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KARLY SPRONK AND JOHAN FOURIE

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KARLY SPRONK
DEPARTMENT OF ECONOMICS
UNIVERSITY OF STELLENBOSCH
PRIVATE BAG X1, 7602
MATIELAND, SOUTH AFRICA
E-MAIL: 14777231@SUN.AC.ZA

JOHAN FOURIE
DEPARTMENT OF ECONOMICS
UNIVERSITY OF STELLENBOSCH
PRIVATE BAG X1, 7602
MATIELAND, SOUTH AFRICA
E-MAIL: JOHANF@SUN.AC.ZA

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South African mega-events and their impact on tourism[1]

KARLY SPRONK[2] AND JOHAN FOURIE[3]

ABSTRACT

The 2010 FIFA World Cup, one of the largest mega-sport events, has stirred renewed interest in the benefits that a host country can derive from these events. While most predict a large increase in the number of tourist arrivals, the recent international literature suggest that ex ante studies are often too optimistic. South Africa has played host to numerous mega-events since 1994. Using a time-series auto-regressive model, we identify increases in tourism numbers for most of these events, controlling for a number of variables standard in predicting tourism flows. However, smaller events, especially those held during summer months, show little increase in tourist arrivals. We disaggregate tourism arrivals to show that, as expected, tourists from participating countries increase the most. Contrary to the international literature, we find little evidence of displacement. This could be as a result of off-season scheduling or because the relative size of these events does not reflect that of the FIFA World Cup or Olympic Games.

Keywords: sport, tourist arrivals, World Cup, developing countries
JEL codes:L83, F19

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[2] Department of Economics, Stellenbosch University
[3] Department of Economics, Stellenbosch University. Corresponding author: johanf@sun.ac.za.

1. INTRODUCTION

The growth of the tourism industry in South Africa over the last two decades signal the country's ability to sustainably export travel services, improving the balance of payments, creating jobs and boosting economic growth (Fourie 2010). The South African travel and tourism sector, of which sport tourism is a subsection, will contribute 8.7% to Gross Domestic Product (GDP) in 2009 (WTTC 2009). One determinant of the rise in tourism is event tourism; tourists attracted to a country or region with the specific aim of consuming event-specific goods. Mega-sport events, in particular, are considered to entail significant benefits for the host country in terms of tourism arrivals, both concurrently with the event and as a legacy (Baade and Matheson 2003; Baade and Matheson 2004; Matheson and Baade 2004; Preuss 2004; Solberg and Preuss 2006; Preuss 2007; Preuss 2007; Hagn and Maennig 2009).

South Africa has hosted major sporting events in the recent past, including the 1995 IRB Rugby World Cup, 1996 African Cup of Nations, 2003 ICC Cricket World Cup, 2007 World Twenty20 Championships, 2009 Indian Premier League (IPL), 2009 British and Irish Lions tour, 2009 Confederations Cup and 2009 ICC Champions trophy. The success of hosting these events has assisted South Africa in building its tourism infrastructure and has helped build its reputation as an international tourist destination. Due to this, South Africa has won the bid to host the 2010 FIFA Soccer World Cup, which has renewed interest in the benefits pertaining to mega-sport events.

There are numerous direct pecuniary and non-pecuniary benefits in hosting these events (Maennig and Du Plessis 2007). For this paper, we focus on the impact of the change in tourist flows to South Africa. We contribute to the international debate on mega-sport events, finding empirical evidence to support our hypothesis that mega-events increase tourism arrivals, ceteris paribus. While this seems an obvious conclusion, the recent literature suggest that mega-events do not necessarily increase tourist numbers, as event-specific tourists may crowd-out or displace non-event tourists (Solberg and Preuss 2006; Allmers and Maennig 2009; Preuss and Kurscheidt 2009). Reflecting on five events held in South Africa since 1995, we find evidence to support both sides of the debate; while some events do increase tourism, a few have no significant impact on tourism arrivals.

In order to understand the impact of sport events on the flow of tourists to South Africa it is necessary to first address the confusion about the exact meaning of terms like sports, sport events and tourists. This is addressed in Section 2. Section 3 follows with a discussion of the previous studies conducted on the determinants of tourism inflows. A description of and motivation for the data is provided in Section 4, with Section 5 covering data changes and limitations. The results from are presented in Section 6 and Section 7 concludes.

2. SPORTS AND NON-SPORTS TOURISTS

Sport events can be defined as events that are characterised by creative and complex content of sport-like, recreational activities, of entertaining character and are performed in accordance with a particular predetermined programme. These events have an influence on tourism, which have great

social and economic significance for the location or region in which they are held (Bjelac and Radovanovic 2003). Sport events vary in size and scope. Bjelac & Radovanovic (2003) categorize events according to 7 different scales: "locally held events", "regional or zonal events", "national sports events", "national events with some international participation", "continental competitions", "intercontinental events" and the largest known as "planetary events". For the purpose of this paper only the larger events with international participation are considered.

South Africa has played host to numerous sporting events but for the purpose of this paper only five are considered. These events all took place at an international level and are classified as South Africa's three main major sport types: soccer (football), rugby and cricket. The five events chosen for the paper are: the 1995 IRB Rugby World Cup, 2003 ICC Cricket World Cup, 2007 World Twenty20 Cricket Championships, the British and Irish Lions rugby tour to South Africa and the Indian Premier League (IPL), the last two events occurring in 2009. Because of data constraints on African arrivals into South Africa, the African Cup of Nations held in South Africa in 1996 is not included. Neither are the smaller events, like the Super 14 (previously Super12). Similarly the ABSA Currie Cup is a national level rugby event and is ignored in this paper because events like these will not have a significant effect on the volume of inbound tourists.

Events can also be characterised as primary, secondary or tertiary attractions. A primary attraction has the power to influence a tourist's decision to travel to South Africa. A secondary sport event or tourist attraction is known to the tourists, but is not critical in the itinerary decisions (Hinch and Higham 2004), while a tertiary attraction is not known to the tourists prior to their visit but is experienced upon arrival at their destination (Higham 2005). Considering this distinction, it is important to define the tourism element, as there is a difference between tourists travelling to South Africa as non-event tourists or as sports tourists. A non-event tourist considers the sporting event in the visited country as a secondary attraction while a sports tourist is defined as "individuals and/or groups of people who actively or passively participate in competitive or recreational sport, while travelling to and/ or staying in places outside their usual environment" (Hinch and Higham 2004:19). The reason for the classification is because tourists often differ in their consumption, and thus expenditure, of the services provided. However, because of the macro nature of our study, we do not distinguish between the different classifications presented above. We therefore assume all tourists equal, and use tourist arrivals as a proxy to measure the 'gains' to the host nation. To the extent that sport tourists differ in their characteristics, length of stay and expenditure patterns from non-sports tourists, however, the actual 'gains', i.e. in tourism expenditure, could be different.

3. TOURISM AND DISPLACEMENT

Studies conducted on the topic of tourism determinants are numerous and in most cases, like Solberg and Preuss (2006), do find that mega-events increase the number of arrivals of foreign tourists to the host country. More recently, however, a number of authors are sceptical and regard *ex ante* studies of mega-events as being too optimistic (Matheson 2002; Matheson and Baade 2004; Matheson 2006; Preuss and Kurscheidt 2009). Maennig and co-authors (Allmers and Maennig

2009; Hagn and Maennig 2009), in particular, found that for the 2006 FIFA World Cup in Germany, visitor numbers appear little different from the counterfactual of 'normal' tourism arrivals, even though the 2006 World Cup is widely considered as one of the most successful yet. This has important implications for countries that consider bidding for such an event, given the large investments/expenditures required.

The critical issue with the increase in foreign arrivals (due to sporting events) is therefore the problem of crowding-out or the displacement effect of normal tourists. In the 2010 FIFA World Cup context, many authors are anxious about this (Preuss and Kurscheidt 2009), but the South African sporting organisers have taken these fears into consideration and plan to limit the displacement of normal tourists. They have done this by scheduling most of the large sporting events in the off season, winter months when there are lower volumes of arrivals to host cities (Maennig and Du Plessis 2007). As Higham (2005) points out with reference to the 2005 Lions tour in New Zealand, this will curb displacement effects and may offer additional benefits to hosting large sports events because there is now a demand in off-peak seasons.

This can be seen in practice with the IRB Rugby World Cup, British & Irish tour and the 2010 FIFA Soccer World Cup which are held in the lowest arrival months of May and June (Figure 1), both winter months in South Africa. On the other hand, the ICC Cricket World Cup and the World Twenty20 Champions are summer sports. South Africa is typically seen as a summer destination by tourists and the highest arrival months are therefore summers months. However both events were scheduled for the lower tourist summer months of February and September. The IPL, another variation of the game of cricket, was not scheduled for these low season summer months. This scheduling problem was not due to bad planning from the South African organizers, but due to the fact that the event's location was shifted 3 weeks before the event was to commence, because of security concerns in India.

While the timing of events is of high importance, it is nevertheless essential to consider the other determinants of inbound tourism too. Previous research in this field has focused mainly on developed countries and their explanation of tourist demand, while far less research has been conducted for developing countries like South Africa. Early research methodologies used empirical models of tourism demand based on consumer theory. This theory states that the optimal consumption is influenced by the consumers' income, the price of goods as well as the price of substitutes and complementary goods. From this, a single equation model is determined to analyze the tourist demand (Phakdisoth and Kim 2007).

Methodologies then advanced to time-series econometric models, focusing on the explanation of tourist demand (Walsh 1996). More recently, a method used by Naudé and Saayman (2005) uses panel data to determine demand and supply factor determinants. They found, specifically for Africa, that political stability, tourism infrastructure, marketing and the stage of development are key aspects in explaining tourism demand. Similarly, Saayman and Saayman (2008) find that, apart from the standard demand-side variables, climate (with the number of sunny days in Cape Town used as proxy) also attracts visitors. Fourie, du Toit and Trew (2010) extend Zhang and Jensen's

(2007) supply-side analysis of the determinants of tourism and find evidence that the natural environment is an important predictor of a country's tourism comparative advantage, while neighbouring countries and a country's relative transport infrastructure are also determinants of tourism. This is especially true of sub-Saharan Africa (Fourie 2009).

The research data of tourism demand models have established that travel costs are an important determinant in the flow of inbound tourism. These costs are an important component of a tourist's decision to visit a place, or not and are especially important because the majority of South Africa's international tourist utilise air transport. The passenger air transport industry was established in the 1950's, but was only affordable to the rich. The improvement and development of factors like technology and communications as well as rising levels of income, the opening of international borders and economic growth of the major industrialised countries (Ringbeck, Gautam et al. 2009), have made travelling more affordable to the masses.

This has stimulated the trade and travel industry and presented more opportunities for sport tourism to flourish (Gibson 1998). The fear, however, of some countries, like South Africa, is the influence that oil prices have on travel costs (Ringbeck, Gautam et al. 2009). A steep increase in oil prices will negatively impact the volume of arrivals, especially from distant developed countries that make use of long-haul flights to reach destinations, resulting in a dampening of the growth of the travel and tourism sector.

Yet there are few attempts to measure the impact of mega-events on South African tourism indicators. South Africa's successful bid to host the FIFA World Cup in 2010 has garnered greater interest in the field, although these ex ante studies are riddled with strong assumptions based on developed country studies. In the only attempt to measure the impact of mega-events on tourist arrivals using a gravity equation approach, Fourie and Santana-Gallego (2010) find evidence to support the notion that mega-events create 'additional' tourism arrivals ceteris paribus. However, their results show startling differences in outcome depending on the type of event, the income per capita of the host country, and the timing of the event. They find a significantly positive impact of 8% on tourist arrivals to South Africa, for example, of hosting the 2003 Cricket World Cup (Fourie and Santana-Gallego 2010). While reports and press articles have often appeared after an event to cite the benefits to the South African economy of hosting such an event (Magubane 2009), none of these consider the counterfactual impact on tourism. This study is therefore an attempt to measure the increase in tourism when hosting a mega-event, controlling for various explanatory factors.

4. DATA DESCRIPTION

To establish the effects that a sporting event has on the normal inbound number of tourists to South Africa, an assessment of the changes in tourists to South Africa are calculated. This is done for each sporting event and each country's arrivals. To make an accurate assessment of the arrivals, other variables that would influence the decisions of tourists to visit South Africa are calculated. The model used in this paper is based on the findings of Sinclair (1998) that foreign tourist arrivals are a function of income of the originating country, relative prices, and transportation costs between

the two destinations.

4.1. Data description of arrivals

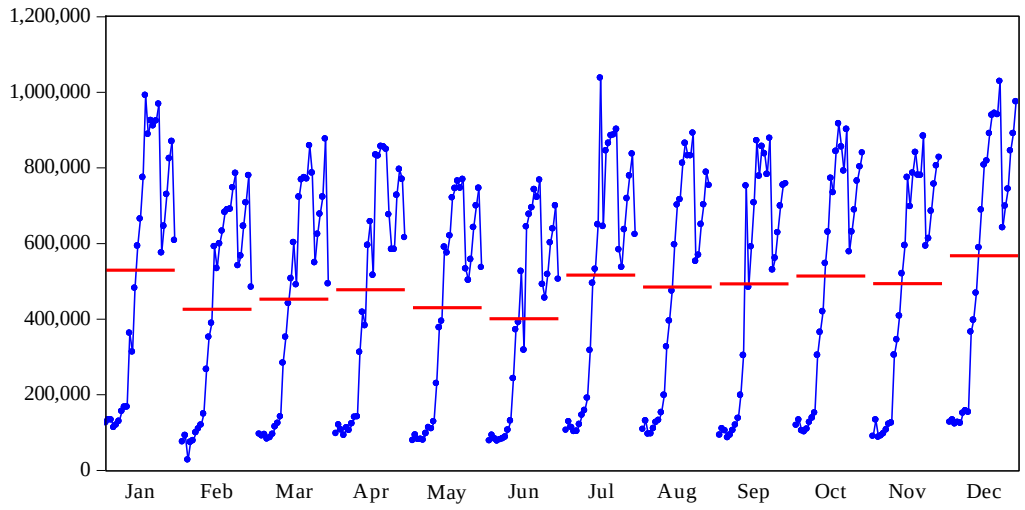
Measuring the change of tourist arrivals means that the dependent variable is foreign inbound tourism in a country. The inbound volume can be determined by one of two different methods, either by using the expenditure and receipts of tourists, or by the volume of tourist arrivals in South Africa. Tourist arrivals is a readily available statistic, while there is no consistency (Saayman & Saayman,2008: 84) in the data collected for expenditure by and receipts from tourists in South Africa. For this reason, this paper uses foreign tourist arrivals ranging from January 1983 to July 2009.

Statistics South Africa (StatsSA) collects monthly data for foreign arrivals from the various countries, published in *Tourism and Migration (P0351)*. Foreign visitors are defined as being any travelers who are not South African citizens or permanent residents. For the purpose of this paper, only the following countries air arrivals are included: Australia, France, Germany, India, Netherlands, New Zealand, United Kingdom (UK) and the United States of America (USA). It is assumed that transfers are zero for incoming arrivals during the period of the event.

African arrivals are completely neglected from the arrivals data although African arrivals contribute largely to the total volume of arrivals in South Africa. This aspect is problematic because South Africa totally encloses Lesotho and Swaziland. Tourists from other parts of Africa, specifically from these two countries, travel to South Africa for different reasons to those of foreign tourists (Saayman and Saayman 2008). Foreign international tourists are also considered to be bigger spenders and have a greater effect on the economic benefit and importance of travel and tourism sector to the South African economy (Saayman and Saayman 2008).

The African arrivals are included in the total arrivals to South Africa in Figure 1. In comparison to Figure 2 (especially Germany, UK and France) there seems to be no clearly visible trend in Figure 1. The red mean line for each month shows that tourists favour South African summer months as a holiday destination (January and December). On the other hand the winter months of May and June have a lower mean volume of arrivals. This seems intuitive as the primary market (Western Europe) is situated in the Northern hemisphere. We can see that for the combined data (which includes Southern hemisphere and other African countries), this effect is watered down.

Figure 1: Total international tourist arrivals per month with mean values (Jan 1983-July 2009)



The identified primary markets travelling to South Africa as tourists are: Germany, Netherlands, France and the UK. Explanations for identifying these as primary markets come from cultural and colonial ties. It is important to try and recognise any negative effects that hosting large sporting events can have on the primary market, which largely supports the South African tourism sector.

However, it is also vitally important to acknowledge the effect that these events have on attracting fans (tourists) from countries that participate in the events. This is based on the understanding that the fans (tourists) would not otherwise have travelled to South Africa if it were not for the sporting event. Indian arrivals are included because it accounts for the IPL, ICC Cricket World Cup and the ICC World Twenty20. The UK is already identified as a primary market but is also included because of their participation in the ICC Cricket World, ICC World Twenty20, IRB Rugby World Cup and the British and Irish Lions tour. Australia and New Zealand are included because both countries participated in the ICC World Twenty20, ICC Cricket World Cup and IRB Rugby World Cup participation. While the USA is not a participant in any of the sporting events identified in this paper, it is included as the arrivals from the USA to South Africa are relative large.

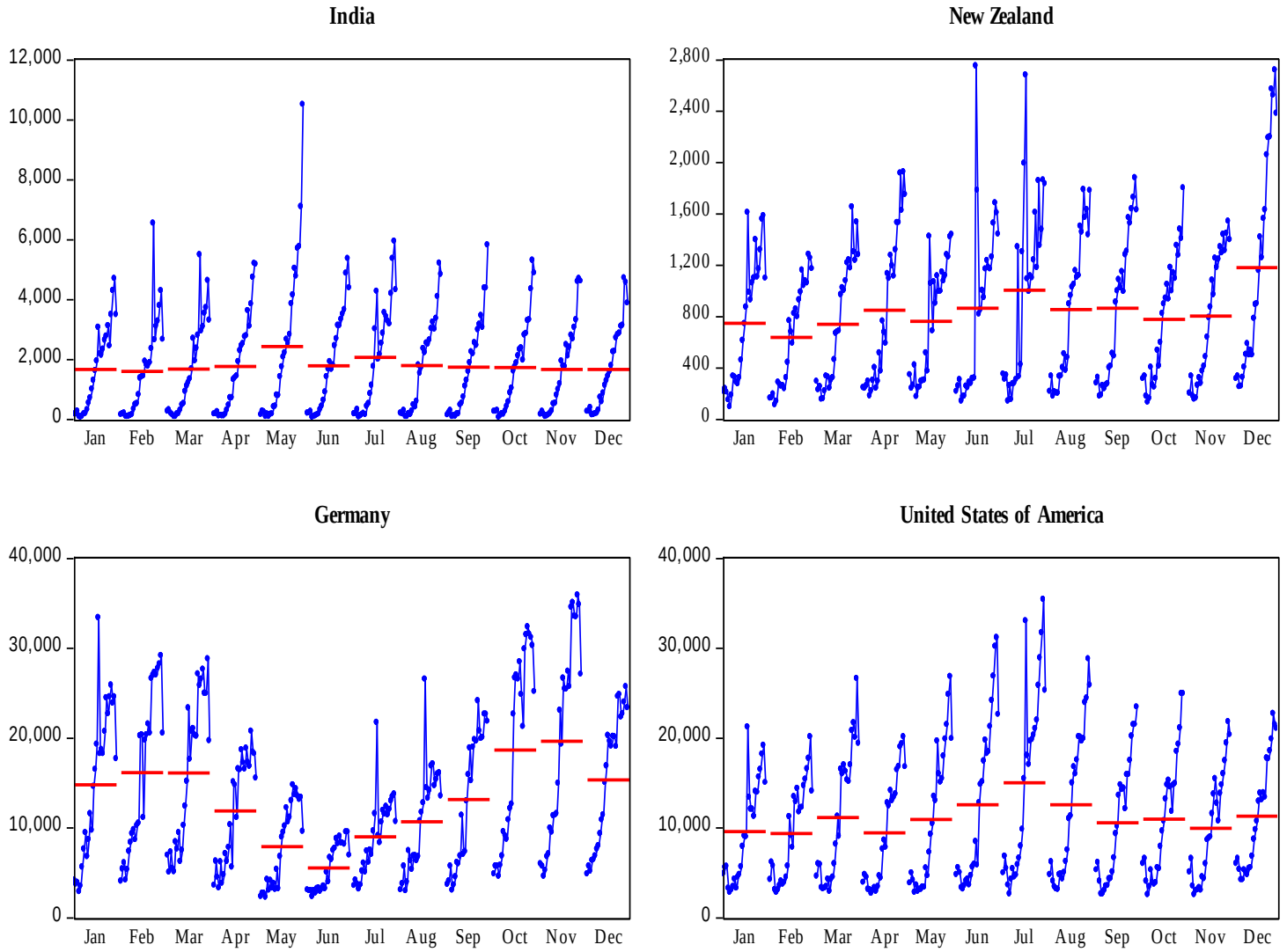
Figure 2 is once again a seasonal representation (similar to Figure 1) of the tourist arrivals to South Africa, but is shown per country. The Northern hemisphere countries of the Western Europe (France, Germany, Netherlands and UK) all follow the same trend as described above, with the USA the exception. This could be explained by the USA's weather diversity (e.g. East and West coasts experience very different weather patterns during the same season). Thus they may travel to South Africa for reasons other than Europeans. New Zealand and Australia do not follow a strict arrival trend associated with weather conditions because the seasons of both countries correspond to the South African seasons as they are both situated far south in the Southern hemisphere.

4.2. Description of data for the income of originating country

Income of the respective originating countries refers to the GDP of the country in question. For India this variable was the GDP at purchasing power parity. The data is obtained from the International Monetary Fund's World Economic Outlook. The Indian GDP is measured annually in billions of US dollars (current international dollar) for the period. There is, however, a mismatch of frequencies concerning the other data used in the model and the GDP. The data is therefore linearly interpolated using Stata 9 to convert the quarterly series into monthly data.

The GDP for the remainder of the countries (UK, Australia, France, Germany, Netherlands, New Zealand and USA) is expressed in the national currency for every quarter. This data is also linearly interpolated using the same method as above, to convert it from a quarterly to a monthly form to be compatible with the rest of the existing data. It is also converted from a nominal to real series. For these real figures to be calculated it is necessary to use the GDP deflators (all 2005 = 100) for each of the countries in question. The deflators are obtained from the International Monetary Fund's International Financial Statistics.

Figure 2: International tourist arrivals per country with monthly mean average (Jan 1983 – July 2009)



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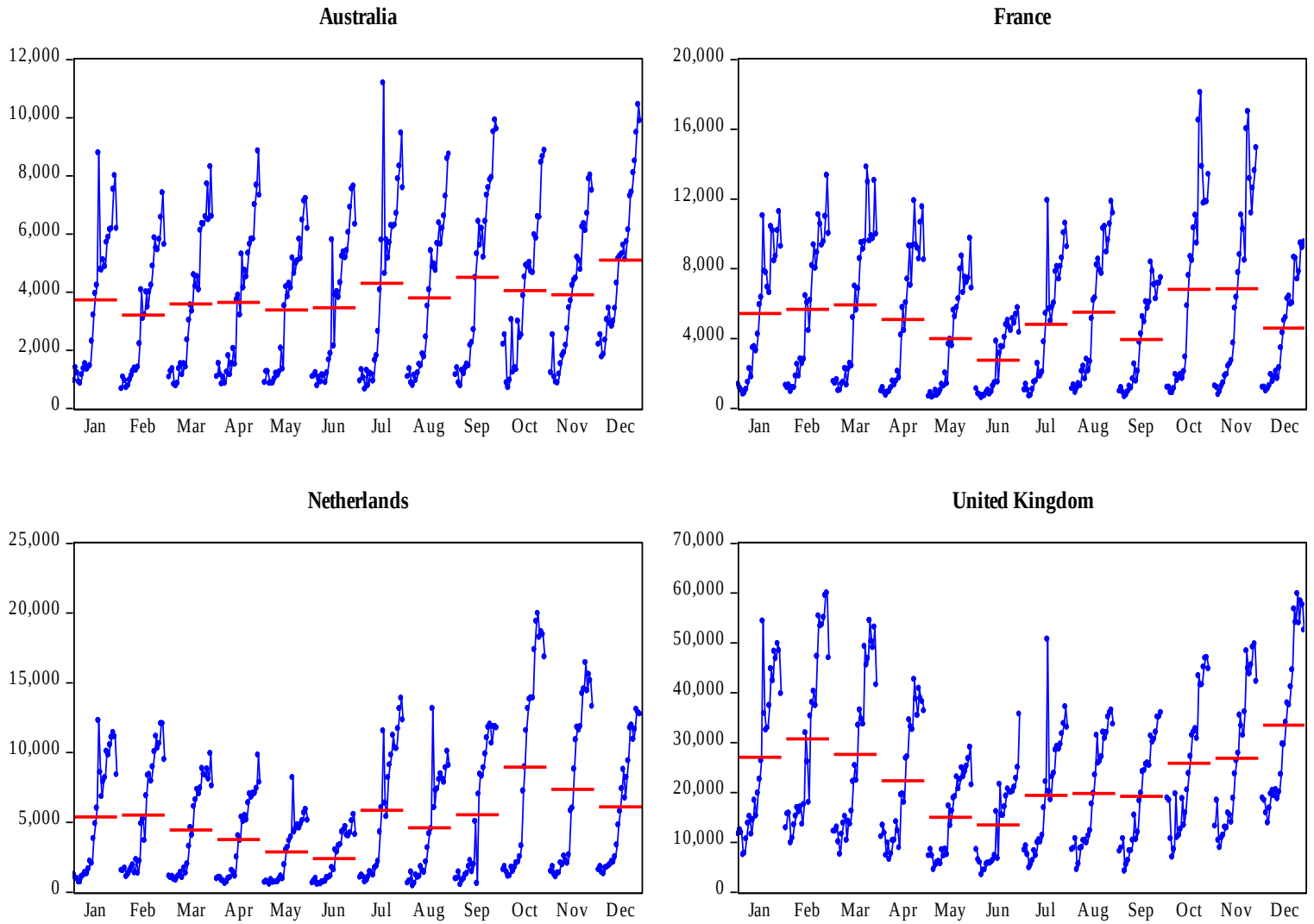


4.3. Description of data for the relative prices

Decisions about prices in the destination relative to the prices in the country of origin are a large determining factor of tourist flows. If prices in the country of destination are cheaper than the country of origin then the tourist's currency is worth more in the country they are visiting. This should be reflected with an increase in the volume of arrivals to the destination.

To accurately measure the relative price variable a proxy must be used. The exchange rate of the South African Rand (Rand) is used as a proxy instead of relative price indices. The exchange rate is expressed in the Rand per foreign currency denomination. The exchange rate is expressed for the Australian Dollar, Indian Rupee, USA Dollar ($), British Pound (£), New Zealand Dollar and the European Union (€) (which includes France, Germany, Netherlands) Euro.

The exchange rate of rand per US $, rand per £ and rand per € are sourced from the RSA Reserve Bank's (SARB) monthly data release and is an average of the daily averages of each rate. The Indian Rupee, Australian dollar and New Zealand dollar are expressed as AUS $ per US $, NZ $ per US $ and Rupee per US $ respectively at a market rate for the monthly average, with the Rand denoted at a principal rate. All the exchange rates were adapted from the International Monetary Fund's International Financial Statistics. The Australian, New Zealand and Indian exchange rates conversions to the rand are calculated by dividing the foreign currency per US $ by the Rand per US $.

Once the above mentioned conversions are done, all the currencies are nominal Rand denominated exchange rates (NER). With all currencies expressed this way, it is easy to convert to a real exchange rate. A real exchange rate is calculated to control the difference in inflation between South Africa and the country of origin. The conversion to real exchange rate (RER) is calculated by multiplying the CPI of the origin country over South African CPI;

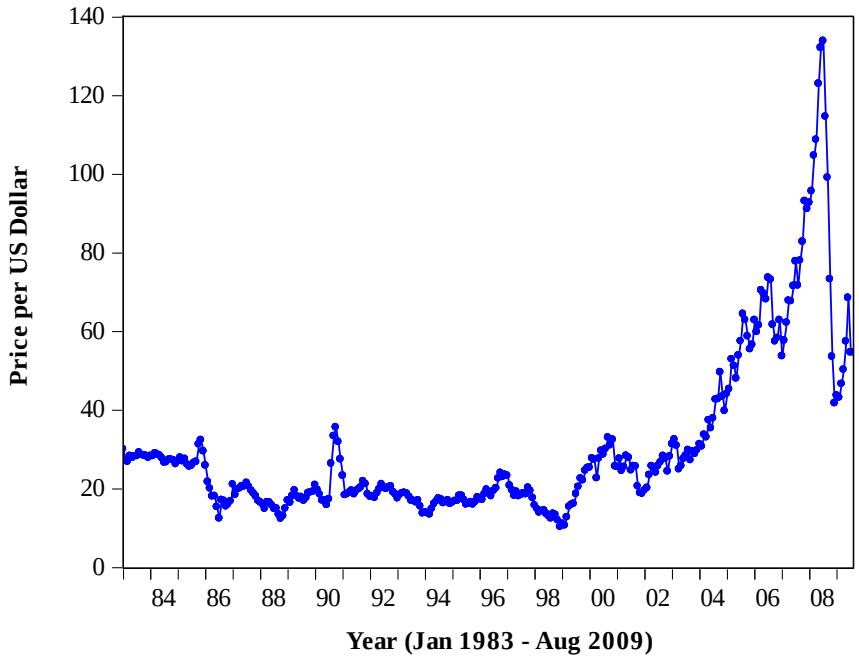
The Consumer Price Index (CPI) data is obtained from the International Monetary Fund's International Financial Statistics and the Australian and New Zealand data are sourced from the OECD financial indicators. The CPI time series data for Germany does not date back to January 1983 because of different time-series for West and East Germany. The time period for Germany is thus limited to the period after unification, January 1991 to June 2009.

4.4. Description of data for travel costs

Finally, travel costs must be determined. The transport cost involved in transporting a supporter (tourist) to the destination or host country influences the costs. This is especially relevant for South Africa where the primary markets usually use long-haul flights. A proxy of dollar price of Brent crude oil per barrel is used as proxy for travel costs. Crude oil per barrel is used instead of jet fuel, as suggested by Saayman and Saayman (2008). The oil price data is obtained from the South African Reserve Bank and is available in monthly format from January 1981 to the most recent data of June 2009.

Figure 3 shows that there was a large increase in the price of crude oil in 2007 and that it continued to increase through 2008, followed by a sharp decrease at the end (starting in October) of 2008. The price of Brent crude oil started to fall in October 2008, due to the decrease in demand following the financial crisis.

Figure 3: Price per barrel Brent crude oil



5. METHODOLOGY

The method followed in this paper is popular for tourist demand modeling. A log-linear single equation model is used where both independent and dependent variables are expressed in logarithmic form. As mentioned previously, the independent variables used in the model are the incomes of the originating country (GDP), relative prices of the destination (real exchange rate) and transportation costs (oil price) between the two destinations. However it is necessary to make this model more dynamic by including lagged variables. This is done because decisions of travelers to travel in the future are based on present and past costs or income levels.

The model specific to this paper is of a dynamic form with lagged variables. Five individual models (one for each sports event) are run for each country. This is done to avoid any possibilities of cointegration of the event indicator variables. Table 1 shows the indicator variable that is set up for each of the corresponding months in which the events took place.

Table 1: Indicator variable information

Sporting events	Date	Dummy variable month
IRB Rugby World Cup	25 May – 24 June 1995	May, June
ICC Cricket World Cup	9 February – 24 March 2003	February, March
ICC World Twenty20	11 September – 24 September 2007	September
Indian Premier League	18 April – 24 May 2009	May
British and Irish rugby tour	25 May – 24 June 2009	June

It is the coefficients of these indicator variables that we are particularly interested in to show the increased effect of inbound tourists to South Africa. It is however important to consider the significance of these coefficients of the indicator variables for each country's arrivals. A dynamic specification of the model (auto regressive model) is as follows:

$$Y_i = \sum_{j=0}^{p} \alpha_j \, \boldsymbol{x}_{(i)(t-j)} + \beta_i time + \mu_i z + \gamma qhh_i + \boldsymbol{\varepsilon}$$

The dependent variable for the dynamic model is the logarithmic of Y_i, the volume of tourist arrivals of country i. It is important to note because of auto-correlation in the dependent variable, as the correlogram (calculated using Eviews 6) of table 8 in the appendix demonstrates. To resolve this, the model has to be more dynamic by including lags of the dependent variable. This model is known as an autoregressive model of the process order p with p the number of lags. Each country's lagged periods of the dependent variable (arrivals) are determined individually.

The summation of $\boldsymbol{x}$ is the general form that captures the vector of the logarithmic variables controlled for, including the lags (j) possible for the entire period (p). The vector x represents the tourist arrivals data as well as oil prices, GDP and real exchange rate of country *i.* A model for each country is developed. This is done because countries included in this paper differ greatly with regard to the variables. With individually tailored models the data for each country is captured, resulting in better models that fit the data. The variable *time* is the time indicator variable, and the z variable is the event-specific indicator variable (sporting event) for the particular month. The **q** vector variable is an indicator of the months and is included to account for seasonality trends. These variables are the same for all models. The ε variable is the error term variable that is homoskedastic with a zero mean.

Before an individual model is designed for each country, a vector autoregression estimate is run to provide a basis from which the lag lengths of the dependent and independent variable can be determined, so as to avoid serial correlation. The first order serial correlation is identified by the Durbin-Watson static. It revealed that serial correlation exists; these estimates of the coefficients are biased and inconsistent. The Durbin-Watson statistic measures the linear relationship between adjacent residuals from a regression. With the aid of the results from the Durbin Watson statics and the vector auto regressive estimates as a basis, more accurate models can be developed. The results from the vector auto regression suggest the lag length of the variables for different periods, each

period is defined as a month. These results are available in the appendix table 9-16 and the suggested lagged periods are highlighted in each case and are all significant at a 90% confidence interval.

The development of the best model for individual countries is calculated from numerous estimates of models, set up using E-views 6. The best model is thus achieved by a comparison of the models because each variable can be lagged for all the suggested periods or different combination of the periods, depending on the criterion statistics of the models that are compared. The most fitted model was strongly influenced by the results obtained from the Akaike information criterion and Schwarz criterion.

6. RESULTS FROM MODEL SPECIFICATION

The best suited model for each country is calculated according to the methodology described and this includes the accurate lagged variables. The exact numbers of lags of each variable for the various models is included in the appendix (Table 17).

The models are then regressed with the 5 different event specific indicators (as mentioned in Table 1) for the 8 different countries. The results are provided below. The period used in these regressions (shaded bars) for all but Germany, is January 1984 till June 2009. As a result of Germany's divided statistics (between East and West Germany), the German models are limited and the harmonised data on Germany only commences from mid-1994.

A shortcoming in the model estimates exists in that there is no indicator that captures the effect of social/political instability or health epidemics linked to travelling such as the terrorist attacks on the World Trade Centre in 2001, the SARS epidemic or most recently the health epidemic of Swine flu. These problems not only affect the citizens of the country but the decisions of all the international travelers. For these reasons and to support the results obtained by the initial models (shaded bars) a test of the robustness of these results is undertaken. The same model is run over different time spans. For the 1995 Rugby World Cup, only six years of data is available before the event occurs, and the window thus captures the changes that took place between January 1989 and June 2009. Similarly the second window is limited from the beginning of 1995 to June 2009. The German models are excluded from the 1995 estimates as the model cannot be regressed, due to insufficient data for the period. For the 2003 ICC Cricket World Cup the second window is altered somewhat and an additional third window is included. The second window runs from January 1999 to June 2009 while the third runs from January 2003 to June 2009. The last three events (Twenty20, IPL, Lions Tour) all use the same three windows; January 1989 to June 2009, January 1999 to June 2009 and January 2005 to June 2009.

6.1 IRB Rugby World Cup 1995 estimates

The 1995 Rugby World Cup was the first international sporting event to be hosted by the Republic of South Africa following the fall of Apartheid. The 1995 Cup was the third occasion of this

competition and a first time appearance for the Springboks after their re-admittance in 1992. This event attracted a lot of international media attention, not only because of the sheer size of the Rugby World Cup but because the unique political events that preceded the tournament.

This event drew many spectators and inquisitive visitors alike to experience the South African version of the World Cup, and, compared to the counterfactual of not hosting the World Cup, overall arrivals increased significantly. Sixteen countries took part in the event. Following on Table 2, the participating countries used in this paper are highlighted in bold: Australia, France, New Zealand and England (UK). The coefficients (μ) of the event specific indicator for these countries are all statistically significant at a 5% level of significance. The significance level of 5% is used throughout the paper to test statistical significance of the estimates.

The tourists from Australia to South Africa increased by approximately 54%, ceteris paribus, for the months that the Cup was hosted. The robustness checks provide evidence that this result is robust. The first window shows arrivals increased by approximately 58%, ceteris paribus. The second window starts at the beginning of 1995 and therefore does not capture the historically low levels of arrivals experienced in South Africa during the Apartheid era. The second window compares future arrivals with arrivals from this event; therefore the effect seems to be reduced. However, even though the absolute value of the change of arrivals is affected it is still a notably significant increase in arrivals of 29%.

New Zealand and Australia are two of the biggest rugby playing nations in the southern hemisphere. This is reflected in the absolute change in arrivals from these two countries, although the increases from France and UK are large and significant too. Tourists from New Zealand increased by 112%, ceteris paribus, for the months that the Cup was hosted. This is a reflection that arrivals from this country are very low and increased significantly because of the World Cup. The robustness checks provide further evidence that this figure is correct. The first and second window show arrivals increase by approximately 117% and 108% respectively, ceteris paribus.

Tourists from France and the United Kingdom follow a similar trend as the Australian arrivals. The French and British arrivals increased by 48% and 33% respectively, ceteris paribus, for the months that the Cup was hosted. Both changes are statistically significant at 5% level of significance and the checks give evidence that this is robust. The first window shows arrivals increased by approximately 47% and 37% respectively. The third window, using only the post-1994 period, still finds a notably large increase in arrivals of 27% for both countries. For the remainder of the countries not participating, there are no statistically significant changes in arrivals noted because of the event. It is interesting to note that a decrease is observed in the third window of these countries, but these changes are not statistically significant and are therefore not clear evidence of cross-country displacement.

Table 2: Results of Rugby World Cup estimates

Country	Change(%) of arrivals	Size of μ	Std. error	T- statistic
Australia*	**54.25**	**0.5425**	**0.1409**	**3.8516**
1989/01 - 2009/06	**57.69**	0.5769	0.1240	4.6505
1995/01 - 2009/06	**28.78**	0.2878	0.1130	2.5469
France*	**48.15**	**0.4815**	**0.1410**	**3.4152**
1989/01 - 2009/06	**47.45**	0.4745	0.1383	3.4318
1995/01 - 2009/06	**26.86**	0.2686	0.1171	2.2938
Germany	**Not sufficient data**			
India*	**11.96**	0.1196	0.1721	0.6950
1989/01 - 2009/06	15.24	0.1524	0.1364	1.1172
1995/01 - 2009/06	-5.20	-0.0520	0.1237	-0.4203
Netherlands	**13.41**	0.1341	0.1800	0.7449
1989/01 - 2009/06	13.75	0.1375	0.1802	0.7631
1995/01 - 2009/06	-11.52	-0.1152	0.1805	-0.6382
New Zealand*	**111.59**	**1.1159**	**0.1582**	**7.0526**
1989/01 - 2009/06	**116.68**	1.1668	0.1486	7.8525
1995/01 - 2009/06	**107.57**	1.0757	0.1290	8.3413
UK*	**33.20**	**0.3320**	**0.1270**	**2.6150**
1989/01 - 2009/06	**37.15**	0.3715	0.1142	3.2527
1995/01 - 2009/06	**26.62**	0.2662	0.1157	2.3003
USA	**5.81**	0.0581	0.1074	0.5414
1989/01 - 2009/06	1.83	0.0183	0.1029	0.1775
1995/01 - 2009/06	-14.28	-0.1428	0.1094	-1.3058

6.2 ICC Cricket World Cup 2003 estimates

The 2003 ICC Cricket World Cup, hosted by South Africa (including a few matches in Zimbabwe and Kenya) was the first time this competition was held on African soil and the eighth of its kind. Fourteen countries took part in the event. Table 3 lists the participating countries used in this paper and are highlighted in bold; Australia, India, Netherlands, New Zealand and England (UK).

Although tourists from Australia, Netherlands and UK increased, this increase is not statistically significant at the 5% level. This means that the event did not attract more tourists than would have travelled to South Africa under normal circumstances. The New Zealand arrivals shows a 64% increase, ceteris paribus. The robustness checks of this change shows that they contradict the initial change, however, and none of the checks are statistically significant. Therefore it can be inferred that arrivals did increase during the tournament, but perhaps not at such a high rate as the initial change first suggested.

Cricket is a national sport in India with a massive supporter base. The results obtained for the World Cup is thus unsurprising. The initial change shows an increase of approximately 64%, *c*eteris paribus, for tourists from India for the months that the Cup was hosted. The robustness checks support this. The first, second and third window all show arrivals increase by approximately 64%, 69% and 65% respectively, ceteris paribus, and these are all statistically significant. This is a reflection that arrivals from these countries are on average very low and increased dramatically during the months of the World Cup.

For the remainder of the countries not participating, there is no statistically significant change in arrivals noted because of the event. A notable decrease is observed for arrivals from the United States during the tournament but these changes are not statistically significant at a level of 5%.

Table 3: Results of Cricket World Cup estimates

Country	Change(%) of arrivals	Size of μ	Std. error	T- statistic
Australia	**10.54**	0.1054	0.1442	0.7313
1989/01 - 2009/06	6.58	0.065847	0.13021	0.5057
1999/01 - 2009/06	11.39	0.113899	0.058433	1.949237
2003/01- 2009/06	11.35	0.113512	0.06385	1.777805
France	17.38	0.1738	0.1434	1.2115
1989/01 - 2009/06	15.61	0.156129	0.142505	1.095603
1999/01 - 2009/06	7.43	0.074346	0.072918	1.01959
2003/01- 2009/06	4.21	0.042083	0.088263	0.476789
Germany	**11.76**	0.1176	0.1189	0.9892
1995/08 - 2009/06	11.76	0.117599	0.118889	0.989154
2003/01- 2009/06	-5.93	-0.0593	0.061411	-0.965605
India*	**64.18**	**0.6418**	**0.1776**	**3.6150**
1989/01 - 2009/06	64.11	0.641061	0.140647	4.557954
1999/01 - 2009/06	68.91	0.689134	0.104835	6.573527
2003/01- 2009/06	64.97	0.649737	0.12759	5.092383
Netherlands	**6.41**	**0.0641**	**0.1839**	**0.3487**
1989/01 - 2009/06	5.17	0.051704	0.185488	0.278745
1999/01 - 2009/06	4.24	0.042398	0.090373	0.469137
2003/01- 2009/06	2.42	0.024167	0.07245	0.333574
New Zealand*	**64.18**	**0.6418**	**0.1776**	**3.6150**
1989/01 - 2009/06	-1.28	-0.01281	0.162502	-0.078823
1999/01 - 2009/06	13.16	0.131596	0.081558	1.613526
2003/01- 2009/06	9.37	0.093704	0.086188	1.087196
UK	**5.32**	**0.0532**	**0.1299**	**0.4096**
1989/01 - 2009/06	4.23	0.042337	0.118845	0.356238
1999/01 - 2009/06	-3.64	-0.03641	0.070917	-0.513431

2003/01- 2009/06	-9.31	-0.09305	0.083033	-1.120648
USA	-2.74	-0.0274	0.1068	-0.2570
1989/01 - 2009/06	-1.32	-0.01318	0.101355	-0.130033
1999/01 - 2009/06	-6.93	-0.06933	0.056598	-1.224996
2003/01- 2009/06	-7.04	-0.07044	0.056382	-1.249413

6.3 ICC World Twenty20 2007 estimates

South Africa was the first country to host the inaugural Twenty20 World Championships. Twelve teams participated in a thirteen day event. Table 4 lists the participating countries used in this paper and are highlighted in bold: Australia, India, New Zealand and England (UK). Although the event itself was a marvellous success according to the organisers, it is not well reflected in the results obtained which are statistically poor. The poor results could be attributed to the small size of the event or the fact that it is an inaugural event which did not attract many tourists to South Africa during the period.

For the remainder of the countries not participating, France, Germany, Netherlands and the USA there are no statistically significant changes in arrivals noted because of the event. The robustness check results are sporadic and form no noteworthy trend to report on. The USA however shows an approximate band of decrease in the initial and robust checks. This could be linked to the housing bubble which burst in 2007 but would not have yet affected the GDP and is therefore not controlled for in the estimates. This is mainly speculative as these findings are not statistically significant.

Table 4: Results of Cricket Twenty20 estimates

Country	**Change(%) of arrivals**	**Size of μ**	**Std. error**	**T- statistic**
Australia	**-0.27**	**-0.002695**	**0.202636**	**-0.013301**
1989/01- 2009/06	0.41	0.004130	0.180779	0.022845
1999/01- 2009/06	-0.50	-0.005039	0.079659	-0.063256
2005/01- 2009/06	2.57	0.025749	0.092164	0.279385
France	-13.32	-0.133186	0.199995	-0.665946
1989/01- 2009/06	-16.80	-0.167977	0.196905	-0.853086
1999/01- 2009/06	-18.26	-0.182594	0.098663	-1.850694
2005/01- 2009/06	-0.91	-0.009112	0.072258	-0.126102
Germany	**-2.20**	-0.022025	0.162457	-0.135572
1999/01- 2009/06	-3.81	-0.038129	0.095364	-0.399824
2005/01- 2009/06	-0.16	-0.001557	0.092488	-0.016834
India	**-10.83**	**-0.108266**	**0.244354**	**-0.443070**
1989/01- 2009/06	-9.51	-0.095079	0.193296	-0.491885
1999/01- 2009/06	-13.58	-0.135834	0.151696	-0.895434
2005/01- 2009/06	-13.45	-0.134471	0.159921	-0.840861

Netherlands	7.43	0.074285	0.255504	0.290741
1989/01- 2009/06	2.94	0.029384	0.256003	0.114780
1999/01- 2009/06	-13.36	-0.133632	0.121063	-1.103827
2005/01- 2009/06	-0.97	-0.009742	0.104583	-0.093155
New Zealand	**14.00**	**0.140034**	**0.238101**	**0.588130**
1989/01- 2009/06	16.63	0.166265	0.230786	0.720431
1999/01- 2009/06	9.19	0.091934	0.117537	0.782167
2005/01- 2009/06	14.67	0.146713	0.135192	1.085215
UK	**-2.52**	**-0.025193**	**0.178395**	**-0.141220**
1989/01- 2009/06	-6.46	-0.064618	0.160333	-0.403023
1999/01- 2009/06	-4.58	-0.045788	0.090663	-0.505038
2005/01- 2009/06	-4.40	-0.043960	0.133495	-0.329302
USA	-13.31	-0.133141	0.150495	-0.884686
1989/01- 2009/06	-12.12	-0.121160	0.142085	-0.852728
1999/01- 2009/06	-12.89	-0.128882	0.077978	-1.652804
2005/01- 2009/06	-12.99	-0.129917	0.094356	-1.376883

6.4 Indian Premier League (IPL) 2009 estimates

Three weeks before the second season of the Indian Premier League, an event that was originally set to be held annually in India, the event was moved to South Africa. Unlike previous events this event did not have participants from different countries but instead eight different franchise teams. The franchises are owned mainly by wealthy Indians that pay large sums to contract top international and domestic Indian cricket players.

The IPL should therefore only largely affect the tourists coming from India to South Africa, as is reflected in Table 5, with the India results highlighted in bold. There is a large increase of arrivals from India of approximately 60%, ceteris paribus, for the months that the IPL was hosted. The robustness checks give evidence that this figure is more or less correct. The first, second and third windows all show arrivals increased by approximately 43% , 56% and 61%, respectively, ceteris paribus, and these are all statistically significant. This is a reflection that arrivals from this country are on average low, but because of the IPL event, the increase was substantial.

For the remainder of the countries not participating, there are no statistically significant changes in arrivals found because of the event. Except for the United Kingdom's arrivals, the initial change because of the event is a decrease of 29%, but which is not statistically significant. The first window renders a decrease of 22% (also statistically insignificant); however, the second and third maintain the decreasing trend and was statistically significant. Although possibly a case of displacement, the type of displacement is not clear; British travellers may have shifted their arrival in South Africa to coincide with the British and Irish Lions rugby tour that occurred one month later. Rather than the Indian Premier League displacing tourists from Britain, the negative coefficient may simply be as a result of shifting expenditures to accommodate the Lions tour.

Furthermore, Fourie, Siebrits and Spronk (2010) argue that the IPL and Lions tour provide a unique natural experiment to measure the size of displacement. Because of the sudden shift in the IPL event, expected displacement would be small given the short notice and the fact that most tourists book their visits well in advance. In contrast, the Lions tour was scheduled two years and advance and tourists would have had enough time to shift their expenditure (i.e. for British rugby enthusiasts to displace non-event tourists). Fourie et al. (2010) find some evidence of displacement, although this is relatively small compared to the additional tourism gains.

Table 5: Results of IPL estimates

Country	**Change(%) of arrivals**	**Size of μ**	**Std. error**	**T- statistic**
Australia	-5.35	-0.0535	0.2190	-0.2442
1989/01- 2009/06	-8.11	-0.081129	0.196386	-0.41311
1999/01- 2009/06	-6.51	-0.065091	0.088583	-0.734806
2005/01- 2009/06	-7.41	-0.07409	0.093152	-0.795362
France	-7.25	-0.0725	0.2098	-0.3454
1989/01- 2009/06	-2.22	-0.022212	0.210515	-0.105514
1999/01- 2009/06	1.32	0.013178	0.109806	0.120014
2005/01- 2009/06	5.62	0.056184	0.070558	0.796284
Germany	-17.54	-0.1754	0.1766	-0.9934
1999/01- 2009/06	-17.44	-0.174361	0.102454	-1.701843
2005/01- 2009/06	1.90	0.019008	0.092703	0.205037
India*	**59.68**	0.5968	0.2508	2.3798
1989/01- 2009/06	43.39	0.433857	0.200157	2.167582
1999/01- 2009/06	55.55	0.555468	0.154129	3.603923
2005/01- 2009/06	60.85	0.60854	0.121491	5.008941
Netherlands	6.11	0.0611	0.2681	0.2279
1989/01- 2009/06	0.28	0.002814	0.271189	0.010375
1999/01- 2009/06	-2.16	-0.021611	0.130276	-0.165884
2005/01- 2009/06	12.00	0.120019	0.107401	1.117485
New Zealand	-11.30	-0.1130	0.2457	-0.4598
1989/01- 2009/06	-5.03	-0.050278	0.239388	-0.210027
1999/01- 2009/06	11.01	0.110096	0.122807	0.896495
2005/01- 2009/06	21.89	0.218892	0.132807	1.648201
UK	-28.63	-0.2863	0.1877	-1.5248
1989/01- 2009/06	-22.46	-0.224618	0.175015	-1.283425
1999/01- 2009/06	-37.89	-0.378902	0.096199	-3.938739
2005/01- 2009/06	-43.51	-0.43506	0.112043	-3.882966

USA	1.66	0.0166	0.1578	0.1051
1989/01- 2009/06	2.03	0.020256	0.151236	0.133939
1999/01- 2009/06	2.10	0.020987	0.083553	0.251182
2005/01- 2009/06	5.03	0.050287	0.082667	0.608311

6.5 British & Irish Lions Rugby Tour 2009

The 2009 British and Irish Lions union tours have become a tradition which occurs every four years between the three rugby power houses of the southern hemisphere: Australia, New Zealand and South Africa and a combined team from the three home unions of Britain (England, Scotland and Wales) and Ireland. It is important to note that the FIFA 2009 Confederations Cup took place in South Africa during the end of the Lions tour. The Lions tour influenced arrivals primarily originating from the UK, while the Confederations Cup had 8 teams participating of which New Zealand and the USA are included in this paper. Fortunately, the English soccer team did not participate and as such our results should not suffer from biased estimates.

It is assumed that all the supporters of the Lions tour will originate from the countries that the players are selected from. Therefore the results of tourists coming from United Kingdom to South Africa are highlighted in bold in Table 6. There is a large increase of arrivals of approximately 57%, ceteris paribus, for the month that the tour was hosted by South Africa. The robustness checks of this figure provide further support. The first, second and third windows show arrivals increase by approximately 78%, 70% and 68%, respectively, ceteris paribus, and these are all statistically significant. Given that Britain is a leading tourism market for South Africa, a large and significant increase suggests that the Lions tour is an extremely lucrative competition to host.

For the remainder of the countries not participating, there are no statistically significant changes in arrivals noted because of the event, except for the Indian arrivals, where a decrease of 54%, ceteris paribus, is found. The first, second and third windows shows arrivals decrease by approximately 65%, 46% and 60%, respectively. This is almost a mirror image of the large increase which occurred the month before, when the IPL tournament was hosted. While the model should capture the expected decrease after the event with the lagged dependent variable, the change is so dramatic that the decrease is still significant. This may provide some evidence that Indians shifted their planned visits during June/July to May to coincide with the IPL event.

Table 6: Results of Lions tour estimates

Country	**Change(%) of arrivals**	**Size of μ**	**Std. error**	**T- statistic**
Australia	50.67	0.5067	0.4400	1.1515
1989/01- 2009/06	61.09	0.610948	0.425733	1.435049
1999/01- 2009/06	1.71	0.017119	0.35148	0.048706
2005/01- 2009/06	-3.32	-0.033195	0.706945	-0.046955

France	-22.18	-0.2218	0.2094	-1.0589
1989/01- 2009/06	-14.16	-0.141605	0.21221	-0.667287
1999/01- 2009/06	-3.75	-0.037537	0.112286	-0.334303
2005/01- 2009/06	-7.39	-0.073874	0.083266	-0.887209
Germany	-0.97	-0.0097	0.1832	-0.0527
1999/01- 2009/06	-1.92	-0.019231	0.110549	-0.173959
2005/01- 2009/06	9.30	0.093033	0.103248	0.901066
India*	-54.30	-0.5430	0.2531	-2.1453
1989/01- 2009/06	-65.29	-0.652864	0.199182	-3.277732
1999/01- 2009/06	-46.42	-0.464188	0.172603	-2.689343
2005/01- 2009/06	-60.89	-0.608885	0.193447	-3.147561
Netherlands	4.36	0.0436	0.2725	0.1600
1989/01- 2009/06	1.15	0.011475	0.276991	0.041427
1999/01- 2009/06	-4.15	-0.041522	0.134717	-0.308219
2005/01- 2009/06	-5.29	-0.052905	0.124882	-0.42364
New Zealand	836.52	8.3652	4.6798	1.7875
1989/01- 2009/06	582.88	5.828759	5.193545	1.122308
1999/01- 2009/06	-122.65	-1.226464	4.152806	-0.295334
2005/01- 2009/06	-671.60	-6.715963	9.041968	-0.742755
UK*	**57.25**	**0.5725**	**0.1900**	**3.0128**
1989/01- 2009/06	78.01	0.780078	0.177872	4.385601
1999/01- 2009/06	69.96	0.699583	0.096893	7.220193
2005/01- 2009/06	67.68	0.676756	0.096154	7.038221
USA	-7.26	-0.0726	0.1589	-0.4568
1989/01- 2009/06	0.50	0.004983	0.152919	0.032583
1999/01- 2009/06	-3.00	-0.029973	0.086001	-0.348521
2005/01- 2009/06	-6.41	-0.064087	0.088943	-0.72054

7. CONCLUSION

The purpose of this paper is to provide proof that the number of sport tourist arrivals rise significantly when South Africa plays host to mega-sports events. We also estimate the size of this increase and search for evidence of possible displacement. We find that the IRB 1995 Rugby World Cup increased arrivals from Australia and New Zealand significantly, while the increases for France and UK were also substantial. The event managed to leave regular tourist patterns undisturbed. The 2003 ICC Cricket World Cup was not as great a success at attracting supporters of participating nations as the Rugby World Cup was. Although the Indian arrivals increased, it had little impact on tourist arrivals from other regions. The 2007 ICC Twenty20 inaugural event was less successful at attracting significantly more tourists to South Africa in the period than the counterfactual. The IPL was however more successful, with Indian arrivals increasing substantially. British tourists, however, did substitute from the IPL month to the months in which the Lions toured. Whether this

is because of IPL displacement or time shifting is unclear. The most obvious explanation, though, seems to be the latter, with UK tourism arrivals increasing by almost 60% during the months of the Lions tour, compared to what was typically expected. This also suggests that working with month-on-month growth rates is not the optimal method to measure the growth in tourism, as it may simply measure substitution of tourists' travel plans.

While this study does not attempt to measure the net gain of hosting mega-events, our results point to possible gains for the host country. However, as found by Fourie and Santana-Gallego (2010), the greatest gains pertain to tourist arrivals from participating countries. This has important implications when a country decides to bid for an event. More specifically for South Africa, the positive coefficients of mega-events over more than a decade suggest that South Africa derives some tangible benefits from hosting these events, with little evidence of tourism displacement. With the FIFA World Cup to be hosted by South Africa in 2010, the results support the ex ante predictions of significant tourism growth during the event.

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9. APPENDIX

Figure 4: Demonstration of upward trend of international arrivals (Jan 1983- July 2009)

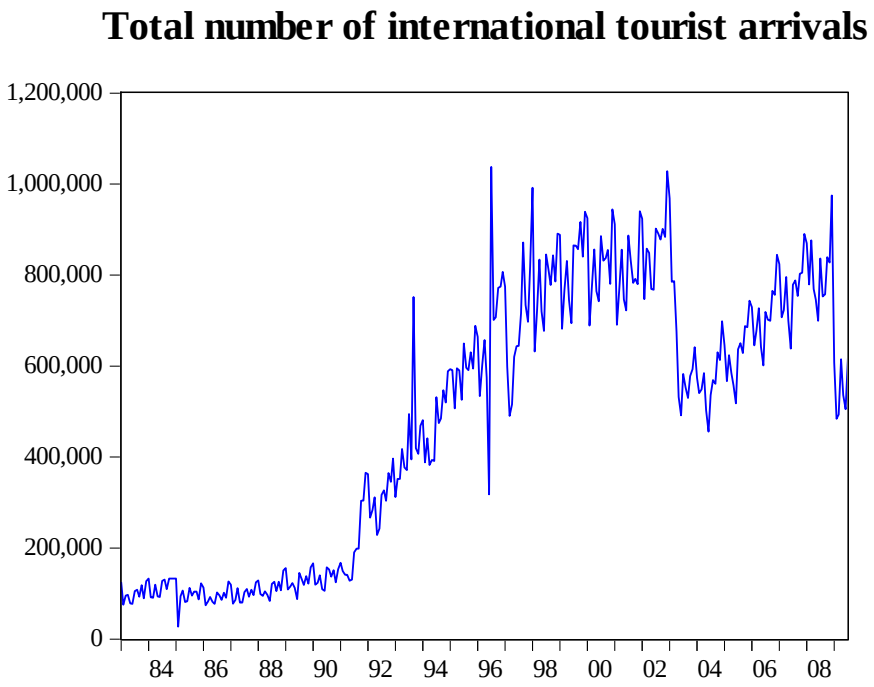

Table 7: Participants of the sporting events:

Event	Participants/Supporters
IRB Rugby World Cup 1995	Côte d'Ivoire, South Africa, Argentina, Canada, Japan, England, France, Ireland, Italy, Romania, Scotland, Wales, Australia, New Zealand, Tonga, Western Samoa
ICC Cricket World Cup 2003	**Australia, India**, Zimbabwe, **England**, Pakistan, **Netherlands**, Namibia, Sir Lanka, **New Zealand**, Kenya, South Africa, West Indies, Canada, Bangladesh
ICC World Twenty20 2007	South Africa, West Indies, Bangladesh, **Australia, England**, Zimbabwe, Sir Lanka, Kenya, **New Zealand, India**, Pakistan, **Scotland**
Indian Premier League 2009	**India**

British and Irish Rugby tour 2009	**UK (England, Ireland, Scotland & Wales)**

Table 8: Correlogram of total international arrivals to South Africa (Jan 1983 – July 2009)

Sample: 1983M01 2009M07
Included observations: 319

Autocorrelation	Partial Correlation		Prob
.|*******	.|*******	1	0.000
.|*******	.|**	2	0.000
.|*******	.|**	3	0.000
.|*******	.|.	4	0.000
.|*******	*|.	5	0.000
.|******	.|.	6	0.000
.|******	.|*	7	0.000
.|******	.|*	8	0.000
.|******	.|*	9	0.000
.|******	*|.	10	0.000
.|******	.|.	11	0.000
.|******	.|*	12	0.000
.|******	**|.	13	0.000
.|******	*|.	14	0.000
.|******	.|.	15	0.000
.|******	.|.	16	0.000
.|******	.|*	17	0.000
.|******	.|.	18	0.000
.|******	.|.	19	0.000
.|******	.|*	20	0.000
.|******	.|.	21	0.000
.|******	*|.	22	0.000
.|******	.|.	23	0.000
.|******	.|*	24	0.000
.|*****	*|.	25	0.000
.|*****	*|.	26	0.000
.|*****	.|.	27	0.000
.|*****	.|.	28	0.000
.|*****	.|.	29	0.000
.|*****	.|.	30	0.000
.|*****	.|.	31	0.000
.|*****	.|.	32	0.000
.|*****	.|.	33	0.000
.|*****	.|*	34	0.000
.|*****	.|.	35	0.000
.|*****	.|*	36	0.000

Vector Autoregressive estimates (table 9-16)

Table 9: Australia

Sample (adjusted): 1984M01 2009M06
Included observations: 306 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	ARRIVALS	GDP	ER	OIL
PERIODS LAG (-1)	0.205218	1.296425	1.103890	1.380032
	(0.05701)	(0.11350)	(0.06305)	(0.06351)
	[3.59988]	[11.4225]	[17.5090]	[21.7291]
PERIODS LAG (-2)	0.132365	-0.044463	-0.125525	-0.318157
	(0.05779)	(0.17246)	(0.09339)	(0.10727)
	[2.29048]	[-0.25782]	[-1.34413]	[-2.96583]
PERIODS LAG (-3)	0.092968	-0.144704	-0.080751	-0.164974
	(0.05851)	(0.17157)	(0.09434)	(0.10678)
	[1.58901]	[-0.84342]	[-0.85596]	[-1.54498]
PERIODS LAG (-4)	0.042573	-0.065175	0.024746	0.087000
	(0.05904)	(0.17016)	(0.09688)	(0.10507)
	[0.72104]	[-0.38302]	[0.25544]	[0.82798]
PERIODS LAG (-5)	-0.113305	0.030902	-0.092371	-0.130799
	(0.05901)	(0.17076)	(0.09820)	(0.10477)
	[-1.92008]	[0.18097]	[-0.94066]	[-1.24844]
PERIODS LAG (-6)	0.034131	-0.084419	-0.075014	0.010676
	(0.05972)	(0.16742)	(0.09696)	(0.10504)
	[0.57153]	[-0.50423]	[-0.77367]	[0.10163]
PERIODS LAG (-7)	0.047077	-0.142724	0.252091	0.207010
	(0.06044)	(0.16801)	(0.09568)	(0.10534)
	[0.77890]	[-0.84950]	[2.63476]	[1.96507]
PERIODS LAG (-8)	0.016454	0.179954	-0.076442	-0.131872
	(0.06011)	(0.16704)	(0.09678)	(0.10606)
	[0.27373]	[1.07730]	[-0.78984]	[-1.24333]
PERIODS LAG (-9)	0.110638	0.160542	-0.020836	-0.250058
	(0.06053)	(0.16415)	(0.09643)	(0.10703)
	[1.82789]	[0.97802]	[-0.21607]	[-2.33643]
PERIODS LAG (-10)	-0.069754	-0.181099	0.057197	0.349821
	(0.06050)	(0.16553)	(0.09671)	(0.10971)
	[-1.15298]	[-1.09406]	[0.59143]	[3.18874]
PERIODS LAG (-11)	-0.046091	-0.184286	-0.046835	-0.078838
	(0.05967)	(0.16837)	(0.09626)	(0.11352)
	[-0.77245]	[-1.09455]	[-0.48655]	[-0.69447]
PERIODS LAG (-12)	0.454367	0.175385	-0.027951	0.008454
	(0.05857)	(0.10899)	(0.06438)	(0.08005)
	[7.75773]	[1.60924]	[-0.43418]	[0.10561]

Table 10: France

Sample (adjusted): 13 318
Included observations: 306 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	ARRIVALS	GDP	ER	OIL
PERIODS LAG (-1)	0.272365	1.908952	1.126412	1.379841
	(0.04797)	(0.06239)	(0.06243)	(0.06325)
	[5.67738]	[30.5984]	[18.0415]	[21.8145]
PERIODS LAG (-2)	-0.088096	-0.880202	-0.168365	-0.337427
	(0.05049)	(0.13487)	(0.09380)	(0.10757)
	[-1.74498]	[-6.52636]	[-1.79489]	[-3.13687]
PERIODS LAG (-3)	0.141398	-0.501803	0.046515	-0.132734
	(0.05101)	(0.14569)	(0.09472)	(0.10720)
	[2.77219]	[-3.44432]	[0.49106]	[-1.23822]
PERIODS LAG (-4)	-0.064871	0.907335	-0.145923	0.060614
	(0.05178)	(0.14937)	(0.09621)	(0.10493)
	[-1.25286]	[6.07448]	[-1.51678]	[0.57765]
PERIODS LAG (-5)	0.035264	-0.436610	-0.069134	-0.122417
	(0.05184)	(0.16019)	(0.09786)	(0.10353)
	[0.68018]	[-2.72550]	[-0.70645]	[-1.18246]
PERIODS LAG (-6)	-0.024585	-0.099651	0.024918	-0.003293
	(0.05193)	(0.16161)	(0.09652)	(0.10288)
	[-0.47343]	[-0.61663]	[0.25817]	[-0.03201]
PERIODS LAG (-7)	0.029691	0.186067	0.248376	0.195398
	(0.05224)	(0.16140)	(0.09712)	(0.10305)
	[0.56835]	[1.15282]	[2.55740]	[1.89620]
PERIODS LAG (-8)	-0.056682	-0.101665	0.008936	-0.099223
	(0.05290)	(0.15843)	(0.09878)	(0.10353)
	[-1.07150]	[-0.64170]	[0.09047]	[-0.95841]
PERIODS LAG (-9)	0.070432	0.028406	-0.124331	-0.226666
	(0.05329)	(0.15028)	(0.10128)	(0.10378)
	[1.32170]	[0.18902]	[-1.22755]	[-2.18406]
PERIODS LAG (-10)	-0.156251	-0.031328	-0.042864	0.329432
	(0.05216)	(0.14936)	(0.10282)	(0.10672)
	[-2.99582]	[-0.20975]	[-0.41688]	[3.08686]
PERIODS LAG (-11)	0.088572	-0.043751	0.075696	-0.055278
	(0.05269)	(0.13658)	(0.10181)	(0.11122)
	[1.68098]	[-0.32033]	[0.74354]	[-0.49701]
PERIODS LAG (-12)	0.642117	0.062796	-0.057617	-0.005272
	(0.04965)	(0.06348)	(0.06602)	(0.07912)
	[12.9321]	[0.98915]	[-0.87268]	[-0.06663]

Table 11: Germany

Sample (adjusted): 157 318
Included observations: 162 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	ARRIVALS	GDP	ER	OIL
PERIODS LAG (-1)	0.179425	1.805185	1.130632	1.307731
	(0.07280)	(0.09450)	(0.09174)	(0.09574)
	[2.46465]	[19.1017]	[12.3241]	[13.6596]
PERIODS LAG (-2)	-0.034529	-0.738741	-0.229067	-0.270403
	(0.07438)	(0.19146)	(0.13688)	(0.15731)
	[-0.46425]	[-3.85847]	[-1.67349]	[-1.71893]
PERIODS LAG (-3)	-0.070037	-0.464943	0.214951	-0.116014
	(0.07394)	(0.19995)	(0.13904)	(0.15579)
	[-0.94721]	[-2.32528]	[1.54591]	[-0.74466]
PERIODS LAG (-4)	0.047532	0.755087	-0.175112	0.080812
	(0.07397)	(0.20402)	(0.14241)	(0.15126)
	[0.64255]	[3.70111]	[-1.22965]	[0.53425]
PERIODS LAG (-5)	-0.166471	-0.281016	-0.136057	-0.153241
	(0.07291)	(0.21410)	(0.14406)	(0.14913)
	[-2.28308]	[-1.31256]	[-0.94446]	[-1.02760]
PERIODS LAG (-6)	-0.002364	-0.277699	-0.001637	-0.065343
	(0.07634)	(0.21584)	(0.14307)	(0.15168)
	[-0.03097]	[-1.28658]	[-0.01144]	[-0.43078]
PERIODS LAG (-7)	0.029433	0.309501	0.233694	0.229919
	(0.07592)	(0.21494)	(0.14115)	(0.15631)
	[0.38767]	[1.43997]	[1.65566]	[1.47089]
PERIODS LAG (-8)	-0.145270	-0.019278	0.050007	-0.162601
	(0.07253)	(0.22317)	(0.14400)	(0.15589)
	[-2.00302]	[-0.08638]	[0.34726]	[-1.04304]
PERIODS LAG (-9)	0.005486	-0.054697	-0.230173	-0.201664
	(0.07335)	(0.22776)	(0.14883)	(0.15578)
	[0.07479]	[-0.24015]	[-1.54659]	[-1.29458]
PERIODS LAG (-10)	-0.072128	-0.046091	0.057290	0.310095
	(0.07273)	(0.22493)	(0.15016)	(0.15603)
	[-0.99176]	[-0.20491]	[0.38153]	[1.98738]
PERIODS LAG (-11)	0.113933	0.119692	-0.009438	0.041349
	(0.07351)	(0.21488)	(0.14888)	(0.16506)
	[1.54988]	[0.55703]	[-0.06340]	[0.25051]
PERIODS LAG (-12)	0.631912	-0.101108	-0.001381	-0.079219
	(0.07238)	(0.11057)	(0.10001)	(0.12672)
	[8.73011]	[-0.91439]	[-0.01380]	[-0.62515]

Table 12: India

Sample (adjusted): 1984M01 2009M06
Included observations: 306 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	ARRIVALS	GDP	ER	OIL
PERIODS LAG (-1)	0.173965	1.939076	1.155226	1.355766
	(0.06301)	(0.06250)	(0.06169)	(0.06319)
	[2.76085]	[31.0264]	[18.7263]	[21.4564]
PERIODS LAG (-2)	0.047157	-0.934642	-0.125842	-0.299619
	(0.07203)	(0.13658)	(0.09486)	(0.10641)
	[0.65465]	[-6.84326]	[-1.32663]	[-2.81561]
PERIODS LAG (-3)	0.002154	0.034602	-0.083111	-0.174067
	(0.07192)	(0.14914)	(0.09565)	(0.10594)
	[0.02996]	[0.23201]	[-0.86890]	[-1.64310]
PERIODS LAG (-4)	-0.025598	-0.046765	-0.049080	0.070170
	(0.07201)	(0.14931)	(0.09572)	(0.10489)
	[-0.35547]	[-0.31321]	[-0.51273]	[0.66896]
PERIODS LAG (-5)	0.035660	0.003690	-0.103981	-0.106035
	(0.07238)	(0.15238)	(0.09566)	(0.10646)
	[0.49268]	[0.02422]	[-1.08693]	[-0.99604]
PERIODS LAG (-6)	0.060461	-0.025032	0.025289	0.021584
	(0.07232)	(0.15963)	(0.09494)	(0.10661)
	[0.83598]	[-0.15682]	[0.26636]	[0.20245]
PERIODS LAG (-7)	0.046164	0.067751	0.300506	0.187790
	(0.07173)	(0.16189)	(0.09462)	(0.10736)
	[0.64355]	[0.41850]	[3.17606]	[1.74920]
PERIODS LAG (-8)	0.052398	-0.053730	-0.040789	-0.151335
	(0.07207)	(0.16254)	(0.09594)	(0.10836)
	[0.72699]	[-0.33056]	[-0.42514]	[-1.39666]
PERIODS LAG (-9)	-0.075110	0.054054	-0.149797	-0.208968
	(0.07187)	(0.16304)	(0.09642)	(0.10888)
	[-1.04510]	[0.33154]	[-1.55354]	[-1.91916]
PERIODS LAG (-10)	0.065725	-0.062445	0.031747	0.343133
	(0.07127)	(0.16352)	(0.09831)	(0.11021)
	[0.92222]	[-0.38188]	[0.32294]	[3.11353]
PERIODS LAG (-11)	-0.059428	-0.000721	0.125133	-0.096635
	(0.07082)	(0.15063)	(0.09738)	(0.11543)
	[-0.83910]	[-0.00479]	[1.28496]	[-0.83717]
PERIODS LAG (-12)	0.425280	0.024058	-0.135007	-0.007200
	(0.06787)	(0.06939)	(0.06268)	(0.08083)
	[6.26614]	[0.34669]	[-2.15380]	[-0.08907]

Table 13: New Zealand

Sample (adjusted): 1984M01 2009M06
Included observations: 306 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	ARRIVALS	GDP	ER	OIL
PERIODS LAG (-1)	0.209687	1.753821	1.122243	1.397837
	(0.05411)	(1.08266)	(0.06193)	(0.06243)
	[3.87522]	[1.61991]	[18.1215]	[22.3911]
PERIODS LAG (-2)	-0.001421	-1.655989	-0.225312	-0.348224
	(0.05566)	(1.90763)	(0.09306)	(0.10664)
	[-0.02553]	[-0.86809]	[-2.42123]	[-3.26552]
PERIODS LAG (-3)	0.042617	0.387992	0.072026	-0.157963
	(0.05504)	(1.93224)	(0.09401)	(0.10619)
	[0.77430]	[0.20080]	[0.76619]	[-1.48756]
PERIODS LAG (-4)	0.109948	-0.371421	-0.114676	0.087104
	(0.05561)	(2.01487)	(0.09653)	(0.10485)
	[1.97709]	[-0.18434]	[-1.18795]	[0.83071]
PERIODS LAG (-5)	-0.076810	1.422523	-0.066743	-0.123309
	(0.05632)	(2.02871)	(0.09980)	(0.10447)
	[-1.36385]	[0.70120]	[-0.66874]	[-1.18035]
PERIODS LAG (-6)	0.058386	-1.295456	0.045168	-0.004895
	(0.05684)	(2.07204)	(0.09929)	(0.10394)
	[1.02728]	[-0.62521]	[0.45489]	[-0.04710]
PERIODS LAG (-7)	-0.052404	-1.334034	0.179315	0.236975
	(0.05707)	(2.06783)	(0.09861)	(0.10408)
	[-0.91821]	[-0.64514]	[1.81838]	[2.27683]
PERIODS LAG (-8)	0.008957	3.905997	0.028564	-0.156073
	(0.05776)	(2.03115)	(0.09894)	(0.10514)
	[0.15507]	[1.92304]	[0.28869]	[-1.48440]
PERIODS LAG (-9)	0.016548	-1.675174	-0.119060	-0.194285
	(0.05722)	(2.01599)	(0.10068)	(0.10681)
	[0.28919]	[-0.83094]	[-1.18257]	[-1.81897]
PERIODS LAG (-10)	-0.114367	0.860037	0.035878	0.310939
	(0.05721)	(1.91326)	(0.10242)	(0.10997)
	[-1.99900]	[0.44951]	[0.35032]	[2.82750]
PERIODS LAG (-11)	-0.019700	-0.332254	-0.077161	-0.073904
	(0.05779)	(1.90709)	(0.10131)	(0.11197)
	[-0.34092]	[-0.17422]	[-0.76165]	[-0.66003]
PERIODS LAG (-12)	0.506593	-0.633159	0.046658	0.006787
	(0.05560)	(1.11011)	(0.06572)	(0.07902)
	[9.11194]	[-0.57036]	[0.70991]	[0.08590]

Table14: Netherlands

Sample (adjusted): 13 318
Included observations: 306 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	ARRIVALS	GDP	OIL	ER
PERIODS LAG(-1)	0.206512	1.821981	1.352820	1.109015
	(0.04686)	(0.06277)	(0.06337)	(0.06244)
	[4.40702]	[29.0268]	[21.3492]	[17.7626]
PERIODS LAG (-2)	-0.000297	-0.842770	-0.278532	-0.124980
	(0.04807)	(0.13029)	(0.10695)	(0.09376)
	[-0.00619]	[-6.46844]	[-2.60444]	[-1.33296]
PERIODS LAG (-3)	0.115750	-0.508655	-0.148785	0.053656
	(0.04704)	(0.14146)	(0.10620)	(0.09404)
	[2.46074]	[-3.59586]	[-1.40099]	[0.57057]
PERIODS LAG (-4)	-0.111762	0.978228	0.089243	-0.133241
	(0.04707)	(0.14504)	(0.10461)	(0.09572)
	[-2.37432]	[6.74449]	[0.85314]	[-1.39206]
PERIODS LAG (-5)	-0.031783	-0.486818	-0.161930	-0.131667
	(0.04762)	(0.15572)	(0.10432)	(0.09757)
	[-0.66743]	[-3.12614]	[-1.55229]	[-1.34952]
PERIODS LAG (-6)	-0.108061	-0.174290	-0.014140	0.018526
	(0.04775)	(0.15652)	(0.10474)	(0.09720)
	[-2.26313]	[-1.11355]	[-0.13500]	[0.19059]
PERIODS LAG (-7)	0.106543	0.427477	0.218982	0.266126
	(0.04791)	(0.15584)	(0.10612)	(0.09684)
	[2.22390]	[2.74298]	[2.06362]	[2.74805]
PERIODS LAG (-8)	-0.070166	-0.277760	-0.120472	0.007305
	(0.04838)	(0.15737)	(0.10688)	(0.09815)
	[-1.45037]	[-1.76502]	[-1.12712]	[0.07443]
PERIODS LAG (-9)	0.169098	-0.012965	-0.221385	-0.122531
	(0.04840)	(0.15137)	(0.10643)	(0.10021)
	[3.49381]	[-0.08566]	[-2.08012]	[-1.22278]
PERIODS LAG (-10)	-0.171316	0.153572	0.324356	-0.020749
	(0.04912)	(0.14779)	(0.10850)	(0.10210)
	[-3.48750]	[1.03915]	[2.98944]	[-0.20322]
PERIODS LAG (-11)	0.095549	-0.129327	-0.087487	0.045050
	(0.04988)	(0.13904)	(0.11221)	(0.10155)
	[1.91571]	[-0.93015]	[-0.77968]	[0.44362]
PERIODS LAG (-12)	0.674469	0.051816	0.034384	-0.040293
	(0.04837)	(0.06680)	(0.08051)	(0.06629)
	[13.9435]	[0.77572]	[0.42707]	[-0.60779]

Table 15: USA

Sample (adjusted): 1984M01 2009M06
Included observations: 306 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	ARRIVALS	GDP	ER	OIL
PERIODS LAG(-1)	0.241659	1.898732	1.206175	1.333614
	(0.05344)	(0.06218)	(0.06144)	(0.06367)
	[4.52214]	[30.5377]	[19.6325]	[20.9446]
PERIODS LAG (-2)	0.042369	-0.870345	-0.236230	-0.257229
	(0.05610)	(0.13256)	(0.09668)	(0.10562)
	[0.75523]	[-6.56559]	[-2.44338]	[-2.43535]
PERIODS LAG (-3)	-0.020489	-0.537307	-0.001579	-0.192322
	(0.05648)	(0.14103)	(0.09816)	(0.10454)
	[-0.36278]	[-3.80976]	[-0.01609]	[-1.83968]
PERIODS LAG (-4)	-0.023528	0.958789	-0.046190	0.107956
	(0.05667)	(0.14481)	(0.09781)	(0.10291)
	[-0.41516]	[6.62090]	[-0.47224]	[1.04900]
PERIODS LAG (-5)	-0.037217	-0.446619	-0.097136	-0.131965
	(0.05700)	(0.15628)	(0.09770)	(0.10287)
	[-0.65294]	[-2.85788]	[-0.99421]	[-1.28282]
PERIODS LAG (-6)	-0.027513	-0.131686	0.068894	0.018714
	(0.05723)	(0.15742)	(0.09769)	(0.10258)
	[-0.48076]	[-0.83652]	[0.70521]	[0.18243]
PERIODS LAG (-7)	0.036976	0.249021	0.115393	0.202517
	(0.05778)	(0.15782)	(0.09750)	(0.10327)
	[0.63998]	[1.57788]	[1.18352]	[1.96103]
PERIODS LAG (-8)	-0.010420	-0.117533	0.137553	-0.157588
	(0.05768)	(0.15640)	(0.09724)	(0.10491)
	[-0.18066]	[-0.75151]	[1.41458]	[-1.50217]
PERIODS LAG (-9)	0.012066	-0.220534	-0.233157	-0.220448
	(0.05754)	(0.14415)	(0.09892)	(0.10637)
	[0.20968]	[-1.52986]	[-2.35695]	[-2.07241]
PERIODS LAG (-10)	-0.026239	0.413320	0.004695	0.341567
	(0.05764)	(0.14093)	(0.10178)	(0.10908)
	[-0.45521]	[2.93282]	[0.04613]	[3.13148]
PERIODS LAG (-11)	0.108874	-0.199817	0.117068	-0.096378
	(0.05728)	(0.13277)	(0.10151)	(0.11267)
	[1.90089]	[-1.50499]	[1.15322]	[-0.85539]
PERIODS LAG (-12)	0.561213	0.003680	-0.096251	0.038092
	(0.05684)	(0.06294)	(0.06383)	(0.07852)
	[9.87275]	[0.05847]	[-1.50786]	[0.48512]

Table 16: UK

Sample (adjusted): 1984M01 2009M06
Included observations: 306 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	ARRIVALS	GDP	ER	OIL
PERIODS LAG(-1)	0.297596	1.897097	1.209057	0.575948
	(0.05234)	(0.06275)	(0.06208)	(0.50378)
	[5.68583]	[30.2347]	[19.4758]	[1.14325]
PERIODS LAG (-2)	0.078598	-0.876194	-0.309500	-0.612502
	(0.05581)	(0.13406)	(0.09655)	(0.78349)
	[1.40829]	[-6.53571]	[-3.20564]	[-0.78176]
PERIODS LAG (-3)	-0.055542	-0.617065	0.137603	0.432554
	(0.05540)	(0.14238)	(0.09793)	(0.79474)
	[-1.00254]	[-4.33383]	[1.40506]	[0.54427]
PERIODS LAG (-4)	0.065020	1.116139	-0.084618	-0.559589
	(0.05595)	(0.14641)	(0.09874)	(0.80126)
	[1.16213]	[7.62313]	[-0.85699]	[-0.69838]
PERIODS LAG (-5)	-0.165098	-0.478993	-0.184846	0.357910
	(0.05602)	(0.16218)	(0.09916)	(0.80470)
	[-2.94738]	[-2.95351]	[-1.86408]	[0.44477]
PERIODS LAG (-6)	-0.082338	-0.229412	0.132380	-0.890803
	(0.05614)	(0.16259)	(0.09906)	(0.80386)
	[-1.46675]	[-1.41100]	[1.33639]	[-1.10816]
PERIODS LAG (-7)	0.133111	0.331932	0.146529	0.630027
	(0.05672)	(0.16233)	(0.09781)	(0.79373)
	[2.34702]	[2.04485]	[1.49810]	[0.79375]
PERIODS LAG (-8)	0.032006	-0.127303	0.072269	-1.303268
	(0.05698)	(0.16341)	(0.09806)	(0.79573)
	[0.56170]	[-0.77906]	[0.73702]	[-1.63783]
PERIODS LAG (-9)	-0.064614	-0.142622	-0.166253	2.132714
	(0.05713)	(0.14908)	(0.10239)	(0.83089)
	[-1.13096]	[-0.95666]	[-1.62374]	[2.56679]
PERIODS LAG (-10)	0.051605	0.205529	-0.119598	-0.909797
	(0.05721)	(0.14230)	(0.10448)	(0.84788)
	[0.90199]	[1.44430]	[-1.14467]	[-1.07302]
PERIODS LAG (-11)	0.043563	-0.056854	0.170406	0.025057
	(0.05676)	(0.13408)	(0.10265)	(0.83299)
	[0.76748]	[-0.42404]	[1.66011]	[0.03008]
PERIODS LAG (-12)	0.558117	-0.023531	-0.069891	0.137288
	(0.05415)	(0.06489)	(0.06431)	(0.52184)
	[10.3060]	[-0.36263]	[-1.08687]	[0.26308]

Model Specification

Table 17: Model representation for the lagged variables of vector x

	Arrivals	GDP	RER	Oil prices
Australia	1, 12	1,8,11	1,7	1,2,10
France	1, 12	1,4	1,7	10
Germany	1, 12	1,2	1,2,7	1,2,10
India	1, 12	1,2	1,7	1,10
Netherlands	1, 12	1,2	1,7	1,2
New Zealand	1, 12	1,8	1,2	1,10
UK	1, 12	1,2,4	1,2,5	1,8
USA	1, 12	1,2,4	1,2	1,2,10

Data manipulations for foreign arrivals:

There is omitting data for a number of months for foreign tourist arrivals, but it impossible to leave them blank as it will have large affects on yearly totals and will be misrepresentative. Therefore an amount was calculated using the following equations and inputted for each of the month missing variables. The subscript *t* represents the current period were there is missing data, the *t-1* subscript refers to the month of the previous period (corresponding to the month in the previous year) while *t+1* subscript refers to the month of the next period (corresponding to the month in the next year)

$$Month_t = \frac{(month_{t-1} + month_{t+1})}{2}$$

This was done for the following data points:

MAY 1985	- India
FEB 1989	-all countries
NOV 1994	-Brazil, China, India and Spain
DEC 1994	-Brazil
JAN 1996- JULY 1996	- Brazil, China, India and Spain
AUG 1996	-Brazil
SEPT 1996	- Brazil, China, India and Spain
OCT 1996	- Brazil, China, India and Spain
DEC 1996	- Brazil, China, India and Spain

For the following points no data was published for foreign arrivals from Spain, therefore the

Portuguese arrivals which is of a similar nature was used as a proxy:

JAN 2009

FEB 2009