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Do Travel Visa Requirements Impede Tourist Travel?

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Abstract: Yes. Using a travel visa data set developed by Lawson and Lemke (2012) and travel flow data from the World Bank and the UN's World Tourism Organization (UNWTO), we investigate the deterrent effect of travel visa requirements on travel flows. At the aggregate level, a one standard deviation more severe travel visa regime, as measured, is associated with a 30 percent decrease in inbound travel. At the bilateral level, having a travel visa requirement on a particular country is associated with a 70% reduction in inbound travel from that country. The gains associated with eliminating travel visas appear to be very large.

Keywords: Travel Visas, Tourism, Travel, Globalization, Economic Freedom.

JEL Codes: F22, F52, F68, L83

Do Travel Visa Requirements Impede Tourist Travel?

To the end that the People may be kept in the requisite Temper of Obedience, none are permitted to Travel upon pain of Death, except such as have special License, which are exceeding few; neither are any Gentlemen of those Countries to be met with abroad, but publick Ministers and their Retinue: The Cause of this severe Prohibition is, lest such Travellers should see the Liberty of other Nations, and be tempted to covet the like for themselves at home, which might occasion Innovations in the State...Travel is a great Antidote against the Plague of Tyranny.

Robert Molesworth (2011(1694))

Robert Molesworth's remarks about 17th Century travel restrictions in Denmark, and the government's motivations for them, highlight that travel rules have been with us for centuries. Notwithstanding that brief period before 1914 when a person could travel "without passport or other formality" (Keynes, 1920: 11), governments have long sought and continue to seek to regulate the mobility of people.

In current times, take the hypothetical situation of an upper-middle class family considering traveling to the United States to visit Walt Disney World in Florida and maybe catch a show in New York City. Upon reading the U.S. Embassy's instructions (see below) for obtaining travel visas for the family, they decide to go to Disneyland Paris and see the Louvre instead. After all, France doesn't require travel visas for Brazilian visitors.

This paper examines whether modern tourist travelers are in fact deterred by travel visa requirements and if so by how much. Using a travel visa data set developed by Lawson and Lemke (2012) and travel flow data from the World Bank and the UN's World Tourism Organization (UNWTO), we investigate the deterrent effect of travel visa requirements on travel flows.

United States Diplomatic Mission to Brazil

Temporary (Nonimmigrant) Visas

How to Apply

All visa applicants should schedule two appointments – one at the Applicant Service Center (ASC) and another at the Consulate or Embassy – following the steps below.

Note that for security reasons applicants are not allowed to enter the Applicant Service Centers (ASC) or embassy/consulates with bags (other than one small purse) or electronic devices. Applicants may enter the ASC with their cell phones as long as they are turned off.

Step 1: Complete DS-160 online application form.

Step 2: Go to the appointment website: <http://brazil.usvisa-info.com> or call the Call Center at one of the local numbers. Register online using your DS-160 confirmation code. Read the interview waiver and renewal pages to determine if a visa interview is required in your case. Pay the visa application fee (MRV fee). This can be done by credit card through our appointment website or by telephone. Applicants may also pay through a bank boleto at any bank in the boleto network. Schedule your appointment at the ASC and your visa interview at the Consulate or Embassy. Appointments can be made online, through the Call Center or through Skype.

Step 3: Attend your CASV appointment to have your photo and fingerprints collected. Applicants will need to present their current passport, old passports with previous visas and DS-160 confirmation page. Applicants age 66 and over and minors 15 years old and younger do not require fingerprint collection at the CASV so they, or a representative, should deliver a 5x7in photograph, less than 6 months old and with a white background. Click [here](#) for more information on State Department Photo Standards.

Step 4: Attend your interview appointment, if required, at our Embassy or Consulates. You will need to bring the following: Current passport. Any old passports with previous visas. DS-160 bar code confirmation page. Any additional documents the applicant feels are necessary for the visa interview

Step 5: Most applicants will receive their visas within 10 businesses days. However some applications may require additional processing time. We recommend that you do not finalize travel plans until you have received your visa.¹

In recent years, travel visas and customs procedures have garnered increasing popular attention (CNN, 2013 and *The Economist*, 2011). Neumayer (2006) and Luedtke, Byrd, and Alexander (2010) created and analyzed travel visa datasets similar to Lawson and Lemke's (2012). However so far and despite the ubiquity of travel visas in our world, almost all of the extant work on this topic has focused on temporary worker, immigrant, or student visas.

Tourist-class visas have gotten little scholarly attention. Neiman and Swagel (2009) argued that post-9/11 visa policy changes were not responsible for declines in travel to the U.S. Hu (2013) found significant benefits associated with the U.S. Visa Waiver Program. Neumayer (2011) found substantial negative effects of travel visas on trade and foreign direct investment volume between countries. On the topic at hand, Neumayer (2010: 171) estimated the impact of travel visas on travel flows and found that “visa restrictions reduce such travel by on average between 52 and 63 percent”. Using a different travel visa dataset and alternate specifications, this paper represents a something of a robustness check on Neumayer’s sizable estimates.²

The Data.

Lawson and Lemke (2012) collected data for 188 countries on whether a travel visa is required of visitors from the other 187 countries; thus there are 35,256 (188 times 187) data points in their dataset. A country was considered to require a travel visa if the potential visitor needs to secure the visa document in advance of the desired travel date. So-called “visas on arrival” that can be obtained at the airport or other port of entry do not count as visas for our purposes as these typically amount to minor inconveniences.

Still, there is considerable variation across countries in the difficulty of obtaining a visa in advance. In some cases, like the U.S.’s policy vis-à-vis Brazilians, the process is quite onerous requiring multiple interviews months in advance and detailed paperwork requirements. Furthermore in countries like the U.S., the legal doctrine of “Consular Absolutism” gives consular officers the power to reject visa applicants without cause and without any due process for judicial or administrative appeal (Delgado, 2009). In other cases, the visa in advance requires only a simple form that can be submitted by mail (or even online) and takes only a few days or at most

weeks to complete. Regrettably, none of the visa datasets developed distinguish among these shades of gray.

Lawson and Lemke (2012) developed a simple measure of travel visa policy for each country. The Ease of Travel for Foreigners (EOTF) index measures the percentage of countries for which a given country does not require a travel visa. For example, the U.S. requires visas of 80.2% (150/187) of the countries measured, and thus earns an EOTF of only 19.8. Higher values for the EOTF indicate a more relaxed visa regime facing incoming foreign visitors.

Additionally, Lawson and Lemke (2012) created an Ease of Travel for Citizens Abroad (EOTA) index that measures how easy it is for citizens of a given country to travel abroad without a visa. For example, only 42.3% of the countries in the sample require visas of Americans, and thus the EOTA for the U.S. is 57.7. Higher values of the EOTA indicate more relaxed travel visa requirements facing the citizens of that country when traveling abroad.

Data on aggregate inbound tourist travel flows for each country were obtained from the World Bank's World Development Indicators online database. In addition, the UNWTO's data on bilateral tourist travel between countries were obtained. Data for 2007-2009 (averaged) were used to correspond to the travel visa dataset's time frame. The World Bank defines inbound tourists as follows:

International inbound tourists (overnight visitors) are the number of tourists who travel to a country other than that in which they have their usual residence, but outside their usual environment, for a period not exceeding 12 months and whose main purpose in visiting is other than an activity remunerated from within the country visited.³

Control variables used in the empirical models will include: GDP per capita (ppp US\$), population, and trade volume – all obtained from the World Bank's World Development Indicators online database. The Economic Freedom of the World (EFW) index by Gwartney, Lawson and Hall

(2011) and the Polity IV index of political regime type developed by the Political Instability Task Force (2011) are also used. Higher values indicate more economic freedom and less autocratic regimes respectively. Finally the number of World Heritage Sites (UNESCO, 2013) was also employed along with regional and legal origin dummy (La Porta, et al., 1999) controls. Table 1 provides summary statistics for the variables used. Variable definitions are in the appendix.

Empirical Results: Aggregate Inbound Travel

As a first pass, we develop a simple model to estimate the number of inbound visitors to each country in the aggregate in Equation (1).

$$(1) \quad \text{Log(Inbound}_i) = \beta_0 + \beta_1(\text{EOTF}_i) + \beta_2(\text{EOTA}_i) + \beta_3(\text{logPop}_i) + \beta_4(\text{logGDPPC}_i) + \beta_5(\text{HeritageSites}_i) + \beta_6(\text{EFW}_i) + \beta_7(\text{Polity}_i) + e_i$$

Table 2 presents the results of three empirical specifications of the above model. The dependent variable is the aggregate number (logged) of inbound visitors to the country.⁴ The core variable of interest is the EOTF variable measuring the severity (or rather lack thereof) of the travel visa regime toward foreign visitors. Since higher values of the EOTF reflect less severe visa policies, we predict a positive sign on its coefficient if visas are a deterrent to travel.

Column 1 reports a basic specification that includes only the EOTF, population (logged), GDP per capita (logged), and EOTA as independent variables. As expected the EOTF is positive and statistically significant. The coefficient magnitude indicates that a one standard deviation increase in the EOTF, the equivalent of eliminating visas on about 23 countries, would correspond to an approximate 35% increase in inbound tourist travel.

In Columns 2 and 3, we add additional controls, but this comes at the expense of sample size because of missing values among some of the control variables. Even when faced with additional controls, the impact of a more liberal travel visa regime on inbound travel is economically large. In Column 3, we find a one standard deviation increase in the EOTF results in a 32% increase in inbound travel. Evaluated at the mean value for inbound travel, this represents an increase of over 1.5 million visitors per year for the average country.

Intuitively as expected, larger countries in terms of population and richer countries attract more visitors in all specifications. The number of World Heritage Sites and greater economic freedom appear positively related to inbound travel flows as well, but political regime type and trade volume appear unrelated.

The inclusion of the EOTA in these models deserves some additional discussion. We argue that if the citizens of Country A travel more abroad (because of a larger EOTA), then the increased interactions of these travelers with foreigners during their travels in turn will encourage those foreigners to visit Country A. Essentially the EOTA captures any possible networking spillovers associated with a country's visa policy toward other countries. At the aggregate level, we find evidence of this only in the Column 1 specification.

Empirical Results: Bilateral Results

The second empirical approach is to examine travel flows from one country to another at the bilateral level. Equation (2) presents our empirical model.

$$(2) \quad \text{Log(Inbound}_{j \text{ to } i}) = \beta_0 + \beta_1(\text{Visa}_{i \text{ to } j}) + \beta_2(\text{Visa}_{j \text{ to } i}) + \beta_3(\log \text{Pop}_i) + \beta_4(\log \text{GDPPC}_i) + \\ \beta_5(\log \text{Pop}_j) + \beta_6(\log \text{GDPPC}_j) + \beta_1(\text{Samelegal}) + \beta_2(\text{SameRegion}) + \beta_1(\text{EFW}_i) + \beta_1(\text{EFW}_j) +$$

$$\beta_2(\text{HeritageSites}_i) + \beta_1(\log\text{Trade}_i) + \beta_1(\log\text{Trade}_j) + \beta_1(\text{Polity}_i) + \beta_1(\text{Polity}_j) + \beta_k(\text{Legal}_{ki}) + \beta_m(\text{Regions}_{mi}) + e_j$$

The dependent variable is the number of inbound travelers (logged) from country j to country i . The primary variable of interest is whether or not country i requires a travel visa of residents from country j , denoted $\text{Visa}_{i \text{ to } j}$. Since the Visa variable is coded to equal 1 if the country requires a visa, we predict a negative coefficient if visas do deter travelers.

We also include country j 's visa policy with respect to country i 's residents, denoted $\text{Visa}_{j \text{ to } i}$, to determine if there is any networking feedback in evidence. As mentioned above, if your country imposes a visa requirement on another country, then not only may this deter visitors from that country, but indirectly it may reduce the likelihood that your own citizens would travel to the other country. A negative coefficient on this variable would be evidence of this loss of networking between people of different nations.

The remaining variables are largely self-explanatory and include measures of characteristics for both the destination country i and origination country j . SameRegion and SameLegal are dummy variables equal to 1 if country i and country j share the same region or legal structure.⁵

Table 3 gives the results of various specifications, again starting with the most parsimonious specification then adding additional control variables. As before, the adding of control variables comes at a cost in the form of reduced sample size. Columns 1 and 2 provide a base model first without and then with the $\text{Visa}_{j \text{ to } i}$ variable. The number of observations is 9943 indicating approximately 100 country pairs in the sample. Columns 3 and 4 add additional

controls bringing the number of observations down to 4752 reflecting approximately 69 country pairs.⁶

The negative (and significant) coefficients on the $Visa_{i\ to\ j}$ variable support of our hypothesis that travel visas deter travelers. At the bilateral level, depending on the specification, we estimate that a travel visa requirement reduces travel into the country imposing the visa by about 70%.⁷ These results are slightly larger, but basically consistent with Neumayer's (2010) estimates.

The negative coefficients on the $Visa_{j\ to\ i}$ variable in Columns 2 and 4 support the networking spillover argument. The results indicate that if country j imposes a visa requirement on country i , then there is a 24-33% reduction in travel from country j to country i .

The control variables perform as one would intuitively expect. There is more travel between larger, richer, and greater trading nations. The impact of one additional unit of economic freedom (about one standard deviation on that scale) in the destination country is +22%, and is about +12% for one unit of economic freedom in the origination country. Each additional World Heritage Site is associated with a 1.2% increase in inbound travel. Being in the same region and having the same legal origin are also very strongly positively associated with greater travel flows between countries. In accord with the aggregate findings in Table 2, we find no evidence that the political regime of the destination country matters, though there are more outbound travelers from less autocratic regimes.

The Cost of Travel Visas: The United States Case

The empirical results presented in the previous two sections suggest large deterrent effects of travel visa requirements on international tourist travel at both the aggregate and the bilateral level. As a final exercise, we will attempt to estimate the dollar cost of visa policy in the case of the

United States, which boasts one of the world's most severe travel visa regimes. Requiring travel visas from residents of over 80% of the countries in the sample, few countries have travel visa regimes as strict as the United States. As an extreme counterfactual, what would happen if the United States opened up tourist travel to all comers without requiring visas? That is, what would happen if we turned all those 1s into 0s in the dataset for the U.S.?

First, looking at the results in Table 2, we see each unit increase in the EOTF associated with 1.4% more inbound visitors. Thus, if the U.S. EOTF score increased from 19.8 to the maximum possible score of 100, we calculate a 112% increase in total inbound travel. In 2010, the U.S. recorded 59,791,000 inbound visitors who spent an estimated total of \$109,975,000,000 (approximately \$2000 per visitor) according to World Bank data. Increasing these figures by 112% yields an *additional* 67 million visitors and \$123 billion in spending.

Next, looking at the bilateral results in Table 3, Column 4, we see the removal of a travel visa on a particular country is associated with a 200% increase in travel from that country. If the U.S. eliminated travel visas on all the countries in the sample, and travel from these countries consequently tripled as predicted, then total inbound travel would increase by an estimated 45 million. Using the \$2000 average spending per visitor figure above, this translates to an additional \$90 billion.

Whether using the aggregate or the bilateral models, the estimates reported suggest very large potential gains, on the order of \$100 billion per year, to the United States associated with removing its visa requirements. Since tourist dollars are likely to be injections of new money into the economy, a multiplier calculation would yield even larger total gains. Frechtling and Horváth (1999) report tourism output multipliers from a variety of different studies with values as high as 2, thus the total gains could easily be over \$200 billion.⁸

Conclusion

This paper finds large deterrent effects on tourist travel associated with travel visas. This is true whether the data are analyzed at the aggregate or bilateral level. Eliminating travel visas at the bilateral level is estimated to more than triple travel flows between the countries.

Extreme counterfactuals of the sort presented for the United States should always be judged cautiously. In the aggregate, for the U.S. to eliminate all visas would be a 3.5 standard deviation shift, and surely our point estimates are not so reliable for such a large change. Also, if travel were to increase by such a magnitude surely prices would have to rise for travel to the U.S. and for various tourist attractions, at least in the short run. Thus, these partial equilibrium estimates are undoubtedly higher than what one might expect in a more general equilibrium setting. Finally, measurement error, misspecification (i.e., potential omitted variables), and issues of reverse causality may be important. Despite these common shortcomings, the numbers are sufficiently large for us to conclude that sizeable deterrent effects exist.

The estimated gains to the United States economy in the form of tourist revenue that could be achieved with a more liberal travel visa regime appear to measure in the many tens, if not hundreds, of billions of dollars annually. Whatever concerns may exist about tourists overstaying their visas or related national security issues must be weighed against these measureable costs associated with travel visas.

On the other hand, there are many other regulatory deterrents to travel besides a travel visa requirement. People can be harassed, detained, and summarily denied entry by border control agents on even the slightest suspicion of criminal activity. For example, carrying condoms can be sufficient to accuse a woman of being an illegal prostitute (Nikiforuk, 2013) and thus denying her entry. Frequent hours-long customs waits, increasingly intense security checkpoints,

and frankly rude border control agents no doubt contributed to the 43% of respondents in a recent survey who said they would discourage others from visiting the United States (CNN, 2013). While eliminating travel visas would encourage more inbound tourism, even more could be achieved with a more comprehensive policy of lowering these man-made impediments to travel.

Table 1: Summary Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
<i>Inbound</i>	180	4865904	10500000	6333	77800000
<i>GDPPC</i> (\$)	158	12343.03	13949.59	298.3698	79485.47
<i>POP</i> (millions)	180	36	133.00	0.020162	1318.30
<i>Trade</i>	137	99.63181	60.14462	26.21417	432.9545
<i>EFW</i>	127	6.56663	1.040912	2.353768	8.933854
<i>Polity</i>	150	3.766667	6.481172	-10	10
<i>HeritageSites</i>	180	4.977778	7.711962	0	44
<i>EOTF</i>	180	24.96589	23.14135	0	100
<i>EOTA</i>	180	24.84667	18.53624	4.81	60.96

Table 2

	(1)	(2)	(3)
	log(<i>Inbound</i>)	log(<i>Inbound</i>)	log(<i>Inbound</i>)
<i>EOTF</i>	0.015*** (0.004)	0.015*** (0.005)	0.014*** (0.005)
<i>logPOP</i>	0.668*** (0.044)	0.505*** (0.072)	0.604*** (0.084)
<i>logGDPPC</i>	0.815*** (0.095)	0.788*** (0.113)	0.815*** (0.122)
<i>EOTA</i>	0.011* (.006)	-0.007 (0.008)	-0.007 (0.008)
<i>HeritageSites</i>		0.033** (0.013)	0.031** (0.014)
<i>Polity</i>		-0.015 (0.019)	-0.007 (0.021)
<i>EFW</i>		0.368*** (0.128)	0.307** (0.145)
<i>logTrade</i>			0.395 (0.239)
<i>Number of Obs.</i>	158	114	101
<i>Adj.R – Squared</i>	0.7684	0.80	0.7802

Note: Standard errors are denoted in parentheses. ***, ** and * denote statistical significance at 1, 5 and 10 percent respectively.

Table 3

<i>Dep. Var. log(Inbound_{j to i})</i>	(1)	(2)	(3)	(4)
<i>Visa_{i to j}</i>	-1.273*** (0.049)	-1.167*** (0.051)	-1.171*** (0.072)	-1.098*** (0.074)
<i>logGDPPC_i</i>	0.671*** (0.026)	0.641*** (0.027)	0.552*** (0.047)	0.531*** (0.048)
<i>logGDPPC_j</i>	0.736*** (0.028)	0.737*** (0.027)	0.831*** (0.045)	0.828*** (0.044)
<i>logPOP_i</i>	0.737*** (0.011)	0.733*** (0.011)	0.844*** (0.029)	0.844*** (0.029)
<i>logPOP_j</i>	0.808*** (0.012)	0.822*** (0.012)	0.884*** (0.025)	0.891*** (0.025)
<i>Visa_{j to i}</i>		-0.400*** (0.052)		-0.270*** (0.073)
<i>Samelegal</i>	0.926*** (0.043)	0.907*** (0.043)	1.125*** (0.056)	1.118*** (0.056)
<i>Sameregion</i>	2.532*** (0.057)	2.440*** (0.058)	2.609*** (0.074)	2.542*** (0.077)
<i>EFW_i</i>			0.220*** (0.046)	0.219*** (0.046)
<i>EFW_j</i>			0.117** (0.050)	0.123** (0.050)
<i>HeritageSites_i</i>			0.012*** (0.004)	0.012*** (0.004)
<i>logTrade_i</i>			0.132*** (0.087)	0.125*** (0.087)
<i>logTrade_j</i>			0.205** (0.085)	0.187* (0.085)
<i>Polity_i</i>			-0.008 (0.006)	-0.009 (0.006)
<i>Polity_j</i>			0.044*** (0.007)	0.043*** (0.007)
<i>Legal Dummies</i>	Yes	Yes	Yes	Yes
<i>Region Dummies</i>	Yes	Yes	Yes	Yes
<i>Number of Obs.</i>	9943	9943	4752	4752
<i>R – Squared</i>	0.7163	0.7182	0.7617	0.7625

Note: Standard errors are denoted in parentheses. The standard errors are Heteroskedasticity consistent Huber-White sandwich estimator of variance. ***,** and * denote statistical significance at 1, 5 and 10 percent respectively.

Appendix: Variable Descriptions

<i>EOTF</i>	<i>EOTF (Ease of travel for inbound foreign visitors) index measures the percentage of countries whose citizens are permitted visa-free entry into each nation. The index is measured on a 0–100 scale, with higher values indicating fewer visa requirements. A value of 32.62 indicates that the citizens of 32.62% of the countries in the world enjoy visa-free entry into that nation. The United States has a value of 19.79, indicating that the U.S. requires travel visas from over 80% of the nations in the sample.</i>
<i>EOTA</i>	<i>EOTA (Ease of travel for citizens traveling abroad) index measures the ability of citizens in any given country to travel abroad without a visa. For example, EOTA of the US is 57.75, which implies that the citizens of the United States are able to travel to 57.75% of the nations in the world without a visa.</i>
<i>Visa_{ij}</i>	<i>“1” if Country i requires a visa of citizens from Country j and “0” if Country i does not require a visa of citizens from Country j. Visa requirements are not necessarily symmetric. We assign a value of “1” only in those cases in which the visa must be obtained before the time of travel for stays of 30 days or fewer. In many cases, travel visas are available at the point of entry. This requirement is rarely more cumbersome than the normal passport control process and thus is coded as a “0”.</i>
<i>Visa_{ji}</i>	<i>“1” if Country j requires a visa of citizens from Country i and “0” if Country j does not require a visa of citizens from Country i.</i>
<i>Legal Dummies</i>	<i>For French , Scandinavian, socialist , Germanic and English legal origins</i>
<i>Samelegal</i>	<i>Assumes a value of “1” if both country i and country j have the same legal origin.</i>
<i>Region Dummies</i>	<i>For North America, Caribbean, the former Soviet Union (CIS), the Middle East, East Asia, West Asia, Central America, South America, Europe, Oceania, and South America</i>
<i>Sameregion</i>	<i>Assumes a value of “1” if both country i and country j are from the same region.</i>
<i>Polity</i>	<i>The Polity conceptual scheme is unique in that it examines concomitant qualities of democratic and autocratic authority in governing institutions. This variable captures this regime authority spectrum on a 21-point scale ranging from -10 (hereditary monarchy) to +10 (consolidated democracy).</i>
<i>EFW</i>	<i>Economic Freedom of the World Index, higher numbers imply higher economic freedom.</i>
<i>HeritageSites</i>	<i>Number of World Heritage Sites in a country.</i>

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Notes

¹ <http://brazil.usembassy.gov/niv-apply.html>. Accessed 31 March, 2012.

² Lawson and Lemke (2012) were unaware of Neumayer's work on this issue and are pleased to acknowledge his efforts at last in this paper.

³ <http://data.worldbank.org/indicator/ST.INT.ARVL>. Accessed 31 March 2012.

⁴ To minimize heteroskedasticity, the dependent variable was logged. The pattern of results was similar in the non-logged specifications.

⁵ Consideration was given to including a distance variable or dummy for contiguity, but in the era of air travel, we argue these factors are adequately covered by the SameRegion variable. Similarly, the SameLegal variable is a good substitute for controlling for Commonwealth countries or other country blocs.

⁶ The number of observations is not a perfect square because there are some country pairs where the inbound travel data were available in one direction but not the other.

⁷ The impact of turning a dummy variable from 0 to 1 on a logged dependent variable is calculated as $e^{\beta} - 1$. The impact of turning a dummy variable from a 1 to a 0 is calculated as $e^{-\beta} - 1$.

⁸ Many of the tourism multiplier studies cited were conducted at the local or state level where leakages are likely to drive the multiplier down a lot. At the national level, and for a nation the size of the United States, concerns about leakages are surely less severe and thus the multiplier for the U.S. is likely higher than those for smaller areas.