFFICE. (Various years). *Annual Migration and Tourist Statistics.* CSO: Harare, Zimbabwe.

[2] CHRISTIE, I. T., and CROMPTON, D. E. (2001). Tourism in Africa. *Africa Region Working Paper Series, 12.* Washington DC: World Bank.

[3] CROUCH, G. I. (1992). Effect of income and price on international tourism. *Annals of Tourism Research, 19*, 643-64.

[4] CROUCH, G. I. (1994a). The Study of International Tourism Demand: A review of findings. *Journal of Travel Research, 33*, 12-23.

[5] CROUCH, G. I. (1994b). The Study of International Tourism: A Survey of Practise. *Journal of Travel Research, 32*, 41-55.

[6] CROUCH, G. I. (1995). A meta-analysis of tourism demand. *Annals of Tourism Research, 22*(1), 103-118.

[7] CROUCH, G. I. (1996). Demand elasticities in international marketing: A meta-analytical application to tourism. *Journal of Business Research, 36*, 117-136.

[8] DIVISEKERA, S. (2003). A model of demand for international tourism. *Annals of Tourism Research, 30*(1), 31-49.

[9] EILAT, Y., and EINAV, L. (2004). Determinants of international tourism: A three-dimensional panel data analysis. *Applied Economics, 36*, 1315-1327.

[10] GAUCI, A., GEROSA, V., and MWALWANDA, C. (2004). Tourism in Africa and the multilateral trading: Challenges and opportunities. *Background paper for the Economic Commission for Africa.* Economic Commission for Africa: Addis Ababa.

[11] IMF (2008). International Financial Statistics Online: http://www.imfstatistics.org/imf, (Retrieved July 24, 2008).

[12] KESTER, I. G. (2003). International Tourism in Africa. *Tourism Economics, 9*(2), 203-221.

[13] KIM, S., and SONG, H. (1998). Empirical analysis of demand for Korean tourism: A cointegration and error correction approach. *Tourism Analysis, 3*, 24-41.

[14] LEIPER, N., and HING, N. (1998). Trends in Asia-Pacific tourism in 1997-98: from optimism to uncertainty. *International Journal of Contemporary Hospitality Management, 10* (7), 245-251.

[15] LI, G., SONG, H., and WITT, S. F. (2005). Recent developments in econometric modelling and forecasting. *Journal of Travel Research, 44*, 82-99.

[16] LIM, C. (1997). Review of international tourism demand models. *Annals of Tourism Research*, 24(4)835-849.

[17] MARTIN, C. A., and WITT, S. F. (1987). Tourism demand forecasting models: Choice of appropriate variable to represent tourists' cost of living. *Tourism Management, 8*(3), 233-245.

[18] MARTIN, C. A., and WITT, S. F. (1988). Substitute prices in models of tourism demand. *Annals of Tourism Research, 15*(2), 255-268.

[19] MELLO, M. D., PACK, A., and SINCLAIR, T. (2002). A system of equations model of UK tourism demand in neighbouring countries. *Applied Economics, 34*, 509-521.

[20] MITCHELL, J., and ASHLEY, C. (2006). *Can tourism help reduce poverty in Africa.* Overseas Development Institute, London.

[21] NARAYAN K. P, (2005). The saving and investment nexus for China: Evidence from cointegration tests. *Applied Economics* 37(17) 1979-90.

[22] NAUDE, W.A., and A. SAAYMAN. (2004). "The Determinants of Tourist Arrivals in Africa: A Panel Data Regression Analysis." *Paper presented at the International Conference of the Centre for the Study of African Economies*, St. Catherine's College, University of Oxford, March 21–22, Oxford, U.K.

[23] PESARAN, M. H., SHIN, Y., and SMITH, R. J. (1996). Testing for the 'existence of a long-run relationship'. *Cambridge Working Papers in Economics.* Cambridge.

[24] PESARAN, M. H., SHIN, Y., and SMITH, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics, 16*(3), 289-326.

[25] ROGERSON, C. M. (2007). Reviewing Africa in the global tourism economy. *Development Southern Africa, 24*(3), 361-379.

[26] SONG, H., WONG, K. K., and CHON, K. K. (2003). Modelling and forecasting the demand for Hong Kong tourism. *Hospitality Management, 22*, 435-451.

[27] SYRIOPOULOS, T. C., and SINCLAIR, T. (1993). An econometric study of tourism demand: the AIDS model of US and European tourism in Mediterranean countries. *Applied Economics, 25*, 1541-1552.

[28] TAN, A. Y., MCCAHON, C., and MILLER, J. (2002). Modeling tourist flows to Indonesia and Malaysia. *Journal of Travel and Tourism Marketing, 13*(1/2), 63-84.

[29] VANEGAS, M. S., and CROES, R. R. (2000). Evaluation of demand: US tourism in Aruba. *Annals of Tourism Research, 27*, 946-963.

[30] WEBBER, A. (2001). Exchange rate volatility and cointegration in tourism demand. *Journal of Travel Research, 39*, 398-405.

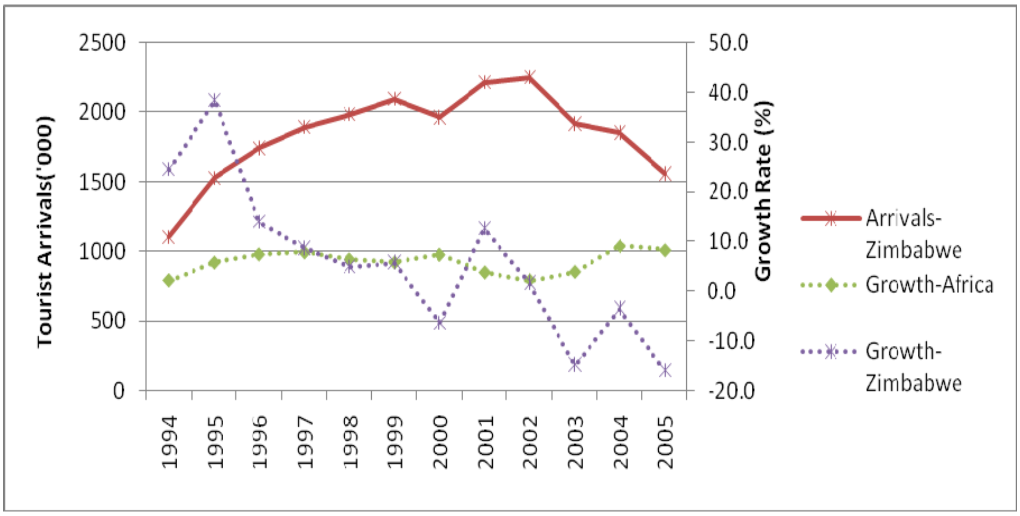
[31] WITT, S. F., and WITT, C. A. (1992). Tourism Demand: Literature review and econometric model specification. In *Modeling and Forecasting Demand in Tourism* (pp. 16-29). San Diego: Academic Press Inc.

[32] WORLD BANK. (2006). Ethiopia: towards a strategy for pro-poor tourism. *Africa Private Sector Development Note 24*. World Bank: Washington DC.

[33] UNITED NATIONS WORLD TOURISM ORGANISATION (UNWTO). (2006). *Tourism Trends*, 2005 Edition. UNWTO: New York.

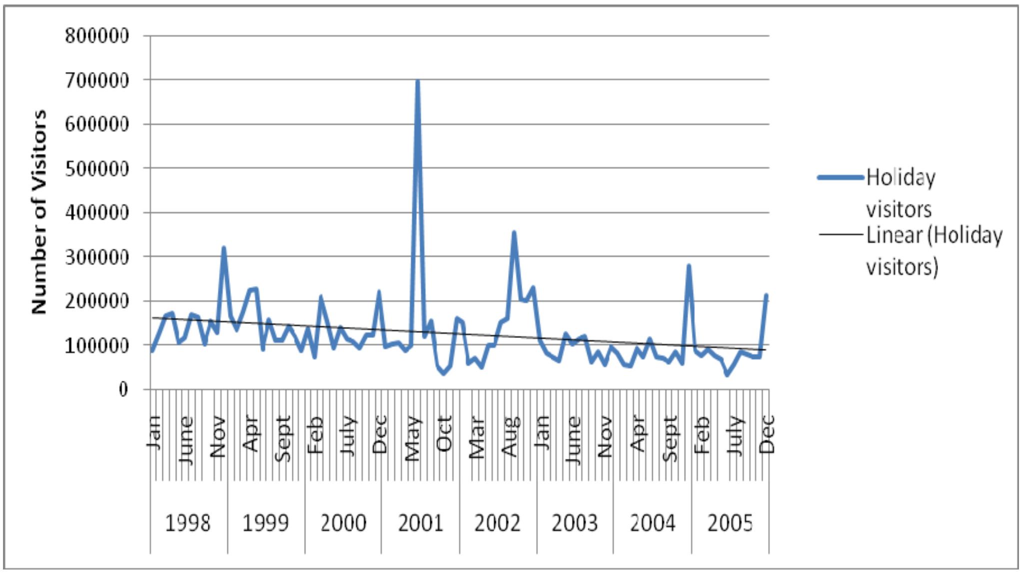
[34] XIAO, H., and SMITH, S. (2006). Case Studies in Tourism Research: A State of-the-Art Analysis, *Tourism Management* 27, 738–749.

Figure 1: Trends in international tourism arrivals in Zimbabwe and Africa



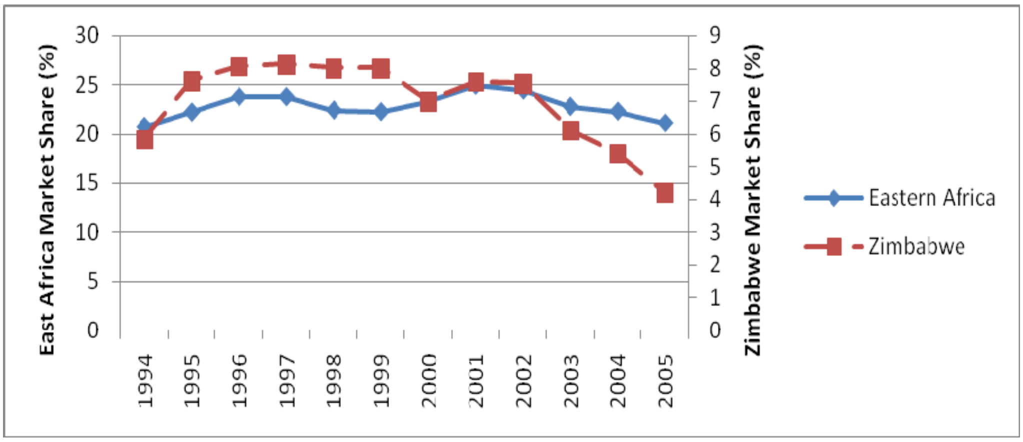
Source: UNWTO (2006)

Figure 2: Monthly holiday visits to Zimbabwe



Source: Central Statistical Office (CSO) (various years)

Figure 3: Trends in Zimbabwe and East Africa's market shares in African tourism



Source: UNWTO (2006)

Table 1: Testing for the existence of a unique cointegrating vector – the Bounds Testing Approach

Dependant Variable	Visits	Zimprice	Saprice	Oilprice	Unemploy
F-Statistic	4.2627**	2.5086	2.0255	0.60253	2.2149

Note: **Significant at 5% level of significance. The critical values for the case of unrestricted intercept and no trend for k=5 and T=80 are Lower Bound I(0)=2.787; Upper Bound I(1)=4.015 (using Narayan (2005)).

Table 2: ARDL model

	(Model 1)				**(Model 2)**			
	ARDL(1,1,0,0,0) Estimates		**Long-run Elasticities**		**ARDL(1,1,1,0,0) Estimates**		**Long-run Elasticities**	
Variable	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error
Visits(-1)	0.2183**	0.0848			0.1854**	0.0807		
Zimprice	-0.6056***	0.2167	-0.1481	0.1677	-0.5159**	0.2109	-0.1452	0.1453
Zimprice (-1)	0.4898**	0.2361			0.3977*	0.2263		
Saprice	0.2896	0.2488	0.3704	0.3182	-1.0045	0.8295	0.03998	0.3016
Saprice(-1)	-	-			1.037	0.7905		
Unemploy	0.04098	0.0987	0.0524	0.1255	-0.1123*	0.0663	-0.1378*	0.0794
Oilprice	-0.2620	0.1822	-0.3351	0.2337	-0.4454***	0.1659	-0.5467***	0.1968
Constant	9.023***	1.2184	11.542***	0.9814	11.2843***	1.3315	13.8518***	0.6984
Eclipse	1.7210***	0.3417	2.2015***	0.5202	1.8117***	0.3184	2.2239***	0.8778
Malaika	1.0186***	0.2509	1.303***	0.3307	0.8145***	0.2419	0.9998***	0.3083
Political	0.04115	0.1572	0.05264	0.2012	0.0727	0.1511	0.0893	0.1855
Nov	-0.0371	0.1287	-0.04745	0.1646	-0.0155	0.1237	-0.0190	0.1517
Dec	0.7178***	0.1321	0.9182***	0.2036	0.6874***	0.1248	0.8439***	0.1851
Sept11	-	-			-0.7359***	0.2165	-0.9033***	0.2519
Sept01	-0.3625*	0.2089	-0.4637*	0.2526	-	-		
Adjusted R2	0.5679				0.6035			
F –stat	15.2205[p-value 0.000]				11.8891[p-value 0.000]			
Serial Correlation LM Test	7.6646[p-value 0.811]				7.2973[p-value 0.8371]			
Heteroscedasticity LM Test	0.96432[p-value 0.326]				1.5920[p-value 0.207]			

Note: ***Significant at 1% level of significance (L.O.S); **Significant at 5% LOS; *Significant at 10% L.O.S.

Table 3: Error Correction Representation for the ARDL Model

	(Model 1)		**(Model 2)**	
	ECM for ARDL(1,1,0,0,0)		**ECM for ARDL(1,1,1,0,0)**	
Variable	Coefficient	Std Error	Coefficient	Std Error
ΔZimprice	-0.6056***	0.2167	-0.5159**	0.2109
ΔSaprice	0.2896	0.2488	-1.0045	0.8295
ΔUnemploy	0.04098	0.0987	-0.1123*	0.0663
ΔOilprice	-0.2620	0.1822	-0.4454***	0.1659
Constant	9.023***	1.2184	11.2843***	1.3315
Eclipse	1.7210***	0.3417	1.8117***	0.3184
Malaika	1.0186***	0.2509	0.8145***	0.2419
Political	0.0412	0.1572	0.0727	0.1511
Nov	-0.0371	0.1287	-0.0155	0.1237
Dec	0.7178***	0.1321	0.6874***	0.1248
Sept11	-	-	-0.7359***	0.2165
Sept01	-0.3625*	0.2089	-	-
ECT	-0.78175***	0.0848	-0.8146***	0.0879
Adjusted R2	0.6492		0.67813	
F (11, 82)	16.7371[p-value 0.000]		18.9943[p-value 0.000]	

Notes: ***Significant at 1% L.O.S; **Significant at 5% LOS; *Significant at 10% L.O.S; $\Delta X_t = X_t - X_{t-1}$.