Applied Economics

ISSN: 0003-6846 (Print) 1466-4283 (Online) Journal homepage: http://www.tandfonline.com/loi/raec20

A panel data analysis of the effect of corruption on tourism

Marie Poprawe

To cite this article: Marie Poprawe (2015) A panel data analysis of the effect of corruption on tourism, Applied Economics, 47:23, 2399-2412, DOI: 10.1080/00036846.2015.1005874

To link to this article: https://doi.org/10.1080/00036846.2015.1005874

Published online: 05 Feb 2015.

Applied Economics, 2015
Vol. 47, No. 23, 2399–2412, http://dx.doi.org/10.1080/00036846.2015.1005874

A panel data analysis of the effect of corruption on tourism

Marie Poprawe
ETH Zurich, KOF, 8092 Zurich, Switzerland
E-mail: marie.poprawe@gmail.com

This study empirically tests the hypothesis that corruption has a negative effect on tourism. Having to pay bribes while on holiday or a business trip increases the costs of travelling to a country where corruption is prevalent. Tourists are thus more likely to travel to countries where these additional costs do not need to be incurred. This hypothesis is tested using a panel data set of over 100 countries and 16 years. The results indicate that a 1-point increase in the Corruption Perception Index (implying a decrease in corruption) results in a 2% to 7% increase in tourist inflows. In addition, tourist inflows rise with GDP per capita, openness and growth and are higher in countries with a temperate climate.

Keywords: corruption; tourism

JEL Classification: D73; L83

I. Introduction

The tourism industry is one of the largest in the world and is constantly growing because of higher disposable incomes and a growing world population. Even during the recent economic crisis, international tourism receipts and incomes from international passenger transports grew continuously and reached about $1.3 trillion in 2012 (United Nations World Tourism Organization, 2012).

While tourism accounts for roughly 6% of world exports, it has been largely neglected by economists. The literature on the sociology of tourism is large; however, in the economics literature, tourism has received surprisingly little attention. Exceptions are Neumayer (2004) and Eilat and Einav (2004) who have shown that uncertainty regarding the personal safety during a trip, caused by either political violence or terrorism, deters tourism significantly. To my knowledge, no study has been conducted to determine the effect of more subtle factors, such as corruption, on tourism demand.

Corruption is ubiquitous, not only around the world but also in the economic literature. Several definitions of corruption have been used in economic studies: 'an illegal payment to a public agent to obtain a benefit for a private individual or firm' (Rose-Ackerman, 1999); 'the illegitimate use of public roles and resources for private benefit' (Bicchieri and Duffy, 1997); or 'an act in which the power of public office is used for personal gain in a manner that contravenes the rules of the game' (Aidt, 2003).

Corruption has been argued to harm an economy's macroeconomic well-being (Mauro, 1995) and 'sand the wheels of growth' (Méon and Sekkat, 2005). While most scholars find that corruption is detrimental and acts like a tax (Aidt, 2003), evidence supporting the 'greasing the wheels' hypothesis has also been found by Dreher and Gassebner (2013), who argue that corruption can be beneficial because it makes the public sector more efficient. Corruption can thus speed up cumbersome procedures and bypass inefficient regulations (Bicchieri and Duffy, 1997).

This article tests whether corruption has a positive or negative impact on tourism and quantifies the effect that perceived corruption has on tourism inflows.

The article makes a number of contributions both to the literature on the economics of corruption and to the literature on the economics of tourism. First, it is the first study to analyse the effect that corruption has on tourism. Second, it does so controlling for a large number of control variables, both time-variant and time-invariant, in a cross-sectional time series setting. More specifically, this is the first study to control for the geographic attributes, the political environment, infrastructure, climate and wealth simultaneously, thus melding elements from the geographic, economic and sociological tourism literature and overcoming the omitted variable bias adumbrating many studies. Furthermore, it is the first attempt to estimate time invariant variables' coefficients in a panel data set in the tourism literature.

II. The Impact of Corruption on Tourism

Literature review

According to the United Nations World Tourism Organization, one billion tourists travelled the world in 2012, and the economic development of many developing nations is highly dependent on tourism incomes. Unfortunately, it is mostly developing nations that suffer from a weak political system.

The coverage of tourism in economic research is scarce. Existing studies are mostly limited to small-sample qualitative studies. Some studies have attempted to answer the question of what determines the demand for tourism, for example Baimai and Daniel (2009). Especially the estimation of the elasticity of tourism demand has received much attention, which Crouch (1995) summarizes in a meta analysis.

Many studies analyse tourism for one particular country or regions within countries, such as Spain in Espasa *et al.* (1992) or Balaguer and Cantavella-Jordá (2002), Sardinia in Pulina and O'Brien (2002), Turkey in Halicioglu (2008) and Thailand in Webb and Chotithamwat-tana (2013), relying mainly on time series data.

Others focus on particular world regions; for example, Baimai and Daniel (2009) use stepwise regression methods to determine which variables affect tourism, focusing in particular on emerging markets. They find that the number of national heritage sites, the number of hotels and advertising expenditure can explain demand for tourism. However, they point out that their study is lacking variables on political stability. While six variables are considered, some important ones, such as GDP, are not included. Naudé and Saayman (2005) undertake a similar study, but analysing African countries using a panel data set. Lim and McAleer (2000) analyse the seasonality of tourism from Asia to Australia.

Concerning political attributes, there are a few papers that estimate the effect of political stability and terrorism on tourism flows. Estimating multinomial panel data models, Eilat and Einav (2004) find that political risk and the exchange rate are important factors affecting tourism. Furthermore, studying the impact of terrorism on tourism in three European countries that experienced terrorist attacks, Enders *et al.* (1992) and Drakos and Kutan (2001) find that revenue losses due to terrorism are seizable. Neumayer (2004) studies the effect of political violence on tourism for a larger set of countries, finding that terrorism severely deters tourist inflows, using both fixed effects and generalized method of moments (GMM) regression methods. Corona Juárez (2013) follows this line of work, using panel data to determine the effect of violent crimes on tourism in Mexican states. Of course, a recent example of the detrimental effect of political violence on tourism is the Arab Spring (Lanquar, 2011). Some studies in sociology have determined the importance of the *feeling* of safety of tourists, arguing that tourists wish to feel secure during their holidays. For example, Gauci *et al.* (2002) include among the obstacles to tourism in Africa fears of personal safety. Similarly, Demos (1992) finds that feeling safe is important to visitors in D.C., while George (2003) finds that fear of crime has a detrimental effect for tourism in Cape Town. Furthermore, Floyd and Pennington-Gray (2004) emphasize the importance of perceived risk rather than actual risk when choosing a holiday location. There are, as of yet, no studies analysing the effect of more subtle types of threat to tourists, such as corruption.

Theoretical considerations

The effect of corruption on tourism may be twofold. While corruption is frequently viewed as impeding to development and growth, thus 'sanding the wheels' of growth (e.g. in Méon and Sekkat, 2005), evidence for the 'greasing the wheels'-hypothesis was found, for example by Dreher and Gassebner (2013) who observe that corruption facilitates firm entry in highly regulated economies. Thus, corruption can help compensate for bad governance.

Similarly for tourism, one could think of anecdotal evidence supporting both 'greasing the wheels' and 'sanding the wheels' hypotheses. In corrupt countries, corruption may facilitate entrepreneurial activity and increase the 'speed of money' and the speed of doing business. In this respect, corruption may have positive effects for tourists. Examples of corruption greasing the wheels of tourism may be the payment of bribes or generous tips, known as *bakhsheesh* in many oriental countries, to achieve certain goals during their holiday, such as nicer hotel rooms. While corruption in this case results in higher costs, it also increases the benefits. This results in the following hypothesis:

H1: In line with the 'greasing the wheels' hypothesis, corruption may be beneficial for tourists, and countries with high perceived corruption will receive more tourists than countries with low perceived corruption, *ceteris paribus*.

On the other hand, corruption may sand the wheels of tourism by increasing uncertainty and therefore increasing risks (see Campos *et al.,* 1999). For example, having to pay someone to 'watch one's bags' – a form of corruption particularly common in the Caribbean – to ensure that same person does not steel one's bags is a form of corruption that is likely to sand rather than grease. More examples include 'express treatment' at airports in Indonesia, corrupt police officers in the Americas and 'tea money' in Thailand. In this case, corruption will have the same effect as a tax, implying that tourists incur additional costs in travelling to more corrupt countries, without any additional benefits.[1] Particularly for tourists from cultures where such corrupt behaviour is uncommon may this result in a reluctance of going to high-corruption countries for their holidays.[2] Tourists might then instead choose alternative destinations with similar characteristics but less uncertain conditions and lower levels of perceived corruption, a substitution effect similar to that described by Enders *et al.* (1992). This results in the following hypothesis:

H2: In line with the 'sanding the wheels' hypothesis, corruption may be harmful for tourists, and countries with low perceived corruption will receive more tourists than countries with high perceived corruption, *ceteris paribus*.

These contrasting hypotheses will be tested using a panel data set of tourist inflows for over 100 countries over the period 1995–2010. An equation of the following form is then estimated:

$$\text{Tourism}_{it} = \beta\,\text{Corruption}_{i,t-1} + \mathbf{X}'_{i,t-1}\gamma + \varepsilon_{it} \quad (1)$$

Where Tourism_{it} is the per-capita log tourism inflow into country i in year t, $\text{Corruption}_{i,t-1}$ is a measure of perceived corruption in country i and year $t-1$, and $\mathbf{X}_{it}$ is a set of control variables. The primary goal is to estimate β to determine which of the two hypotheses, H1 or H2, the data provides evidence for. The expected signs of β and γ are discussed in Section III.

III. Data

Tourism

Raw data on tourism is taken from the World Tourism Organization (UNWTO). The UNWTO provides data on total inbound tourism as well as overnight tourism, both being head-counts. Total inbound tourism is the sum of overnight visitors and same-day visitors (excursionists). The main dependent variable is *TOURISM*, the total inbound tourism, expressed in per capita terms and logarithmized, as in Garin-Munoz and Amaral (2000). The data on tourism by the UNWTO give total tourist inflows. Although not

[1] Some governments are becoming increasingly aware of the harm that corruption does to their tourism industry; for example, the Burmese government has a website promoting an 'open, accountable, and responsible tourism industry': www.tourismtransparency.org.

[2] A hypothesis of this form can only be tested with bilateral tourism data where origin and destination countries are known.

on a bilateral basis, the benefit of these data is that they cover a large set of countries for the period 1995–2010. Some countries' tourist inflows are as high as 50 times their population, while other countries receive almost no tourists – for example, Tajikistan (with a population of 5.8 million) had 700 tourists in 1996. Further descriptive statistics are shown in Table 1.

Corruption

The main variable of interest in this analysis is *CORRUPTION*, the Corruption Perception Index by Transparency International. The Corruption Perception Index measures the perceived levels of public sector corruption. Being a composite index based on both surveys and professional assessments and reflecting the views of observers from around the world, including experts living and working in the countries evaluated, it is unbiased and has a good coverage (Méon and Weill, 2010). For a country to be included in the ranking, it must be included in a minimum of three of the index's data sources (independent institutions specializing in governance and business climate analysis). As in Bjornskov (2003), the variable ranges from 0 to 10, with 10 being perceived as the least corrupt.[3] In this sample, corruption varies between 0.4 in Bangladesh and 10 in Denmark and Finland. In estimating Equation 1, one would therefore expect a negative β in support of hypothesis H1 and a positive β in support of hypothesis H2.

It has frequently been argued in other settings that the Corruption Perception Index is only useful to a limited degree because it considers only perceived corruption and not actual corruption. However, in the case at hand, the decision of where to spend one's holiday is based precisely on perceived corruption rather than actual corruption, particularly if one is travelling to a country for the first time. Even the threat of corruption will likely discourage tourism. This reasoning is similar to that provided by Floyd and Pennington-Gray (2004) and especially Neumayer (2004): 'Political violence is bad news for a country's tourism, even if no tourist ever becomes physically harmed or killed'(p. 278). Therefore, the usual criticism of this corruption data source being subjective is actually advantageous here.

Controls

Coshall (2000) states that 'there are many financial, perceptual, cultural, social and environmental factors that could be used to try and explain international tourism flows'. Overall, the empirical studies on tourism use different sets of control variables and it is not clear which control variables are sufficient and appropriate, possibly resulting in an omitted variable bias. In particular, country-specific wealth measures as well as geographical and political attributes are often insufficiently accounted for. Little attention has been given to the effects of the political environment and the costs associated with unstable political and social conditions. This study tries to account for these attributes simultaneously.

One needs to account for the economic and political conditions in the receiving country. In particular, GDP, log GDP per capita (purchasing power parity adjusted), is included to account for prosperity. By including POP, the log population, scale effects are controlled for. Additionally, OPEN, measuring openness to international trade is used as a proxy for connectedness to international markets. As in Eilat and Einav (2004), the exchange rate, XRATE, measured in terms of the absolute standardized deviation of the exchange rate from the country's mean exchange rate to the US$, is included to account for the uncertainty relating to changing exchange rates. These data come from the Penn World Tables. One expects wealthier, faster-growing and more open economies to attract more visitors, *ceteris paribus*. One therefore expects positive coefficients for these variables. On the contrary, large fluctuations in the exchange rate provide uncertainty and potentially unanticipated costs to tourists and will thus likely discourage tourism inflows, *ceteris paribus*. A negative obtained coefficient would therefore support this statement.

To account for the degree of cultural proximity to the Western world, the social globalization component of the KOF Globalization Index is used (Dreher, 2006).[4] However, since this index includes

[3] Recently, the methodology was changed and the index now ranges from 0 to 100. However, since the panel ends in 2010 no rescaling was necessary.

[4] Since the tourism data are not bilateral, one cannot account for cultural proximity between sending and receiving countries. Accounting for overall social globalization gives an indication of a receiving country's level of social globalization and thus its proximity to the Western world (which provides the largest number of tourists, see United Nations World Tourism Organization, 2012).

many variables that are already included both as controls and as the dependent variable (tourism, telephone traffic, internet users), a new index is formed excluding those variables but leaving everything else unchanged. SOCIAL GLOB. is the resulting control variable. One expects a high level of social globalization to have a positive impact on tourism inflows; therefore, one expects a positive coefficient.

One must also control for the political environment as armed conflicts, wars and terrorist attacks will likely impede tourism. As in studies by Eilat and Einav (2004) and Neumayer (2004), one must control for political risk and violence. Data on intrastate conflicts, CONFLICT and NEWCONFLICT are dummy variables measuring the incidence of intrastate conflict and whether a new conflict occurred in any given year, respectively. These data come from the Uppsala Conflict Data Program (UCDP). Data on terrorism, TERROR, provide the number of terrorist attacks per year and come from the Global Terrorism Database (GTD, 2012). Conflicts create uncertainty and may thus discourage tourism; therefore, one expects negative coefficients.

Several geographic variables need to be taken into account. The variable DIST. TO COAST provides the average distance to the nearest coast (Gallup *et al.,* 1999). A dummy indicating whether a country has a coastline, LANDLOCKED, is included. In line with the existing literature, particularly Lise and Tol (2002), climate is accounted for using the variable TEMPERATE, indicating the share of the 1995 population in Koeppen–Geiger temperate zones, coming from Gallup *et al.* (1999), is included. One expects countries with a temperate climate to attract more visitors than countries with extreme climates; thus, we expect a positive coefficient for TEMPERATE. Since a coastline is an attractive attribute to tourists, one expects a negative coefficient for LANDLOCKED.

Similarly, the number of heritage sites, HERITAGE, is included in the analysis to account for points of interest for tourists, following Baimai and Daniel (2009) and Frey *et al.* (2013). The World Heritage List is created by the UNESCO; to be included in the list, sites must be of outstanding universal value, either from a cultural or from a natural perspective. The hypothesis is that heritage sites attract tourists and therefore one expects a positive coefficient.

To control for the infrastructure, the number of airports, AIRPORTS, is also included. Furthermore, along the lines of Naudé and Saayman (2005), the number of internet users, INTERNET, and the number of phone lines, PHONES, are added. These variables are given as a percentage of people who have an internet access and landline phones. These variables come from the CIA World Factbook for various years. Also here, one expects positive coefficients for these variables since tourists are likely to be attracted to countries with a good infrastructure.

IV. Econometric Specification

To test the hypothesis that an insecure and corruptive political environment leads to lower tourist inflows into a given country, a panel data set of over 100 countries and 16 years will be analysed. The goal is to estimate the coefficients β and γ in the following equation:

$$\text{Tourism}_{it} = \beta \text{CPI}_{i,t-1} + \mathbf{X}'_{i,t-1}\gamma + \varepsilon_{i,t} \qquad (2)$$

where Tourism_{it} is the logarithmized per-capita tourism inflow into country i in year t, $\text{CPI}_{i,t-1}$ is the Corruption Perception Index for country i in year $t-1$, $\mathbf{X}_{i,t-1}$ is a matrix of controls and other variables of interest and ε_{it} is an error term. Corruption is included with a lag because of the assumption that tourists book their holiday in advance. The matrix $\mathbf{X}_{i,t-1}$ contains geographic, environmental, political and economic variables, as described earlier. Where appropriate, the controls in $\mathbf{X}_{i,t-1}$ are included in logarithmized form (see Table 1).

Previous studies have used relatively simple techniques to analyse the determinants of the demand for tourism. Many studies use cross-sectional data sets, and those that use panel data frequently use estimation techniques that require strong assumptions to be fulfilled. Baimai and Daniel (2009) use a panel data set of 22 emerging economies over 30 years, but then consequently pool those data. This means that the time dimension is insufficiently accounted for. Eilat and Einav (2004) provide a more sophisticated analysis, assuming that countries are effectively differentiated products and therefore estimating multinomial logit models, but without nests.

Table 1. Summary statistics. Detailed variable descriptions can be found in the appendix, Table A1

Variable	*N*	Mean	SD	Min.	Max.
Tourism	1749	–1.00	1.95	–9.02	3.94
Corruption	1881	4.32	2.26	0.4	10
GDP	3019	8.52	1.35	4.88	11.87
POP	3024	8.60	2.03	2.85	14.10
Open	3019	89.64	50.44	1.86	440.43
Growth	2830	0.59	0.97	–5.47	13.17
XRATE	3024	0.18	0.21	0	1.82
Social glob.	3104	42.49	18.67	1.33	85.75
New conflict	2718	0.01	0.09	0	1
Conflict	2718	0.15	0.36	0	1
Terror	3280	11.81	61.78	0	1176
Area	3184	11.18	2.75	3.34	16.65
Dist. to coast	2576	5.34	1.24	2.05	7.77
Landlocked	3280	0.80	0.40	0	1.00
Temperate	2576	0.30	0.42	0	1
Heritage	2432	1.26	1.03	0	3.76
Airports	3168	–7.55	1.64	–10.99	–2.49
Internet	3008	33.40	29.51	0.18	140.32
Phones	3024	20.91	19.34	0.05	95.86

Estimating Equation 2, Section V below first presents regressions with country fixed effects to determine the correlation between tourism inflows and lagged corruption. Furthermore, similar to Neumayer (2004), dynamic GMM regressions are conducted to allow for a lagged effect of the dependent variable.

One of the main problems in using panel data in this setting is the large number of variables that are time-invariant, such as geographic features, and that the obtained results are not entirely comparable to the literature. These variables would then drop out if one was to use fixed effects regression techniques or first differences. Many studies, such as Naudé and Saayman (2005), solve this problem by running random effects regressions. The random effects model treats the unobserved individual heterogeneity as independently distributed of the regressors. For random effects to be unbiased, the country-specific effects must be orthogonal to the other covariates in the model. It is likely that this is not satisfied in practice, and indeed this is what is observed in the data at hand (see Table 2).

One must therefore find an alternative way of estimating all coefficients in a panel data model with time-invariant and time-variant variables if one wishes to estimate coefficients for both the time-invariant and time-variant variables. What seems appropriate in this context is the Hausman–Taylor (HT) approach, see Hausman and Taylor (1981), because it has the advantages of both the fixed effects and random effects estimator. The HT estimator is based on an instrumental variable estimator which uses both the between and within variation of the strictly exogenous variables as instruments. In particular, the individual means of the strictly exogenous regressors are used as instruments for the time-invariant regressors that are correlated with the individual effects (Baltagi *et al.* (2003)). One of the disadvantages of the HT approach is therefore that one has to make assumptions about the endogeneity and exogeneity of variables. In the setting at hand, GDP per capita is treated as an endogenous variable.[5]

The following section will therefore present country fixed effects regressions, dynamic GMM regressions and HT regressions.

V. Results

To get a general idea of the relationship between corruption and tourism, one may plot the Corruption Perception Index against the per capita, logarithmized tourist inflows.

Figure 1 shows that the relationship between corruption and tourist inflows is positive. It uses

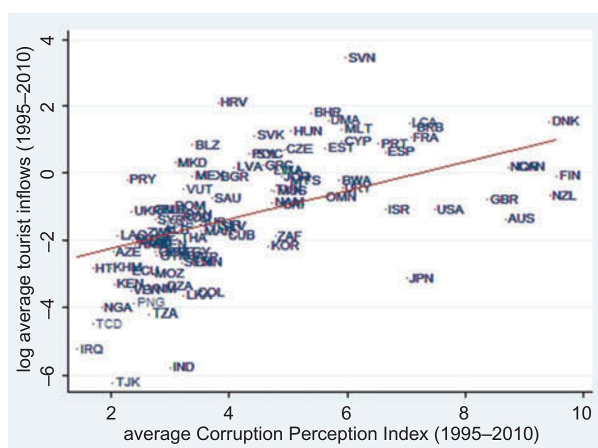

Fig. 1. Pooled OLS regression of corruption on tourist flows

[5] As a robustness check, trade openness, corruption, the exchange rate deviation, growth and the number of heritage sites (as in Frey *et al.,* 2013) are treated as endogenous.

averages of corruption and log tourism over the period 1995–2010. An OLS regression gives a coefficient of $\beta = 0.615$ with a corresponding t-value of 34.38. The adjusted R^2 is 0.37. Recalling that a higher corruption index signifies lower corruption, this graph gives a first indication that more corrupt economies receive fewer tourists on average. However, this result cannot be taken at face value because no controls have been taken into account.

Fixed effects estimations

Table 2 presents country fixed effects regressions containing only time-variant variables. The first column shows a regression of per capita log tourism inflows on lagged corruption. Recall that a higher value of CORRUPTION implies lower corruption – therefore, we expect a positive coefficient, implying that fewer tourists visit high-corruption countries. Indeed, this is confirmed. The coefficient of the variable CORRUPTION, lagged corruption, is positive and significantly different from zero at the 1% level. This implies that countries with lower levels of corruption attract a greater number of tourists, on average. Countries that deteriorate their corruption score receive fewer tourists, on average. Across the six specifications in Table 2, the coefficient of corruption is between 0.042 and 0.045. A coefficient of around 0.042 (0.045) implies that, if the Corruption Perception Index increases by 1 (on a scale of 0 to 10), then tourist inflows increase by 4.2% (4.5%) on average. This relationship remains highly significant when controlling for GDP per capita, population, openness and growth. The coefficient of GDP is positive and highly significant, implying that countries receive more tourists as their wealth increases. In particular, a 1% increase in GDP coincides with an increased tourism inflow of roughly 0.6%. Similarly, as a country's population grows, it attracts significantly more tourists per capita.

Table 2. Fixed effects estimations of tourist arrivals

	(1)	(2)	(3)	(4)	(5)	(6)
Corruption	0.045***	0.043***	0.044***	0.042***	0.042***	0.044***
	(0.003)	(0.005)	(0.003)	(0.007)	(0.007)	(0.004)
GDP	0.59***	0.60***	0.59***	0.60***	0.60***	0.59***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
POP	0.47***	0.48***	0.48***	0.48***	0.49***	0.47***
	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)
Open	0.0021***	0.0013**	0.0021***	0.0015**	0.0015**	0.0021***
	(0.000)	(0.035)	(0.000)	(0.020)	(0.019)	(0.000)
Growth	0.037***	0.037***	0.036***	0.038***	0.038***	0.037***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Social glob.		0.00035				
		(0.831)				
XRATE			–0.053			
			(0.399)			
New conflict				–0.092		
				(0.300)		
Conflict					0.032	
					(0.497)	
Terror						–0.00014
						(0.495)
R^2	0.42	0.40	0.42	0.41	0.41	0.42
N	1053	1025	1053	1006	1006	1053
Countries	116	114	116	105	105	116
Hausman test stat	34.08	40.16	35.40	32.24	38.28	35.17
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)

Notes: The dependent variable is population-weighted log tourism. A constant is included but not displayed. SEs are heteroscedasticity-robust. All explanatory variables are lagged by one year. Hausman test statistics displayed use the presented fixed-effects regression and its random-effects counterpart. p-values in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Specifications (2) to (6) include measures of social globalization, the exchange rate deviations, conflict and terrorism variables. None of these are statistically significant, though the signs of the coefficients are largely as expected. Corruption remains a highly significant variable across the various specifications presented.

Hausman tests are performed to determine whether fixed effects are needed or a random effects model can be used. Looking at Table 2, the Hausman tests for all four specifications indicate that a fixed-effects estimation procedure is more appropriate than a random-effects estimation procedure.

Dynamic GMM estimations

To allow for a lagged effect of the dependent variable as well as lagged effects of the explanatory variable, Table 3 reports analogous results but with Arellano and Bond's GMM panel estimator (Arellano and Bond, 1991). The lagged dependent variable is highly statistically significant. The effect of corruption on tourism is again positive and significant, though the coefficient is smaller. Here, a 1-point increase in the Corruption Perception Index coincides with a 2% decrease in tourism. The effects of the control variables remain largely unchanged; in particular, GDP, openness, population and growth all have a positive and significant impact on tourism inflows, as expected. Adding further controls, social globalization has a positive and significant impact, while exchange rate variability, conflict and terrorism have a statistically significant negative impact. When all control variables are included simultaneously, except for GDP all included variables remain highly statistically significant with the expected effect on tourism.

Hausman–Taylor estimations

To evaluate the effect of some time-invariant variables on tourism and to increase comparability to some of the literature on the determinants of tourism, Table 4 presents HT regressions with different specifications. Using this approach, time-invariant variables' coefficients can now be estimated, which was impossible with fixed effects and GMM estimation

Table 3. Dynamic Generalized Method of Moments estimation of tourist arrivals

	(1)	(2)	(3)	(4)	(5)	(6)
Tourism	0.56***	0.58***	0.56***	0.58***	0.56***	0.58***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Corruption	0.018***	0.021***	0.019***	0.020***	0.022***	0.019***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GDP	0.026***	0.030***	0.025***	0.018	0.032***	0.016
	(0.000)	(0.000)	(0.006)	(0.112)	(0.000)	(0.132)
POP	0.14***	0.087***	0.15***	0.058	0.15***	0.11*
	(0.000)	(0.000)	(0.000)	(0.457)	(0.000)	(0.079)
Open	0.00092***	0.00073***	0.00094***	0.00074***	0.00091***	0.00076***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Growth	0.0060***	0.0065***	0.0057***	0.0039***	0.0065***	0.0050***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Social glob.		0.0013***				0.0011***
		(0.000)				(0.000)
XRATE			–0.047***			–0.055***
			(0.000)			(0.000)
New conflict				–0.023***		–0.024***
				(0.000)		(0.000)
Conflict				–0.020***		–0.017***
				(0.000)		(0.000)
Terror					–0.00011***	–0.00010***
					(0.000)	(0.001)
N	897	871	897	861	897	848
Countries	111	109	111	101	111	100

Notes: The dependent variable is population-weighted log tourism. A constant is included but not displayed. All explanatory variables are lagged by one year. p-values in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 4. Hausman–Taylor estimations of tourist arrivals

	(1)	(2)	(3)	(4)	(5)	(6)
Corruption	0.069***	0.070***	0.061***	0.069***	0.069***	0.062***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
POP	0.20	0.19	0.37**	0.20	0.19	0.34*
	(0.122)	(0.150)	(0.041)	(0.138)	(0.141)	(0.056)
Open	0.0031***	0.0031***	0.0030***	0.0031***	0.0031***	0.0030***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Growth	0.029***	0.029***	0.028***	0.029***	0.029***	0.028***
	(0.006)	(0.006)	(0.008)	(0.006)	(0.007)	(0.008)
Xrate	–0.12*	–0.12*	–0.096	–0.12*	–0.12*	–0.097
	(0.074)	(0.075)	(0.150)	(0.075)	(0.073)	(0.149)
GDP	0.61***	0.61***	0.60***	0.61***	0.61***	0.60***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Area	–0.12	–0.25	–0.20	–0.16	–0.16	–0.45*
	(0.491)	(0.260)	(0.375)	(0.331)	(0.332)	(0.095)
Temperate	1.68***	1.53***	1.73***	1.59***	1.60***	1.31**
	(0.001)	(0.003)	(0.007)	(0.002)	(0.002)	(0.044)
Heritage	–0.51**	–0.37	–0.77**	–0.47*	–0.46*	–0.49
	(0.049)	(0.175)	(0.023)	(0.069)	(0.070)	(0.157)
Landlocked		–0.17				–0.37
		(0.777)				(0.622)
Dist. to coast		0.17				0.24
		(0.488)				(0.443)
Internet			–0.022***			–0.022***
			(0.007)			(0.006)
Phones			0.048***			0.047***
			(0.000)			(0.000)
Airports			–0.19			–0.061
			(0.422)			(0.803)
Social glob.				0.00094		0.00077
				(0.576)		(0.647)
New conflict					–0.11	–0.11
					(0.205)	(0.184)
Conflict					0.046	0.047
					(0.333)	(0.310)
Terror					–0.00014	–0.00014
					(0.495)	(0.490)
N	876	876	876	876	876	876

Notes: The dependent variable is per-capita log tourism. GDP is assumed endogenous. A constant is included but not displayed here. CORRUPTION, POP, OPEN, XRATE, GDP, SOCIAL GLOB., NEWCONFLICT, CONFLICT, and TERROR are lagged by one year. p-values in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

techniques. The variable GDP is treated as endogenous in all six specifications in Table 4.[6]

Column 1 shows a HT regression with CORRUPTION, POP, OPEN, GROWTH, XRATE, GDP, AREA, TEMPERATE and HERITAGE included as explanatory variables, the latter three of which are time-invariant. The sign and significance of the coefficient of CORRUPTION are similar to the

[6] As a robustness check, different sets of variables were presumed endogenous. Regressions with GDP, HERITAGE, OPEN and CORRUPTION assumed endogenous were run, as were regressions with GDP, XRATE and GROWTH assumed endogenous. The results remain virtually unchanged when compared to Table 4; the effect of corruption on tourism is robust to changes in the exogeneity assumptions using the Hausman-Taylor approach. Across the various specifications presented is the effect of the Corruption Perception Index on tourism positive and highly statistically as well as economically significant.

results presented in Table 2, while its magnitude is larger. In particular, a 1-point increase in the Corruption Perception Index results in a 6.9% increase in per capita tourism inflows, *ceteris paribus*. Similarly, the effect of GDP is positive and highly significant. Here, a 1% increase in GDP results in a 0.6% increase in tourism. Tourism falls with the size of the country and rises with the size of the population, though these effects are not statistically significant. GDP, GDP growth and openness all increase tourism inflows. A greater volatility of the exchange rate results in decreased tourism. The higher the share of a country's area in temperate climate the greater its tourism inflows. The coefficient of HERITAGE is negative and significant, implying that the more heritage sites a country has the lower its tourism inflows. Specification (2) accounts for geographic attributes, in particular the mean distance to the coast and a landlocked-dummy, neither of which have a significant impact on tourism. The number of airports, internet connections and phone lines are included in Specification (3). The number of internet connections and phone lines have a significant impact on tourism, while the number of airports does not. Column (4) includes the social globalization index which does not have a significant impact on tourism. Specification (5) includes measures of the incidence of intrastate conflicts and new outbursts of conflicts as well as the number of terrorist attacks, neither of which are significant. Column (6) includes all the aforementioned variables simultaneously; the effect of CORRUPTION on tourist inflows remains positive and highly significant across the different specifications. Its effect is economically significant as it implies a 6% to 7% increase in tourism following a 1-point increase in the Corruption Perception Index.

Additional robustness checks

Several robustness checks were performed, some of which are presented in Table A2 in the Appendix. More specifically, the sample is split into two groups, one of European and OECD countries and one of the rest of the world. In both settings, corruption is highly statistically significant but its coefficient is larger for the subsample of European and OECD countries (see Columns (1) and (2)). Column (3) includes a squared term of CORRUPTION which is not statistically significant. Column (4) uses the ICRG's corruption measure in exchange for Transparency's corruption index.[7] The results do not change. A rolling-window estimation has furthermore revealed that the coefficients are stable over time.

VI. Discussion

The results presented above show that corruption has a negative effect on tourism inflows, thus lending support to the 'greasing the wheels' hypothesis. To provide some intuition of the size of the coefficients: A fall in Uruguay's corruption score from 7 to 6 means that tourism inflows decrease by around 42,000–146,000 tourists (depending on the specification). If Swaziland's corruption index falls from 3.5 to 2.5, then this goes hand in hand with a fall in tourist numbers by 25,000–90,000. If Australia's corruption index was to fall from 8.8 to 7.8, then Australia would loose between 100,000 and 340,000 tourists annually.

Furthermore, wealthy, open and fast-growing countries attract more tourists than poor countries, on average. This result is in line with the existing literature. As in Eilat and Einav (2004), the exchange rate variability has a negative impact on tourism because of increasing uncertainty. Climate appears to be a decisive factor for tourists' decision making, with tourists preferring moderate climates (as in Lise and Tol, 2002).

The effect of infrastructure remains ambiguous. I find that, while the number of phone lines is significant in explaining tourism, the number of airports has no significant impact on tourism, and the number of internet connections has a negative effect. These results align with Corona Júarez (2013) who finds that the number of roads has no significant effect on Mexican tourism and with Naudé and Saayman (2005) who find that internet usage is insignificant in explaining tourism in South Africa. Overall, the effect of infrastructure on tourism remains unclear.

As Frey *et al.* (2013) point out, one advantage of being on the list of heritage sites is the '*attention* created'. The lack of a positive effect of heritage sites on tourism is perhaps surprising. The results obtained here are in contrast to those found by Frey Pamini and Steiner (2013) and Baimai and

[7] The ICRG corruption index is rescaled to range from 0 to 10 to increase comparability to the main results.

Daniel (2009), but generally align with those found by Cuccia Cellini (2007) who observe that (cultural) heritage is not among the important factors influencing tourists' travelling habits. The overall effect of the number of heritage sites on tourism thus remains ambiguous.

Another startling result is that intrastate conflicts and terrorism appear to have an ambiguous effect on tourism, unlike found in Neumayer (2004) and Eilat and Einav (2004). The effect found here is somewhat weaker than in the related literature, although in some regressions a significantly negative effect is indeed found.

The results are generally independent of the estimation method; the sign and significance of the variables does not change, while the magnitude of all coefficients is slightly lower in the GMM regressions. Overall, the main results of this study confirm previous findings and enhance them by showing that perceived corruption has a significant impact on tourism. In particular, a 1-point increase in the Corruption Perception Index, signifying a decrease in corruption, results in an increase in tourist inflows of 2–7%, depending on the specification.

For example, Mexico experienced a decline in the Corruption Perception Index from 3.6 in 2008 to 3.1 in 2010, and at the same time lost over 11 million tourist visits (12.7% of tourism). At the same time, revenue from tourism decreased from 14.726 bn US $ in 2008 to 12.648 bn US $ in 2010.[8] Only around 10–30% of the decline can be attributed to the increase in corruption,[9] but it becomes clear from this example that policies aiming at reducing corruption can have a positive effect on the development of the tourism sector. Such policies could include raising tourists' awareness and teaching them how to counteract corruption. At the same time, policies could involve fighting corruption of government officials, under the assumption that a reduction in public sector corruption will have an external effect on private sector corruption.

VII. Conclusion

This article has investigated what the effect of corruption is on tourists' travelling behaviour. Countries where corruption is inherent to the culture attract fewer tourists than countries where corruption is not prevalent. An explanation for this is that tourists do not wish to incur additional costs in travelling, whether these costs be of a direct or indirect nature. As a consequence, tourists are likely to visit countries where corruption is low. To test this hypothesis, a panel data set of over 100 countries and 16 years was analysed. Using the Hausman-Taylor (1981) methodology has shown that the effect of the Corruption Perception Index (with high values signifying less corruption) on total tourist inflows is positive and highly significant. This implies that the hypothesis of corruption discouraging tourist inflows is confirmed and that corruption appears to 'sand the wheels' of tourism. In particular, a 1-point increase in the Corruption Perception Index *ceteris paribus* results in around 2% to 7% higher tourist inflows. Furthermore, tourist inflows rise with GDP per capita and economic growth. Additionally, temperate climates are beneficial for tourism, as is trade openness.

These findings result in the conclusion that corruption not only affects growth and investment as confirmed by many scholars but it also has a detrimental effect on the tourism sector. Since tourism contributes a great proportion to GDP in developing nations in particular, a policy implication is that reducing public sector corruption will increase an economy's wealth in more ways than one: by increasing growth, investment and GDP (as shown by Mauro (1995) and others) and by increasing incomes from tourism.

Disclosure Statement

No potential conflict of interest was reported by the author.

References

Aidt, T. S. (2003) Economic analysis of corruption: a survey, *Economic Journal*, **113**, F632–652. doi:10.1046/j.0013-0133.2003.00171.x

Arellano, M. and Bond, S. (1991) Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations, *The Review of Economic Studies*, **58**, 277–97. doi:10.2307/2297968

[8] Source: World Bank, World Development Indicators.

[9] Depending on the estimation technique and the obtained coefficients.

Baimai, C. and Daniel, J. L. (2009) Market potential estimation for tourism in emerging markets, *PASOS, Revista De Turismo Y Partimonio Cultural*, **7**, 515–24.

Balaguer, J. and Cantavella-Jordá, M. (2002) Tourism as a long-run economic growth factor: the Spanish case, *Applied Economics*, **34**, 877–84. doi:10.1080/00036840110058923

Baltagi, B. H., Bresson, G. and Pirotte, A. (2003) Fixed effects, random effects or Hausman–Taylor? A pretest estimator, *Economics Letters*, **79**, 361–69. doi:10.1016/S0165-1765(03)00007-7

Bicchieri, C. and Duffy, J. (1997) Corruption cylces, in *Political Corruption*, Heywood, P. (Ed.), Blackwell, Oxford, pp. 61–79.

Bjornskov, C. (2003) Corruption and social capital, Working Papers 03-13, University of Aarhus, Aarhus School of Business, Department of Economics, Aarhus.

Campos, J. E., Lien, D. and Pradhan, S. (1999) The impact of corruption on investment: predictability matters, *World Development*, **27**, 1059–67. doi:10.1016/S0305-750X(99)00040-6

Corona Júarez, N. (2013) Essays on the economics of crime in Mexico, PhD thesis, Alfrew Weber Institute for Economics, Ruprecht-Karls University, Heidelberg.

Coshall, J. (2000) Spectral analysis of international tourism flows, *Annals of Tourism Research*, **27**, 577–89. doi:10.1016/S0160-7383(99)00081-X

Crouch, G. I. (1995) A meta-analysis of tourism demand, *Annals of Tourism Research*, **22**, 103–18. doi:10.1016/0160-7383(94)00054-V

Cuccia, T. and Cellini, R. (2007) Is cultural heritage really important for tourists? A contingent rating study, *Applied Economics*, **39**, 261–71. doi:10.1080/00036840500427981

Demos, E. (1992) Concern for safety - A potential problem in the tourist industry, *Journal of Travel & Tourism Marketing*, **1**, 81–88. doi:10.1300/J073v01n01_06

Drakos, K. and Kutan, A. M. (2001) Regional effects of terrorism on tourism: evidence from three mediterranean countries, ZEI Working Papers B 26-2001, ZEI - Center for European Integration Studies, University of Bonn, Bonn.

Dreher, A. (2006) Does globalization affect growth? Evidence from a new index of globalization, *Applied Economics*, **38**, 1091–110. doi:10.1080/00036840500392078

Dreher, A. and Gassebner, M. (2013) Greasing the wheels? The impact of regulations and corruption on firm entry, *Public Choice*, **155**, 413–32. doi:10.1007/s11127-011-9871-2

Eilat, Y. and Einav, L. (2004) Determinants of international tourism: a three dimensional panel data analysis, *Applied Economics*, **36**, 1315–27. doi:10.1080/000368404000180897

Enders, W., Sandler, T. and Parise, G. F. (1992) An econometric analysis of the impact of terrorism on tourism, *Kyklos*, **45**, 531–54. doi:10.1111/j.1467-6435.1992.tb02758.x

Espasa, A., Gomez-Churruca, R. and Morales, E. (1992), An econometric analysis of tourism in Spain: implications for the sectoral study of exports and some economic policy considerations, Working Paper 33, Carlos III, Getafe, Madrid.

Floyd, M. and Pennington-Gray, L. (2004) Profiling risk perceptions of tourists, *Annals of Tourism Research*, **31**, 1051–54. doi:10.1016/j.annals.2004.03.011

Frey, B. S., Pamini, P. and Steiner, L. (2013) Explaining the world heritage list: an empirical study, *International Review of Economics*, **60**, 1–19. doi:10.1007/s12232-013-0174-4

Gallup, J. L., Sachs, J. D. and Mellinger, A. D. (1999) Geography and economic development, *International Regional Science Review*, **22**, 179–232. doi:10.1177/016001799761012334

Garin-Munoz, T. and Amaral, T. P. (2000) An econometric model for international tourism flows to Spain, *Applied Economics Letters*, **7**, 525–29. doi:10.1080/13504850050033319

Gauci, A., Gerosa, V. and Mwalwanda, C. (2002) Tourism in Africa and the multilateral trading system: challenges and opportunities, Background paper, Economic Commission for Africa, Addis Ababa.

George, R. (2003) Tourist's perceptions of safety and security while visiting cape town, *Tourism Management*, **24**, 575–85. doi:10.1016/S0261-5177(03)00003-7

GTD (Global terrorism database) (2012) *National Consortium for the Study of Terrorism and Responses to Terrorism (START)*, University of Maryland, College Park, MD.

Halicioglu, F. (2008) An econometric analysis of aggregate outbound tourism demand of Turkey, Discussion Paper 6765, MPRA, Munich.

Hausman, J. A. and Taylor, W. E. (1981) Panel data and unobservable individual effects, *Econometrica*, **49**, 1377–98. doi:10.2307/1911406

Lanquar, R. (2011) Tourism in the MED 11 countries, Case Network Reports, CASE-Center for Social and Economic Research, Warsaw.

Lim, C. and McAleer, M. (2000) A seasonal analysis of Asian tourist arrivals to Australia, *Applied Economics*, **32**, 499–509. doi:10.1080/000368400322660

Lise, W. and Tol, R. S. (2002) Impact of climate on tourism demand, *Climate Change*, **55**, 429–49. doi:10.1023/A:1020728021446

Mauro, P. (1995) Corruption and growth, *The Quarterly Journal of Economics*, **110**, 681–712. doi:10.2307/2946696

Méon, P.-G. and Sekkat, K. (2005) Does corruption grease or sand the wheels of growth?, *Public Choice*, **122**, 69–97. doi:10.1007/s11127-005-3988-0

Méon, P.-G. and Weill, L. (2010) Is corruption an efficient grease?, *World Development*, **38**, 244–59. doi:10.1016/j.worlddev.2009.06.004

Naudé, W. and Saayman, A. (2005) Determinants of tourist arrivals in Africa: a panel data regression analysis, *Tourism Economics*, **11**, 365–91. doi:10.5367/000000005774352962

Neumayer, E. (2004) The impact of political violence on tourism dynamic cross-national estimation, *Journal of Conflict Resolution*, **48**, 259–81. doi:10.1177/0022002703262358

Pulina, M. and O'Brien, R. (2002) Monthly, annual and quarterly frequencies: a comparison of models for tourism in Sardinia, Discussion Paper Series in Economics and Econometrics 0206, University of Southampton, Southampton.

Rose-Ackerman, S. (1999) *Corruption and Government: Causes, Consequences, and Reforms*, Cambridge University Press, Cambridge.

United Nations World Tourism Organization (2012) Annual report, UNWTO, Madrid.

Webb, A. J. and Chotithamwattana, C. (2013) Who visits Thailand and why? An econometric model of tourist arrivals by country of origin, in *Proceedings of 8th Asian Business Research Conference*, 1–2 April, Bangkok, pp. 1–14.

Appendix

Table A1. Variable names, descriptions and sources

Variable	Description	Source
Tourism	Log per–capita number of tourists	UNWTO
Corruption	Corruption Perception Index	Transparency International
GDP	Log GDP per capita	PWT
POP	Log population	PWT
Open	Index for trade openness	PWT
Growth	Annual GDP growth rate	PWT
XRATE	Absolute standardized deviation of the exchange rate to the US dollar from the country-specific mean exchange rate	PWT; own calculations
Social glob.	Index of social globalization	KOF Globalization Index; own calculations
New conflict	Dummy indicating whether a new conflict occurred	UCDP
Conflict	Dummy indicating whether a conflict occurred	UCDP
Terror	Number of terrorist attacks	GTD
Area	Log area	CIA World Factbook
Dist. to coast	Mean distance to the coast	Gallup *et al.* (1999)
Landlocked	Dummy indicating whether a country is landlocked	Gallup *et al.* (1999)
Temperate	Share of a country's area located in regions with temperate climates	Gallup *et al.* (1999)
Heritage	Log number of heritage sites	UNESCO
Airports	Per-capita log number of airports	CIA World Factbook
Internet	Percentage of population that has one internet connection	CIA World Factbook
Phones	Percentage of population that has one phone connection	CIA World Factbook

Table A2. Robustness checks

	(1)	(2)	(3)	(4)
Corruption	0.088***	0.036**	0.038*	0.025***
	(0.001)	(0.032)	(0.098)	(0.004)
GDP	0.69***	0.63***	0.60***	0.67***
	(0.000)	(0.000)	(0.000)	(0.000)
POP	–2.60***	0.64***	0.47***	0.64***
	(0.000)	(0.000)	(0.004)	(0.000)
Open	0.0041***	0.0014**	0.0021***	–0.00027
	(0.000)	(0.049)	(0.000)	(0.714)
Growth	0.091***	0.036***	0.037***	0.057***
	(0.001)	(0.001)	(0.000)	(0.000)
Terror	–0.00034	–0.00023	–0.00014	0.0015***
	(0.488)	(0.324)	(0.494)	(0.000)
Corruption^2			0.00063	
			(0.896)	
R^2	0.57	0.43	0.42	0.41
N	178	875	1053	1048
Countries	18	102	116	82
Sample	Western	Rest of world	All	All
Corruption	TI	TI	TI	ICRG

Notes: The dependent variable is population-weighted log tourism. A constant is included but not displayed. Regressions contain country fixed effects. SEs are heteroscedasticity-robust. All explanatory variables are lagged by one year. Column (1) uses only Western and OECD countries; Column (2) uses the rest of the world; Column (3) introduces CORRUPTION nonlinearly; Column (4) uses corruption data from ICRG. p-values in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.