Determinants of International Tourism Flows to the Republic of Croatia: An SUR Analysis of Panel Data from 1993-2015.

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Abstract: *This paper examines origin-effects of tourist flows into Croatia from 1993-2015, a time period that features several important events: the fragmentation of Yugoslavia, the European recession, and Croatia's accession to the European Union. Applying the seemingly unrelated regression (SUR) approach to a large panel data set with the number of annual arrivals from each origin country as the dependent variable, we identify and analyze the determinants of tourism flows to Croatia. A series of augmented gravity model specifications reveals that inflows can be explained by geographic proximity, GDP per capita, origin country population, and openness. The role of the real exchange rate variable is inconclusive, and in fact problematic for years 1993-95 when hyperinflation plagued the region in the wake of Yugoslavia's dissolution. The results confirm the validity of the models, both for the subset of origin countries and for the subset of non-origin countries for which otherwise complete data are available. Given the importance of tourism to Croatia's national accounts position, implications for tourism policy are discussed, as are suggestions for future research.*

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Introduction

International tourism is a mainstay of Croatia's economy, currently representing 12.5% of the country's GDP (WTTC, 2015). Such a heavy reliance on this single industry leaves the country susceptible during times of recession in other European Union economies, which collectively comprise about three quarters of Croatia's tourism exports (Škuflić and Štoković, 2011; WTTC, 2015). Given the importance of tourism revenues for Croatia's balance of payments, it is essential that policymakers understand the drivers of demand for international tourism and hospitality (Baldigara, 2013; Tica and Kožić, 2015). This paper assesses origin-effects of tourist flows into Croatia from 1993-2015, a time period during which several events have impacted Croatia, the Balkan region, and the broader European Union. These include the aftermath of Croatia's independence from Yugoslavia, regional political instability throughout the 1990s, the European recession (from 2007 onward), and Croatia's 2013 accession to the European Union.

Tourism is hailed as one of the world's most important economic sectors, with the value of international tourism ranking as the third largest category of exports after fuels and chemicals (UNWTOa, 2016; 2). Officially, the World Tourism Organization defines tourism as "the activity of visitors taking a trip to a main destination outside their usual environment for less than a year, for leisure, business or other personal purpose other than to be employed by a resident entity in the place visited." As such, the industry is expansive, and global international tourism alone resulted in receipts of $1.5 trillion in 2015 (UNWTOa, 2016).

For some small countries like Croatia, the industry is even more important as an economic sector and as a means of obtaining foreign revenue that ultimately raises GDP (Pavlic, Svilokos, and Tolic, 2015). Thanks in large part to deliberate and successful policy efforts, Croatia ranks thirty-third globally in the World Economic Forum's (2015) Travel and Tourism Competitiveness Index. Croatia's Ministry of Tourism (2013) provides a thorough analysis of the industry from a policy perspective, and sets forth goals to be targeted for the year 2020, including a top-twenty competitiveness ranking.

A cursory examination of Figure 1 yields the observation that several events have impacted the otherwise steady acceleration of international arrivals to Croatia. See, for example, the falloffs in arrivals approximating 1995, 1999, and additional general languishing from 2007-2010. In an effort to capture the most important facilitators of tourism during this time period, the present research requires the assembly and

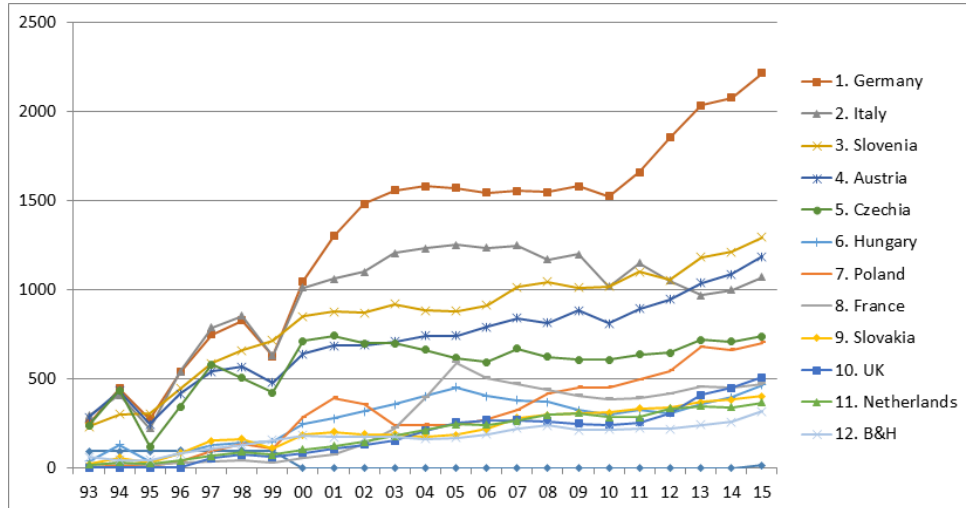assessment of a large data set from sources including the World Bank and Croatia's Ministry of Tourism.

Figure 1: International Arrivals from Leading Origins (in thousands)

Data Source: Ministry of Tourism (2016)

This project employs regression modeling of a panel set of new data through 2015 to advance the existing body of research on international tourism in Croatia. In so doing, it builds upon an array of variables identified by other scholars. For example, Mervar and Payne (2007) note that during the first decade after Croatia's independence, tourism was highly elastic with respect to income fluctuations of origin countries, and that political conflict in the region impacted the industry severely, although at that time they found no evidence of a significant role for exchange rates and transportation costs. As another example, Škuflić and Štoković (2011) discover that income, marketing, quantity, price, and age of hotels are significant drivers for explaining the length of stay nights. It is plausible that the scene depicted in Figure 1 can be explained in part by the differential effects of the European recession (note the increase in German and Austrian arrivals, and decline in those from Italy). Based upon overnights, Galičić (2015, 93) points out that overall, Croatia's tourism sector was protected from the recession, unlike other industries. This may be attributable to the wealthier characteristics of northern European tourists who tend to travel to Croatia, combined with worse economic

conditions in other southern European destinations such as Portugal, Italy, Greece, and Spain.

The present paper examines variables such as these by employing data beginning in 1993, during Yugoslavia's war of dissolution, and extending through the global economic crisis as called for by Panagiotou (2010), and Croatia's 2013 accession to the European Union. The results should enlighten scholars and policymakers and enable them to better prepare for and respond to such events in the future. These findings will also have considerable relevance for other tourism-dependent countries.

It is quite straightforward to conceptualize this research approach in terms of the gravity model, borrowed from Newton's Law of Gravity, and pioneered in economics by Tinbergen (1962). Since then, the approach has been widely used to explain flows of migrants (Lewer and Van den Berg, 2008), trade (Ok, 2010), and foreign direct investment (Deichmann, 2013), as well as international tourism (Khadaroo and Seetanah, 2008; Eryiğit, Kotil, and Eryiğit, 2010; Keum, 2010), setting the groundwork for the present research.

> The basic gravity model can be presented as follows:
> $Arrivals_{ij} = \alpha \ (M_i M_j / D_{ij})$
>
> Where: Arrivals= number of international tourists from each country (in thousands)
> α = constant
> M = mass (GDP or population)
> D = resistance (geographical or cultural distance)

Quite simply, with trans-national <u>interactions</u> being defined as "tourist arrivals," ceteris paribus, we would expect more interaction between large countries and less between smaller ones. Similarly, countries that are near to each other (either geographically or culturally) would be more likely to experience greater flows of tourists than those that are farther away.

In order to contribute to a more robust understanding of contemporary demand issues by stakeholders, the simple model above can be augmented with other variables that have emerged in the scholarly literature, including income at origin (Eilat and Einav, 2005), visa-requirements (Cole and Hall, 2005), transportation costs (Mervar and Payne, 2007), and exchange rates (Tica and Kožić, 2015), all of which have been shown to play a role in explaining "origin-effects", or flows of tourists from different origins.

Literature Review

A large literature focuses upon the international tourism industry in Croatia, highlighting the national economic importance of the industry as well as the necessity of effective forecasting models (Baldigara, 2013; Tica and Kožić, 2015). Research on the topic is expansive due to the commanding and increasing presence of Croatia's tourism industry, especially in coastal areas (Ballinger, 2003). The portion of literature that relates to the war's crippling results of physical destruction and hyperinflation is descriptive (Currie, Skare, and Loncar, 2004; Schőnfelder 2005, Ateljevic and Čorak, 2006), but nevertheless provides an essential backdrop for more recent scholarship on international tourism.

Radnić and Ivandić (1999) embrace Maslow's hierarchy of needs as a starting point to explain the deterioration of overnights and total beds used by foreign tourists during the war years of 1990-1995, focusing specifically on human safety needs as being fundamentally more important than those of self-actualization. The authors employ a combination of quantitative and qualitative data from Croatia's Institute for Tourism to provide an excellent summary of the impacts of conflict, and a very slow recovery in Croatia, comparing a lagging perceived value for money vis-à-vis other destinations in Italy, Spain, and Greece; one that was comparable to Turkey at the time of data collection (1997). They conclude with a series of insightful principles highlighting the need to understand crisis and its impacts on tourism, among other considerations that might inform future crisis-management measures.

Similarly, Hall (2002) calls for brand development and re-imaging throughout former Yugoslavia as a means of helping the region's post-war tourism industry recover. He compares and addresses issues in several countries in the region, and identifies examples of national tourism "straplines" for marketing purposes. In the case of Croatia, the strapline he identifies is "small country for a great holiday" (p. 327). In order for Croatia to both bring back tourists from traditional markets and attract high-income-generating groups, Hall argues that marketing programs should differentiate Croatia as "not Balkan", and reassure tourists that its attractions' traditional quality and value have been restored to pre-war levels.

McKercher and Lew (2003) identify what they designate as an Effective Tourism Exclusion Zone (ETEZ) based upon telephone survey of 952 Hong Kong residents conducted in the year 2000. They argue that this type of zone exists for every tourist market, although it varies according to the nature and size of the voids that exist near

the source market. ETEZs might be oceans, unpopulated areas, or product voids. For example, Switzerland has many competing land neighbors, while New Zealand's nearest destination is between 2000 and 3000km away, representing the latter country's expansive ETEZ.

Currie et al. (2004) examine the effects of Yugoslavia's war of dissolution that took place from 1991-1995 paying special attention to international tourism. They underscore the country's dependence upon tourism with official state statistics showing 5.4% annual growth in arrivals, with a 19.1% yearly acceleration of spending. The authors use ordinary least squares regression to compare models of the Croatian economy during the war with two peaceful time periods: 1960-1990 and 1996-2000. Their model estimates a cumulative economic loss of $5.139 billion in tourism revenues during the war (approximately five percent of national revenue), and they note that tourism actually started to increase toward the end of the war, drawing on earlier work by Weaver (2000) that suggests that conflict can eventually have a positive impact on international arrivals as battle sites are transformed into attractions. Subsequently, the body of literature on "dark tourism" has been extensively and critically reviewed by Stone (2013).

Eilat and Einav (2004) employ a three-dimensional panel data set to survey the determinants of international tourism. They examine flows between all pairs of countries in the years 1985 and 1998. Defining their dependent variable as flows relative to population of the origin country, they find evidence that political risk is a major inhibitor of tourism, while exchange rates are important especially for tourism to developed countries, which exhibit exchange rate elasticity of approximately one.

Schőnfelder (2005) focuses more theoretically and broadly on the war's economic impacts related to run-away inflation, arguing that "the most obvious economic victim of the war was tourism" (page 10). The Croatian dinar was introduced in December 1991, and experienced monthly inflation rates between 21.5% and 31.2% for more than a year. In response, in 1994 the dinar was replaced by the kuna, which was redenominated with the removal of three zeros.

Among the comprehensive historical overviews of the industry is a descriptive chapter by Ateljevic and Čorak (2006) that highlights the evolution of tourism in the region. The authors trace tourism's growth over the past century, during which, as part of Yugoslavia, the Adriatic coast represented a tourist magnet of continental magnitude. Yugoslavia was particularly accessible to travelers because visas were not required for visitors from Western or Eastern Europe. The authors focus upon the social, cultural, and psychological conditions of tourism in the country, which they

argue tend to be overshadowed in the regional transition literature by political and economic considerations. As part of this discussion, the chapter highlights the endurance of gender division in tourism occupations over time.

Jordan (2006) examines the impact of EU Enlargement on tourism in Central Europe, including Croatia. His assertion that 2004 is merely a symbolic date for the gradual integration of much of Central Europe can be extended to Croatia in 2013, when the new republic formally joined the EU. Effectively, the expansion of the EU is a gradual socio-economic process that has occurred over the past quarter century, and one that will continue to unfold as time passes. The author maps and explains tourist flows between the Central European states for 1910, 1937, and 2003, then highlights the major types of tourism that characterize the region. He concludes by speculating on the outlook for the industry in Central Europe, arguing that it depends largely upon improvement in accommodations, infrastructure, and marketing, particularly with regard to negative images of the political and security environment of competing countries. The legacy of war is a consideration particularly relevant to Croatia and its Balkan neighbors.

Colonial ties are explored as a facilitator of tourism flows by McKercher and Decosta (2007). The authors note that lingering effects of colonization can remain strong, especially in the case of French and Dutch tourists. Colonial legacies appear even more important where multiple colonizers had been present, for example in Namibia, where South Africa, Germany, and the UK remain the most important origins of tourists. Moreover, they find evidence that an absence of colonial ties represents an equally strong inhibitor to travel. Although this study is largely descriptive, the authors conduct some rudimentary correlations, and discover that the ties they identify tend to deteriorate with time after destinations become independent. Moreover, markets that are large and diversified tend to rely less on their colonial ties.

Building upon McKercher and Lew's (2003) work on distance decay and ETEZs, the impact of distance on tourism movements is further examined by McKercher, Chan, and Lam (2008). Reporting on 2002 data from 41 source markets to 146 destinations, they find that a classic decay curve is most typical for origin markets, whereby demand peaks at adjacent land neighbors, and declines rapidly as distance to destinations increases. They acknowledge that other variables such as pairwise relationship characteristics might also be at work. The authors note that 80% of all international tourism takes place within 1000km of the origin, whereas negligible tourism takes place between extremely distant countries.

Khadaroo and Seetanah (2008) examine bilateral tourism flows between 28 countries from 1990-2000 using a GMM panel analysis, arguing that transportation infrastructure is a significant determinant of international tourism that is sensitive to other characteristics of origins and destinations. The authors measure several aspects of infrastructure, including roads, ports, airports, and distance itself in a global gravity model. In conclusion, based on their findings, Khadaroo and Seetanah (2008) make the case that governments should refrain from spending cuts that lead to the neglect of infrastructure. Moreover, countries should take advantage of developmental loans and private investment alike to improve accessibility that will lead to greater tourism flows.

Keum (2008) argues that economists have come to value the gravity model not just as an empirical tool but also as a theoretical one. Using a panel data set with tourist flows to Korea, he confirms the gravity model's robustness when applied to international tourism as a form of trade, citing an array of mainstream international trade theories. Highlighting evidence of the importance of geographical distance and GDP measures, he concludes that the gravity model is "indispensable for analyzing the flows of spatial interactions" (2008, 545).

Eryiğit et al. (2010) specify an eight-factor model for explaining the number of tourists to Turkey from the time period 1995-2005. Their expanded gravity model reveals that the most important explanatory variables for Turkey include geographic distance and tourism climate index. In addition, the authors report that GDP per capita, population of the origin country, earthquakes, adjacency, and the September 11th attacks have impacted the magnitude of inflows. Notably, they find no evidence that safety concerns surrounding the nearby Iraq War deterred tourists away from Turkey.

Baldigara (2013) compares five time-series forecasting methods to determine their relative accuracy for predicting international tourism demand in Croatia. Her investigation is based upon the number of tourist nights from five European countries between 2009 and 2012. She concludes that although all of the methods are useful, her double moving average (3x3) method is superior because it yields the smallest mean absolute percentage error. She concludes by calling for additional quantitative analysis of determinants of Croatia's tourism demand.

Employing an expansive list of variables, Tica and Kožić (2015) evaluate drivers of inbound tourism demand in Croatia. The authors find that Polish real GDP and Czech wages are the most important determinants of international tourism overnight stays, and that their impact is realized in a lead time of one year. Some evidence is

also found that favorable exchange rates attract tourists to stay longer at a destination.

Finally, Pavlic et al. (2015) examine the impact of tourism on GDP using a set of mainstream variables, including the independent variable of international arrivals in an interesting twist. They also confirm the importance of an economy's openness (imports plus exports) and real effective exchange rate as drivers of Croatian GDP from 1996-2013. Although their dependent variable is different from the present study, this work by Pavlic et al. (2015) is relevant here because of its examination of causality between variables and the resulting evidence underscoring the role of tourism in the host economy.

Table 1: Summary of Variables in the Literature for Explaining Tourism Flows

Variable	Author(s)	Valence Sign
Population of origin	Eryiğit et al. (2010)	+

Income at origin	Eilat and Einav (2005), Mervar and Payne (2007), Keum (2008), Khaderoo and Seetanah (2008), Škuflić and Štoković (2011), Tica and Kožić (2015)	+
Historical Rule	McKercher and DeCosta (2007)	+
Geographical distance	McKercher and Lew (2003), Eilat and Einav (2005), Keum (2008), McKercher, Chan, and Lam (2008), Eryiğit et al. (2010)	-
Transportation infrastructure	Khaderoo and Seetanah (2008)	+
European Union membership	Coles and Hall (2005)	+
Political Instability or Terrorism	Hall (2002), Currie et al. (2004), Schőnfelder (2005), Mervar and Payne (2007), Eryiğit et al. (2010)	-
Price index or exchange rates of origin to destination	Eryiğit et al. (2010), Tica and Kožić (2015)	+
Visa Requirements	McKercher, Chan, and Lam (2008), Deichmann and Frempong (2016)	-

Taken together, these mainstream variables can provide an elaborate explanation of tourism flows. It is important to remember that these and other variables can have differential impact over time. During the twenty-three years under investigation here, the region has been impacted by war (Hall, 2002), economic recession (Panagiotou, 2010), and most recently the European Union accession process (Coles and Hall, 2005). In the present study, due to data constraints and in an effort to specify a parsimonious explanation of tourism flows, it is prudent to limit the number of variables included in the models.

Data and Methodology

This section discusses our data set, imputation technique, and methodology. Following supplications from Eilat and Einav (2004), we seek rigorous results by

using a large and carefully constructed panel data set. Our data cover 142 countries spanning the years 1993-2015, with a one year lag for the response variable and employing a missing value treatment as explained below. We analyze the results with the approach of seemingly unrelated regression (SUR).

The data set has been constructed and employed to assess the impact of an array of origin country determinants collected from an extensive literature review. The variables include population (POP), gross national product per capita (GDPC), geographic proximity to Zagreb in kilometers (DIST), real exchange rates (EXR), and a binary variable for whether an origin is visa-free (OPEN)[i]. Because the relationship between the independent variables and the response variable is non-linear, a logarithmic transformation is applied to the dependent variable to correct skewness in its distribution. Population (POP), income (GDPC), and geographical distance (DIST) are scaled in order to standardize their weights in the models.

The variables are assembled in an enhanced gravity framework as follows:

$$\ln(\text{Tourists}) = \alpha + \beta_1 POP_i + \beta 2 GDPCi - \beta 2 DISTij - \beta_4 EXR_i + \beta_5 OPEN_{ij}$$

With the following notations:
α = constant for fitting the equation
$\beta_1 - \beta_5$ = coefficients for each independent variable explained above

The dependent variable "Tourists" is defined here as the number of tourist arrivals (in thousands) from each origin country each year between 1993 and 2015, reported by Croatia's Ministry of Tourism (2016). As a global authority on the industry, the World Tourism Organization ("UNWTO") defines tourism as "the activities of persons traveling to and staying in places outside their usual environment for not more than one consecutive year" (UNWTO 2016b). Although the dependent variable of tourist arrivals tends to dominate the mainstream literature reviewed above, it is true that the intensity of tourism flows can alternatively be measured using overnight stays (Radnić and Ivandić (1999), Škuflić and Štoković (2011), Galičić (2015), and Tica and Kožić (2015). In the present gravity approach, arrivals represent the preferred measure because we seek to answer to the question "why did you go to Croatia?" rather than "why did you stay as long as you did?" Moreover, it is possible to work with a more complete dataset for arrivals than for overnight stays; even with arrival data, entries for some origins and years could only be acquired through direct correspondence with Croatia's Ministry of Tourism.

The rationale for the specific timeframe examined here is to perform an analysis that is as thorough as possible, covering inflows of tourists throughout the entire history of the Republic of Croatia. The dataset includes arrivals by most modes of transportation. According to the Croatian Bureau of Statistics (2016) in 2014, the approximate breakdown is road (64.5 million), air (2.84 million), sea (1.33 million), rail (392 thousand) and river (33 thousand). It should be acknowledged that some "arrivals", especially at surface border crossings, were made by individuals such as regular commuters who are not formally counted as tourists according to the UNWTO's (2016b) aforementioned definition.

The sample under investigation includes 142 country observations. There are 62 countries with complete data for the independent variables that are origins of tourists to Croatia. In addition, 80 additional countries with independent variable data that are otherwise complete had no reported visitors to Croatia. Admittedly, the fact that many countries with missing data throughout the years in question tend to be poor and/or unstable (Afghanistan and Iraq, for example) can introduce a bias into the models. Notwithstanding this concession, models will be generated using both sets of data ("origins only" and "full data") in order to capture insights that are as complete as possible. In other words, while we are interested in factors explaining what attracts tourists from each origin to Croatia, we are also concerned with origin-specific factors that inhibit tourism.

The independent variables used here relate to the origin countries alone, and most of them are available from the World Bank's World Development Indicators. As pointed out by Eilat and Einav (2004), exchange rates are an excellent proxy for tourism prices, distances capture transportation costs, and income is considered a plausible enabler because tourism is a luxury good rather than a necessity. Other variables found elsewhere in the literature (such as transportation connectivity as per Khaderoo and Seetanah [2008]) are excluded from the analysis in order to reduce redundancies and or prevent data problems[ii].

Table 2: List of Variables selected for the Models

Variable	Unit of Measure	Expected Valence	Data Source(s)
Tourists	Number of arrivals		Ministry of Tourism (2016),

(dependent)	(thousands)		Croatian Bureau of Statistics (2016)
POP	Population (persons)	+	World Bank (2016)
GDPC	Gross Domestic Product per Capita (in 2005 US$)	+	World Bank (2016)
DIST	Air distance between capitals (km)	-	www.worldatlas.com
EXR	Real exchange rate index (2010= 100)	+	World Bank (2016), European Union (2016).
OPEN	Visa-free? (1= yes 0=no)	+	www.justlanded.com

The data set required considerable cleaning, and several observations are complicated by changing borders during the time period under consideration. For example, the country that had been Yugoslavia at the beginning of the time period under investigation has gradually devolved into seven distinct political entities: Slovenia, Croatia, Bosnia-Herzegovina, Serbia, Macedonia, Montenegro, and Kosovo. These and other events introduce a great deal of complexity into the construction of a useful database, and dealing with the issues will itself require examining work by other scholars.

Countries converted to the Euro at different dates, so it was useful to consult the European Commission's web site for specific conversion rates (European Union, 2016). There were considerable missing values for both EXR and GDPC in 1992 and 1993, and this resulted in the omission of several country observations. Missing data treatment is particularly necessary for the years of the Yugoslav civil war (through 1995). The empty cells are missing at random (MAR), and the pattern is monotone (vis-à-vis arbitrary). Specifically, missing cell values for GDP and exchange rate are consistent for certain countries during the years 1993, 1994, and in some cases 1995. Based on this condition, it is appropriate to use multiple imputation where only a few values are missing. Some exchange rates in the Balkan region- including those of Croatia itself- remained extremely unstable through 1995. The research plan is therefore to run alternate models comparing the complete time period with the period beginning in 1995, when currencies generally regained stability. In all, the data set includes 22 years, with 62 countries as tourist origins, and another 80 with complete data but without tourists[iii].

The Lagrange multiplier (LM) test, developed by Breusch and Pagan (1980) should be used before applying a panel regression model (Keum, 2008). Using the LM test, this data set shows a high level of cross-sectional dependence as indicated by a p-

value of <2.2e-16. As a result, the present methodology employs seemingly unrelated regression ("SUR"). This approach was pioneered by Zellner (1962) for data that are characterized by cross-sectional dependence, and it is used widely in econometric modeling (Egger and Pfaffermayr, 2001). In the present panel data set the number of years under consideration ("T"= 23) is significantly larger than the number of variables (5), and therefore SUR is an appropriate method. The models are run using the R language[iv].

Our analysis covers five models as follows:
Model 1: all years since 1993, only those countries with tourists traveling to Croatia.
Model 2: 1996-2015 only those countries with tourists traveling to Croatia.
Model 3: all years since 1993, all countries with independent variable availability.
Model 4: 1996-2015, all countries with independent variable availability.
Model 5: all years since 1993, all countries with independent variables except EXR.

Models 1 and 2 consider only those countries listed as origins (n=62). These models could have a bias because they leave out the countries from which few tourists originate. As a result, we run Models 3 and 4 for all countries with complete data (n= 107). In an effort to assess the impact of missing values for EXR during the period 1993- 1995, we remove these years in Models 2 and 4. Model 5 includes all years but without the exchange rate, the variable that turns out to be the least effective in explaining arrivals.

Analysis and Results

In this section we discuss the results of the models and compare them to one another, as well as previous findings. Five models are specified in order to make the best use of our large database using seemingly unrelated regression (SUR). The results are summarized in Table 3, with R^2 values ranging from .346-.565. In each case, the conventional gravity variables of population and distance are significant, with the expected valence signs. The results confirm that the larger the population of the origin country is, the greater its tourist flows to Croatia. Conversely, the farther an origin country is from Croatia, the fewer the number of arrivals from that origin. The gravity variables confirm and extend previous findings by Eryiğit et al. (2010) on the importance of population size and the role of geographical distance as highlighted by McKercher and Lew (2003), Eilat and Einav (2005), Keum (2008), Eryiğit et al. (2010).

Table 3: Results from the Five Models

	Model 1 Only Origins 1993-2015	Model 2 Only Origins 1996-2015	Model 3 Full Data 1993-2015	Model 4 Full Data, 1996-2015	Model 5 Full w/o EXR 1993-2015
Intercept	2.59843***	2.85299***	1.046e+00***	1.086e+00***	1.04581***
scale (POP)	.53768***	.58473***	5.8914e+01***	6.327e-01***	.58917***
scale (GDPC)	.26178*	.10129	7.1928e+01***	6.935e-01***	.71942***
scale (DIST)	-1.45916***	-1.40637***	-1.6616e+00***	-1.71e+00***	-1.66155***
scale (EXR)	-.07320**	-.14795*	-2.7936e-08	-7.35883e-05	
OPEN	5.94032***	6.15694***	4.7300e+00	4.97e+00***	4.73067***
R^2	.346	.336	.552	.565	.552
DF	1420	1234	3237	2814	3238

Significance levels: ***=.001, **=.01, *=.05

Table 3 summarizes the results of all five models. The goal of the changing model specifications is to improve the R^2 values through increasingly parsimonious specifications. Moreover, as discussed earlier, the fact that the "non-participant" countries are omitted from Models 1 and 2 subjects the results not only to a sampling bias, but also relatively low R^2 indicators. Because the significance results are similar across most models, it makes sense to discuss each variable generally rather than model-by-model.

Geographical distance, a standard gravity variable, is significant (p=.001) in each generated model, moreover with the expected negative valence sign, reinforcing the notion of distance representing a barrier to spatial interaction. This outcome is in agreement with findings by McKercher and Lew (2003), Eilat and Einav (2005), McKercher, Chan, and Lam (2008), and Eryiğit et al. (2010). The observation that geographic distance inhibits tourism as a form of spatial interaction confirms Keum's (2008) assertion that the gravity model characterizes a robust approach in tourism studies. As an explanatory variable, geographical distance is arguably superior to transportation costs, which Mervar and Payne (2007) argue to be less than significant determinants in Croatia.

Origin country population size, another conventional gravity variable, is positive and significant at the .001 level in all five models, supporting previous findings on this standard gravity variable (Tinbergen, 1962; Eryiğit et al., 2010; Ok, 2010). Intuitively, larger populations are more likely to interact more than smaller ones. Many of the world's largest populations (China, India, Indonesia, Brazil, Pakistan, and Bangladesh) do not rank among the leaders of tourists to Croatia. However, the

relatively large European countries such as Germany, Italy, France, and the UK, as well as other large countries such as the USA and Russia that are relatively important sources of inflows, undoubtedly impact the regression line favorably. The performance of geographical distance and population together provides abundant evidence that the gravity approach is applicable here, even though it is more commonly invoked as framework for understanding trade (Tinbergen, 1962) or foreign direct investment (Deichmann, 2013).

Openness (or lack of visa requirements) is a third significant variable in Models 1, 2, 4 and 5 (p=.001) that has a positive impact on tourism flows to Croatia. Research elsewhere has also unveiled the importance of a liberal visa regime toward origins in facilitating tourism from those countries (McKercher, Chan, and Lam, 2008; Deichmann and Frempong, 2016). One explanation for the lack of significance in Model 3 is that this time period included the years of war within the Balkans, and Model 3 features all 122 countries in the full dataset. In other words, a lack of visa requirements during the war years was not enough to make tourists forget about the dangers of that conflict.

In this study, GDP is divided by population in order to capture the relative wealth of travelers from origin countries. This income level, measured by GDP per capita, is an indication of the ability to afford luxury goods such as international travel. It is therefore unsurprising that the variable appears as a positive and significant determinant in three of the five models. Notably, the variable is only significant at the .05 level in Model 1, which examines only origin countries (not the full data set) from 1993-95, and in Model 2 it lacks significance during the time period starting in 1996. This means that income is less of a determinant for the countries that do provide tourists, especially since Yugoslavia's war of dissolution ended and conditions returned to normal. This distinction also underscores the importance of using the full data set to support conclusions. A cursory examination of the dataset yields the observation that many of the countries that do not supply tourists to Croatia tend to be lower income (as measured by per capita GDP). This lack of personal resources is evidently a deterrent to travel, an activity that Eilat and Einay (2005) rightly consider to be a luxury good. The importance of income mimics results of earlier research by Khaderoo and Seetanah (2008), Škuflić and Štoković (2011), and Tica and Kožic (2015).

The effect of the exchange rate variable is inconclusive based upon evidence found here. Although unexpected, this finding is in harmony with earlier work by Mervar and Payne (2007). In search of a plausible explanation, this result leads to the following observation with regard to real exchange rates (EXR): tourism to Croatia

has increased dramatically over the time period under investigation, while the strength of origin currencies has remained stable or increased only moderately. This absence of a statistically significant relationship does not dismiss observations by Eryiğit et al. (2010) in the context of Turkey, and in Croatia by Tica and Kožic (2015), that exchange rates can be influential at specific times and in certain contexts. However, given the methodology applied here and the strength of other variables, their importance is impossible to confirm.

When we use the full data set of 142 countries, the R^2 improves dramatically, with or without EXR. Model 5 is generated as in an effort to obtain a parsimonious explanation of tourism flows to Croatia without the problematic variable of EXR. We are aware from previous research (Currie et al., 2004; Schőnfelder, 2005; Ateljevic and Čorak, 2006) that hyperinflation during the war clearly distorted the impact of exchange rates. We also note that Eryiğit et al. (2010) removed Belgium and Bulgaria from their 1994-2005 origins analysis due to "chaotic" exchange rate movements. In the present case of Croatia, we believe that the impact of this variable requires further consideration.

Conclusions

The findings of this research on origins of international tourist flows to Croatia are based upon an unprecedented depth and breadth of study. The data base features 16,330 cells, including 142 countries over 23 years, assembled to scrutinize the role of five independent variables. In an SUR application of the gravity model, we find that international tourism is facilitated by geographic proximity and origin country population size, as well as visa openness and income level of the origin country. Our examination of exchange rates is inconclusive. The findings can be useful for scholars and policymakers alike. Scholars may wish to extend this broad-based research into more specific directions such as exchange rates, or replicate the study in other contexts. Policy makers may wish to reconsider a heavy dependency upon this single sometimes-volatile industry. They may also want to consider introducing more liberal visa regimes toward targeted tourist markets, and safeguard against the dubious role of exchange rates as a determinant of holidays in Croatia. Recognizing the factors that govern flows by origin countries should help stakeholders forecast demand based upon changes in other variables. Moreover, the results reported here are certainly relevant for other countries that are similarly tourism-dependent.

The limitations of this study should be also acknowledged. First, the necessity to omit countries with incomplete or problematic data introduces a bias because the

excluded observations tend to be poor and/or unstable countries. Arguably, length of stay (rather than tourist arrivals) represents another valid way to capture the appeal of Croatia to tourists. In the present study, however, length of stay data would prevent construction of a data set as large as the one used here because reported values for that variable are less complete. In addition, the inclusion of Croatia within multi-destination trips would be worthwhile to investigate, but as acknowledged by Eilat and Einav (2005), such complexity would be impossible to track with this sort of quantitative approach. The study plan set out to capture the role of EU membership in tourism flows, but because Croatia joined the EU only in 2013, and unrestricted cross-border movement is not yet permitted, this question remains unanswered. Arguably, the visa requirement variable does capture the role of free movement, but it is not parallel to EU membership. Finally, the direction of causality between transportation infrastructure and tourism remains to be fully understood, and despite infrastructure's existence in the literature (Khaderoo and Seetanah, 2008), we were unable to interrogate it here due to lack of arrival data by origin that are also specific to each mode of transportation. Many of these questions could be better addressed with a qualitative approach to complement the present findings, perhaps by surveying travelers across origin countries about the rationale underlying their complete travel programs and how Croatia fits into the picture in as a destination.

Notwithstanding the contributions enumerated above, the conclusion of this research points to several additional questions. Most of these items can be addressed only as new data become available, following supplications by Baldigara and Mamula (2012), and Galičić (2015). First, this study could be replicated with sub-samples based on the purpose of visit. The World Bank offers such data at http://wdi.worldbank.org/table/6.14, but at the time of writing these are not available for the time period and multitude of countries examined in the present research. It would also be worthwhile to focus upon the impact of cultural linkages between Croatia and its neighbors (as historical provinces of the Austro-Hungarian Empire, Yugoslavia, etc.). This research would certainly benefit from a more regionally-focused approach with greater historical depth. A better understanding of the impact of Croatia's 2013 EU accession will also be possible to glean in the not-too-distant future, given the near-certainty of the country entering the Schengen zone after the year 2018[v]. In the near future, it will also be possible to reflect critically upon the Ministry of Tourism's (2013) Development Strategy for 2020, and whether Croatia was successful at achieving its goal of a top 20 global ranking.

Finally, lest this paper end on the negative note of its finite scope and work that remains to be done, it is worth reiterating the contributions presented herein. This

analysis of international tourism origin effects is unprecedented in the combination of time duration under investigation and the large number of 142 countries included, and the extensive degrees of freedom underscore the validity of the findings. The result is a comprehensive model based upon the past two-plus decades, revealing that the origins of tourism in Croatia are governed by traditional gravity variables of distance and population, as well as Croatia's generally liberal visa regime and income in origin countries. According to the results generated in this paper, the role of exchange rate fluctuations varies with each model specification, but falls short of statistical significance in the context of Croatia.

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[i] Although it was anticipated that variables for proximity to Croatia (DIST) and visa requirements (OPEN) would be overly similar, the simple correlation of .025 allays any concerns.

[ii] Direct flights to Croatia are intuitively an enabler of inbound tourism flows, but the direction of causality is spurious (i.e., do people travel because direct flights exists, or are flights scheduled in order to meet travel demand?). In addition, long distance travelers normally connect in another (non-Croatian)

European city. Overall, during 2013-14, less than five percent of passenger border crossings to Croatia were by plane (Croatian Bureau of Statistics 2016, 43).

[iii] In order to complete the data set, several cell entries were imputed, and this was particularly challenging in the case of the exchange rate variable (EXR). Euro exchange rates were first available in the year 1999, three years before the currency emerged in physical form. Prior to 2002, exchange rates were based upon individual currencies and their fixed conversion rates to the euro. Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Portugal, and Spain joined the euro zone in 1999, followed by Greece (2001), Slovenia (2007), Cyprus and Malta (2008), Slovakia (2009), Estonia (2011), Latvia (2014), and Lithuania (2015). Additionally, Montenegro used the German mark (DM) from 1996 until 2002, and then adopted the euro. Similarly although not a Eurozone member, Kosovo adopted the euro in 2002, abandoning Serbia's dinar. Figures for Montenegro and Kosovo were obtained for years 1992-95 by imputation using the Serbian dinar. Belarus and Ukraine used the Russian ruble until 1997. Russia redenominated its ruble in 1997. Liechtenstein used to use the Swiss Franc. For further explanation of how missing values were calculated, please contact the authors.

[iv] The R language is a well-established environment for statistical computing, and is widely used among statisticians and data miners for developing statistical software and data analysis. R has been publicly available for over 20 years, and most of its developers are senior academics with expertise in statistical computing.

[v]   http://www.schengenvisainfo.com/croatia-could-join-schengen-area-after-2018/