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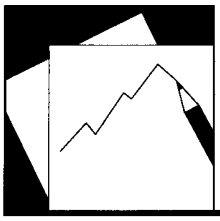

IMF Working Paper

Vacation Over: Implications for the Caribbean of Opening U.S.-Cuba Tourism

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Vacation Over: Implications for the Caribbean of Opening U.S.-Cuba Tourism

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Abstract

An opening of Cuba to U.S. tourism would represent a seismic shift in the Caribbean's tourism industry. This study models the impact of such a potential opening by estimating a counterfactual that captures the current bilateral restriction on tourism between the two countries. After controlling for natural disasters, trade agreements, and other factors, the results show that a hypothetical liberalization of Cuba-U.S. tourism would increase long-term regional arrivals. Neighboring destinations would lose the implicit protection the current restriction affords them, and Cuba would gain market share, but this would be partially offset in the short-run by the redistribution of non-U.S. tourists currently in Cuba. The results also suggest that Caribbean countries have in general not lowered their dependency on U.S. tourists, leaving them vulnerable to this potential change.

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I. INTRODUCTION

The trade literature regularly seeks to explain how changes to trade barriers impact exports. For example, recent work that more tightly linked the workhorse gravity trade model to its empirical applications solved a major puzzle as to why borders reduce trade.[2] Empirical studies have measured export growth after European Monetary Union (EMU) or World Trade Organization (WTO) accession, or the industrialization of China. Similarly, this study seeks to estimate the impact on the Caribbean of normalizing bilateral tourism trade between the U.S. and Cuba.

The kaleidoscope of nationalities, languages, races, political and colonial histories, coupled with what at first appears to be comparable endowments, makes the Caribbean a unique natural experiment for trade. Moreover, the importance of tourism for the region's economies fuels interest from policymakers and academics.[3] For example, a recent passport mandate for U.S. travelers to the Caribbean set off intense lobbying by the affected economies to stop a transitory cost asymmetry relative to Mexico. Similar concerns were raised by the region in response to EU preference erosion for banana and sugar exports from their former Caribbean colonies.[4]

On the issue of the supply shock that would result from a hypothetical opening of U.S. tourist flows to Cuba, concerns are beginning to arise over the need to brace for such competitive pressures.[5] For example, the very high costs of visiting Cuba compared with the perfect trade integration of the U.S. Virgin Islands, suggests that the current restriction provides substantial trade protection to the latter. The rest of the Caribbean lies somewhere in between these two extremes, with U.S. tourist arrivals driven at least in part by preferential trade positions relative to Cuba. Under a scenario in which U.S. tourists flows to Cuba were to be unrestricted, the market would need to find a new equilibrium, as the largest consumer of tourism services in the region meets for the first time in nearly fifty years the region's largest potential producer. As this dead weight loss would be lifted from U.S. consumers, Caribbean vacations would be re-priced, based on fundamental costs, and new tourism consumption patterns would emerge across all destinations and visitor countries.

Previous work has not reached a consensus on the impact of a hypothetical liberalization of Cuba-U.S. tourism on the Caribbean. In particular, previous work forecasting tourism

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[2] Anderson and Van Wincoop (2001), Baldwin and Taglioni (2006).

[3] See Randall (2006) on tourism and Caribbean economies.

[4] To give a few examples, the erosion of European Union bananas and sugar trade preference on the Caribbean see Sahay, Robinson, and Cashin (2006), Singh (2004), Gilson et. Al (2006), on currency unions see Rose (2004 b), Rose and Van Wincoop (2001), on the World Trade Organization see Subramanian and Wei (2007) among others, on China's impact on east Asia see Eichengreen, Rhee and Tong (2004).

[5] Jamaica Observer (2003), Reuters (2007), Cuba's president addressed this issue at the outset of that country's major expansion in the early 1990s, arguing, "Let nobody be mislead into believing that the development of tourism in Cuba-as some press circles interested in dividing us have been saying-could harm tourism in the Caribbean, in Jamaica." See Castro (1995).

without the current restrictions draws on potentially unreliable data or on untested assumptions. For example, Padilla and McElroy (2003) project arrivals based on a comprehensive historical review, including evidence from the 1950s and industry surveys. These projections appear plausible, but they are not tested econometrically and the resulting conclusions depend on qualitative evidence that is difficult to benchmark in the wake of a major structural change. [6] This study shapes a liberalized Cuba-U.S. tourism counterfactual by estimating a gravity trade model of the Caribbean tourism industry. The gravity model, grounded in consumer optimization across differentiated international products, can successfully explain upwards of 85 percent of the variation in the trade data used here. These estimations are anchored on macroeconomic, industry, and socio-economic data from international sources, so as to minimize Cuba-specific uncertainty. The measures employed are standard in gravity models, which have enjoyed great empirical success in the trade literature.[7] Moreover, the gravity model allows tests of whether Cuba and competing Caribbean destinations would adjust their tourism base to hedge potential gains/losses from a liberalization of free Cuba-U.S. tourism trade. The general equilibrium that emerges reflects both the current distortions in Cuba-U.S. tourism relations, as well as the underlying fundamentals that determine the long-run equilibrium.

The results presented here point toward two major findings. First, a future liberalization of Cuba-U.S. bilateral tourism would increase overall arrivals to the Caribbean. This surge would likely drive tourism in Cuba to full capacity, although much is unknown about short-run supply constraints. As U.S. visitors overwhelm capacity, OECD visitors currently vacationing in Cuba would have to be redirected toward neighboring countries. Hence, while short-run constraints would be binding in Cuba, the region would enjoy a period of sustained demand. In the wake of this change, some countries would potentially stand to lose U.S. tourists but would gain new non-U.S. tourists, as trade redistributes in line with fundamentals. The results suggest that total Caribbean arrivals would increase by approximately 2–11 percent; hence, as costs obey fundamentals in lieu of trade barriers, strong tourism growth would await some Caribbean destinations while others would potentially face long-term declines.

The second major finding regards preparation for a possible future opening of Cuba-U.S. tourism. An industry-wide shock such as this occurs once in one hundred years. While the probability, timing or pace of Cuba-U.S. tourism liberalization is unknown, previous empirical tests conducted during periods of potential liberalization suggest that Cuba moves to retain non-U.S. visitors even while preparing to receive increased U.S. arrivals. There is no empirical evidence that neighboring tourist destinations—particularly those that are heavily dependent on U.S. tourist arrivals—hedged potential losses ahead of this change.[8]

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[6] Similar issues arise with Robyn et. Al (2002) and Saunders and Long (2002). The U.S. International Trade Commission (2001), in response to an inquiry by the U.S. House of Representatives Committee on Ways and Means, studied bilateral trade across all goods and services between the U.S. and Cuba, but focused very little on tourism and less on a Caribbean-wide equilibrium.

[7] See Rose (2004 a) for an overview of trade estimations using the gravity model.

[8] In a similar vein, Mlachila, Samuel and Njoroge (2006) find limited success in Eastern Caribbean countries' trade integration efforts ahead of other foreseable and policy driven trade preference erosions.

The results presented in this study also measure various fundamental tourism costs that would determine the long-run equilibrium (beyond the Cuba-U.S. tourism restriction). First is geography. Unsurprisingly and in line with other studies, distance is an excellent proxy for trade costs, particularly since there are non-linear jumps in travel costs to the Caribbean for tourists from different continents. A simple back-of-the-envelope calculation of the average tourist-mile traveled reveals how competitive Cuba could become relative to the existing tourism situation. Using tourist-mile as a cost proxy for current tourism restrictions, the cost to U.S. consumers of traveling to Cuba is estimated to be equivalent to traveling to Oceania. Second, common languages and colonial history also play a major role in identifying costs, which is consistent with other trade studies. As Cuba would move toward full capacity, the spill-over would shift in part to destinations with colonial ties to their OECD visitors. Third, there appear to be economies of scale in servicing regions. For example, the evidence suggests that dependence on European tourism lowers overall arrivals, but if a critical mass of 40 percent of total arrivals are European (independent of country capacity), this loss is somewhat offset, as Europeans tend to visit particular destinations in masses.

On trade regimes, this study tests across a variety of existing treaties in the Caribbean, including the United States Caribbean Basin Initiative (U.S.CBI), the North American Free Trade Agreement (NAFTA), and the Caribbean common external tariff regime (CARICOM). In brief, NAFTA has a substantial positive effect on tourism, while U.S.CBI has a smaller but still positive effect. As far as CARICOM, the evidence suggests that membership is negligible if not detrimental to tourism arrivals.

Energy is a concern in the Caribbean, as most countries are heavily dependent on petroleum imports. Hence, PetroCaribe, the Caracas accords (and its predecessor, the San José accords), and the capacity for oil production itself, are tested. The evidence suggests that receiving oil through PetroCaribe and the Caracas accords benefit tourism arrivals more than producing oil.

Another major concern is natural disasters—specifically hurricanes. However, the impact on tourism for individual countries in the year following a hurricane is uneven. The evidence surprisingly indicates that tourism in some countries improves in the year following hurricanes making landfall, relative to their neighbors where the hurricane did not land. While this may reflect some cost not captured by the model, the pattern that emerges suggests that size matters—larger islands fare much better. More importantly, countries that compare favorably in international building code surveys do better in the wake of hurricanes. Finally, hurricanes trigger official and private capital inflows, and force public and private investors to upgrade facilities and to bring forth new projects in the tourism sector.

Natural disasters do not appear to be the only area in which being bigger is better. The study looks into the industrial organization of the sector with a view to identifying the effects of market power. Using a standard in line with the U.S. Justice Department's measures for market concentration, the evidence supports moderate market concentration in the Caribbean. The results presented here suggest that bigger destinations concentrate tourism arrivals and

reduce overall regional intake, which is consistent with monopolistic behavior as small destinations face capacity constraints.

Finally, the impact of airlines is considered, although the explanatory power of the data is limited by the presence of major hubs in the region. Nevertheless, the results fail to find evidence of nationally-owned Caribbean airlines contributing positively to tourism arrivals. That is, Caribbean countries with domestic flag carriers flying into OECD countries do not do significantly better that those without domestically-owned airlines.

The next section gives a brief overview of the gravity trade model, and the impact of removing this trade barrier. The study then discusses the data in section three, and estimations are presented in section four, along with the forecast of the equilibrium tourist distribution in the Caribbean. Finally, conclusions are drawn.

II. ADAPTING GRAVITY TRADE THEORY

The aim of this study is to judge the potential impact on Caribbean nations' tourism of a hypothetical opening of U.S. tourism to Cuba. This impact is studied by modeling a counterfactual situation that captures and isolates the effect of the bilateral tourism restrictions between the U.S. and Cuba, and then controls for its removal. Gravity trade theory accounts for the amount of tourism between countries on the basis of their sizes and trade costs. Traditionally, the gravity model allows for trade costs to be proxied by a variety of indicators, the most common being geographic distance between countries. Other cost proxies are also included, however, to capture the impact of free trade agreements, preferential oil supplies, and other determinants of trade. The model used in this study is "off-the-shelf," based largely on Anderson and Van Wincoop (2001) and Baldwin and Taglioni (2006).

Having anchored expected tourist arrivals on the gravity model, optimal preparation by Caribbean destinations ahead of any potential tourism normalization is also considered. Removing this barrier would be equivalent to a sharp drop in U.S. travel costs to Cuba. Hence, tourist arrivals are modeled as a mixed Brownian motion with a Poisson jump process, consistent with Cukierman (1980) or Bernanke (1983). The jump in arrivals captures the potential change in U.S. arrivals were Cuba to open up to tourism. Optimally, hedging away from potential U.S. tourist losses is shown to depend on uncertainty over the arrival date of a hypothetical Cuba-U.S. tourism liberalization. As this uncertainty were to be reduced, Cuba would need to prepare for increases in U.S. tourists (and potential losses of Europeans), and vice-versa for competing Caribbean destinations.

An alternative to the gravity model is the computational general equilibrium (CGE) approach, which relies heavily on country and sector modeling to capture the impact of policy changes on labor costs and market clearing trade quantities. However, the current uncertainty—particularly in the case of the Cuban economy—concerning factor and labor costs, elasticities, and the impact on these in the wake of a major policy change, favors a first-pass anchored on more reliable trade data. Nevertheless, while outside the scope of this study, a CGE approach would usefully benchmark the results presented here.

The gravity trade model resembles Newton's equation for the force of gravity between two objects in space:

$$gravitational\ force = G\frac{M_1 M_2}{\left(dist_{1,2}\right)^2}. \quad (1)$$

The gravitational force is proportional to the masses of the two objects in consideration (M_1 and M_2), with the proportionality given by the gravitational constant (G) over the squared distance between the two objects. In the trade version, each country produces an imperfectly substitutable good, and trade between countries is inversely related to the distance between them, and proportional to their respective economies' sizes. The bilateral trade derived for two countries is similar to (1), and given by:

$$trade_{orig,oecd} = \tau^{1-\sigma}\left(\frac{Y_{orig}E_{oecd}}{\Omega_{orig}P_{oecd}^{1-\sigma}}\right) \quad (2)$$

Where Y_{orig} represents the origin nation's output. In this case, the origin nations are all in the Caribbean, as they are the origin of tourism services exported, and σ is the consumer's elasticity of substitution. E_{oecd} represents the expenditure on tourism for the country destined to receive these service exports. That is, exports of tourism services are destined for the OECD, and are denoted "*oecd*". $\tau^{1-\sigma}$ is the cost of trading between the origin and OECD destination countries, which depends on distances, common languages, and other costs, as well as consumers' elasticity of substitution, given by σ. Ω_{orig} measures the market potential or openness of the origin country's exports to world markets, and this measure depends on the trade costs between the origin and destination countries. This term normalizes the origin country's output. $P_{oecd}^{1-\sigma}$ is the destination country's price index, which "normalizes" the OECD country's expenditure. In empirical applications, the ratio,

$$G = \left(\frac{\tau^{1-\sigma}}{\Omega_{orig}P_{oecd}^{1-\sigma}}\right), \quad (3)$$

is referred to as the "gravitational un-constant," as it captures trade costs between two countries in a given year, which naturally vary from year to year as policy and factor costs change. Taking the logarithm of (2),

$$\ln(tourists_{OECD,Car}) = c + \underbrace{(1-\sigma)\ln(\tau)}_{(Trade\,Costs)} + \underbrace{\ln\left(\frac{Y_{orig}}{\Omega_{orig}}\right)}_{(Car,year)} + \underbrace{\ln\left(\frac{E_{oecd}}{P_{oecd}^{1-\sigma}}\right)}_{(OECD,year)} + e_{OECD,Car,year} \quad (4)$$

Equation (4) suggests that empirically controlling for the idiosyncratic terms to the Caribbean destination and the OECD source countries (labeled in parenthesis below) in each year is sufficient to obtain unbiased estimates. In so doing, geographic distance traditionally proxies for trade costs (i.e. great circle distance along the Earth's surface between national capitals). This study adopts this measure, with additional continent indicators for OECD nations located in Europe or Asia.

Other variables refine the measure of trade costs, such as common language, common country, etc. In the Caribbean, countries with common languages have common colonial

pasts, so that at most one of these indicators can be used. Trade costs are also captured through measures of airline access, trade and regional agreements, hurricane preparedness, and other costs embedded in $\tau^{1-\sigma}$.

The estimates of the denominator terms capturing "multilateral resistance" (Ω_{orig} and $P_{oecd}^{1-\sigma}$) can be found in certain cases using non-linear methods, but are not of particular interest here. Instead, country-year specific indicator variables control for these terms, and the estimated equation the becomes:

$$\ln(tourists_{O,C}) = c + \beta_{OECD,t} i_{OECD,t} + \beta_{Car,t} i_{Car,t} + \beta_{dist} dist_{OECD,Car} + \{\beta_{others} others\} + e_{O,C,t} \quad (5)$$

The *i*'s are country-year specific indicator variables, *dist* is bilateral distance, and *others* represent the other costs that this study measures. Note that because tourism service exports are measured as actual human tourist arrivals, there is no concern as to the appropriate deflator for exports, and the nature of the study does not require two-way tourism (i.e., Caribbean nationals traveling to the OECD).

The {others} term in (5) captures trade costs that determine the long-term determinants of tourists, as well as the current Cuba-U.S. tourism trade regime. Costs considered here are largely standard in the trade literature, including distance, language and colonial or political history, as well as:

Economic Fundamentals:	Free trade agreements
	Economic fundamentals and infrastructure
	Natural disasters
	Airlines and access to air routes
Energy:	Oil Production and subsidized oil supplies
Industrial organization:	Scale economies
	Oligopoly
	Spillovers were Cuba to reach capacity
Measurement errors:	Puerto Rico: data problems stemming from airline passengers in transit, cruise passengers, and ex-patriots
	PRGF: (Poverty Reduction and Growth Facility) poor countries disproportionately excluded from tourism

U.S.-Cuba Tourism Restriction Tests

In the log-linear estimated form, the effect of the tourism restriction between Cuba and the U.S. is measured directly by a bilateral indicator, similar to previous work measuring the impact of currency unions or membership in the WTO.[9] By controlling for the this restriction, the model can estimate a counterfactual in which tourism were to be liberalized.

[9] Rose and van Wincoop (2001), Rose (2004b).

One can also consider the potential impact of changes in the relative intensity of Cuba-U.S. tourism restrictions on both Cuba and its competitors. Cuba is the largest potential tourism supplier, the U.S. is by far the largest regional tourism consumer, and the present restriction has stood for nearly five decades. Eliminating this barrier would represent a sizeable dislocation as U.S. travel costs to Cuba would decline abruptly. Every country's demand would jump discontinuously as U.S. tourists would shift to Cuba, and non-U.S. tourists currently in Cuba would compete against lower U.S. travel costs. To capture this dynamic, one can model tourist arrivals as a Brownian motion with a jump process:

$$dTA = \alpha TA dt + \gamma TA dz - TA dq \tag{6}$$

Here, TA are tourist arrivals that arrive with drift rate α, which captures the evolution of fundamentals measured by the Gravity model. The instantaneous change in the observed tourism arrival rate is given by γ. dz is a Wiener process that captures the potential impact of a hypothetical normalization in Cuba-U.S. tourism. For each destination, tourists arrive at an "average" rate α, with changes in the arrival rate of size γ occurring under the present tourism restrictions. Hence, γ captures routine variation in arrival rates not related to the Cuba-U.S. tourism restriction, while dq represents the size of the jump in the year that Cuba-U.S. tourism were to be liberalized. This jump is modeled as the increment of a Poisson with mean arrival rate λ.[10] The parameter λ is unknown, but the duration of the embargo is $1/\lambda$ years, so that estimating the end date of the current tourism restriction is equivalent to estimating λ, which summarizes the length of time under the restriction. Equation (6) then describes a process in which tourist arrivals would change suddenly in response to a change in the U.S.-Cuba tourism regime. The "break" represented by this regime change is captured by dq. A useful example of this process considers a zero drift, (i.e. $\alpha = 0$), which would be the case for a country that receives about the same number of tourists every year. This example isolates the impact of the jump, where the change in tourist arrivals each time period is:

$$dTA = \begin{cases} \gamma TA\sqrt{dt} & with\ prob\ \frac{1}{2}(1-\lambda dt) \\ -\gamma TA\sqrt{dt} & with\ prob\ \frac{1}{2}(1-\lambda dt) \\ -\phi TA & with\ prob\ \lambda dt \end{cases} \tag{7}$$

where ϕ is the total fraction of tourist arrivals that are lost (or gained) when the jump occurs, i.e., when Cuba-U.S. tourism relations would be normalized. The variance then is:

$$Var(dTA) = \gamma^2 V^2 dt + \lambda \phi^2 V^2 dt \tag{8}$$

and the time until the embargo were to be lifted is summarized by the unknown λ. Equation (8) summarizes the jump in tourist arrivals, which depends on the size of ϕ, i.e.,

[10] As in Dixit and Pindyck (1994), or jump processes in Cukierman (1980) and Bernanke (1983).

the share of U.S. tourists. At the end of the regime, U.S. tourists would face a sharp decline in costs to traveling to Cuba. Countries that depend heavily on U.S. tourism would need to diversify away from this base as it becomes clear that they would be facing a new, large market competitor with lower costs. These competitors would need to minimize their exposure to U.S. tourist losses toward the end of the regime, reflected by ϕ in Equation (8), and hedge toward other tourist sources.

Diversification requires finding an instrument that identifies visitor preferences in a market in a hypothetical post-opening of Cuba-U.S. tourism. Previous work has found that measures of national culture (or cultural distance) are a useful instrument for predicting such preferences.[11] In other words, measures of cultural distance identify OECD tourists with destination preferences that differ from U.S. tourists. As the likelihood of Cuba opening to U.S. tourism were to rise, Caribbean competitors would need to hedge potential tourist losses to Cuba by diversifying away from U.S. tourists and toward culturally different countries. This effect would be strongest and most observable for Caribbean destinations that are most dependent on U.S. tourists. This effect would also be most observable whenever it were to appear that the Cuba-U.S. tourism restrictions might be lifted. In such times, heavily U.S.-dependent countries would have a strong incentive to diversify away from U.S. tourists, that is, reduce ϕ in Equation (8). At times when these tourism restrictions are very unlikely to end, they would have little incentive to do so.[12]

Two periods are identified as having relatively tighter and looser travel restrictions between the U.S. and Cuba.[13] The first is 1996–97, when the Helms-Burton Act increased sanctions against Cuba. The second period was 1999–2000, when there was a relaxation in a number of sanctions, including expanded travel to Cuba. During 1999–2000, Caribbean destinations receiving a high percentage of tourists from the U.S. should have diversified toward countries that are culturally different from the U.S. to hedge against the potential end of the embargo in Equation (8). These same countries would have had less of an incentive to diversify away from the U.S. during the 1996–97 period.

Thus, Cuba- and U.S.-dependent Caribbean destinations are tested during both periods across three groups of OECD countries. The U.S.-dependent Caribbean destinations are the Bahamas, Cancun, Dominican Republic, Jamaica, and the U.S. Virgin Islands. The three groups of OECD countries are selected as being: (i) culturally different from the U.S. (a hedge), (ii) culturally similar to the U.S. (not a good hedge), and (iii) the U.S. The expected result is that at times when the end of the embargo appears imminent, U.S. dependent destinations diversify toward countries differing culturally from the U.S. and away from the U.S. itself and culturally similar countries to hedge, and the opposite during the embargo tightening.

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[11] For example, Ng, Lee, Soutar (2007).

[12] Ausubel and Romeu (2004) use a similar approach to isolate the indirect effect of market size during periods of increased uncertainty and higher volatility.

[13] Sullivan (2007) gives an overview of legislative changes in Cuba-U.S. relations since 1961, and Vanderbusch and Heany (1999) also discusses U.S. policy towards Cuba during the period in question

III. DATA

The data employed here provide a fairly comprehensive picture of the Caribbean tourism market. Table 1 gives descriptive statistics on the number of tourists arriving to each destination from individual OECD countries. The data record thirty-three destinations receiving tourists from 21 OECD countries from 1995–2004.[14] The average number of tourist arrivals and rooms are reasonable indicators of market share for each country. The weighted average distance traveled by a tourist to arrive at a destination is also a useful measure, as geographic distance is one of the most prominent measures of trading costs in gravity models. These models routinely explain more than 70 percent of the observed variation in international trade data. The weighted mean distance reveals the average cost for a country, where cost is proxied by nautical miles traveled. If Cuba-U.S. tourism were to open, this cost indicator would fall precipitously, as fifty-thousand hotel rooms would be opened up to over 10 million U.S. tourists at a distance measured in hundreds rather than thousands of nautical miles.

Figure 1 maps the Caribbean, with country shading reflecting average tourist arrivals to each destination in the years 2003–04. Unsurprisingly, the mass of arrivals are received by Puerto Rico, Cancun, Jamaica, the Dominican Republic, and Cuba—the largest destinations. Nevertheless, observable differences between seemingly comparable destinations (e.g., Cancun and Belize or Martinique and St. Vincent) are driven by costs other than geographical distance. Figure 2 shows the impact of the Cuba-U.S. tourism restriction. The OECD map is scaled by arrivals to Cuba, and Caribbean destinations are scaled by U.S. arrivals. Under the current restriction, the U.S. and Portugal show roughly equivalent arrivals to Cuba, which in turn receives about the same number of arrivals as St. Lucia. Cuba, along with the Dominican Republic, has grown to a dominant position in Caribbean tourism in the decade to 2004 (Figure 3, which plots tourism arrivals against hotel capacity in 2004, scaled to each country's GDP). This market, thus, appears to have developed a few very large players and many small ones.

Political autonomy matters since it is easier to travel within a country than internationally, and the countries vary greatly in this dimension. The destinations in the data range from overseas territories of OECD countries (e.g. Guadeloupe is a Department of France) to independent countries such as the Dominican Republic. Size also matters in determining trade costs, as economies of scale are unavailable for very small countries, e.g., St. Vincent and the Grenadines, versus large countries such as Mexico—represented here by Cancun's international tourist arrivals. There is an array of languages and colonial histories represented in the Caribbean, as well as differing economic governance and income levels, ranging from

[14] Caribbean destinations: Anguilla, Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bonaire, British Virgin Islands, Cancun, Cayman Islands, Costa Rica, Cuba, Curacao, Dominica, Dominican Republic, Grenada, Guadeloupe, Haiti, Jamaica, Martinique, Montserrat, Panama, Puerto Rico, Saba, Saint Kitts, Saint Lucia, Saint Vincent, Saint Eustatius, Saint Maarten, Trinidad and Tobago, Turks and Caicos, U.S. Virgin Islands. OECD countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, U.K., U.S.A.

very poor (PRGF) countries to high income per capita nations, such as the British overseas territories. There are differing trade agreements such as PetroCaribe and the San José accords in the area of energy, Open Skies agreements for airlines, and preferential trade agreements such as the U.S. Caribbean Basin Initiative and NAFTA.

These differing political and economic arrangements contribute to skewing the visitor distribution of OECD countries across Caribbean destinations.[15] A Caribbean destination may depend heavily on one OECD country for tourists, or alternatively, it may draw from a diversified base of countries. Table 2 shows market concentration (Herfindahl index) based on each OECD visitors' "market share" of the total tourists arriving to each Caribbean country. The table shows the most concentrated and the most diversified of the thirty-three Caribbean destinations in the sample. U.S. and U.K. overseas territories tend to be the most concentrated, while Cuba and the Dominican Republic stand out as receiving a highly diversified visitor base, despite contrasting trade regimes with the U.S. This is underscored in Figure 4, which shows arrivals to each destination. The United States is a major tourist source for the majority of large destinations—but not so in Cuba or the Dominican Republic. Figure 5 focuses on the top five visitor countries for each tourist destination (with a country with roughly equal-sized bars depending equally across its top five OECD clients, for example, contrast the dependence of Martinique on incoming French tourism with the diversification of Barbados). Figure 6 shows the five most-visited destinations for each OECD country in the sample (with roughly equal-sized bars indicating that the OECD country spreads equally its visitors across several Caribbean destinations). Notice that many countries in the OECD show disperse distributions across destinations, implying OECD countries differ sharply in their preference for destination variety.

The criteria for selecting tourism destinations lies at the heart of forecasting a new equilibrium that would follow a hypothetical opening in Cuba-U.S. tourism. Figure 7 clusters countries by their current destination choices across visitor patterns. The clustering algorithm groups countries by minimizing the differences between their de facto tourism distributions under the present Cuba-U.S. tourism regime. The OECD is distributed along a spectrum with Anglo-Saxon countries at one end and southern Europe on the other, with Greece the most dissimilar country in the sample. The U.S. appears somewhat out of place and is most similar to Japan. Except for Guadeloupe and Martinique which are French Departments, differentiating among Caribbean countries depends to a significant extent on size, with the largest destinations anchoring one end of the spectrum. Moreover, among the largest, Cuba and the Dominican Republic stand out as similar to each other and more dissimilar to the others (Puerto Rico, Bahamas, Jamaica, Cancun). The de facto "preferences" depicted in this figure are distorted by the current tourism restriction between the U.S. and Cuba; hence, were this barrier to be eliminated, this would lead to a redistribution of the status quo toward one based on economic fundamentals.

Clustering OECD visitors based on their cultural preferences and Caribbean destinations around industry fundamentals is a useful guide for prediction, as the de facto patterns in

[15] See, for example, Rose (2001).

Figure 7 would break down after a hypothetical Cuba-U.S. tourism normalization. Figure 8 clusters OECD visitors based on sociological measures of "cultural distance" which have been empirically linked to tourism destination choices.[16] Caribbean countries are grouped on the basis of their macroeconomic and industry fundamentals.[17] The OECD clustering is similar to the de facto distribution, except that the U.S. now anchors the Anglo-Saxon end of the spectrum. On the Caribbean side, Cuba is clustered with Jamaica and Costa Rica, both large tourism destinations, and fundamentally different from Cancun and the Dominican Republic at the other end of this spectrum. This fundamentals-based clustering reflects production costs in the Caribbean. To illustrate this point, Figure 9 graphs unit-labor-cost differentials of Costa Rica, Jamaica, and the Dominican Republic over Mexico (proxying Cancun). While much is unknown about future production costs in Cuba, presently it is clustered with large, high-cost Caribbean destinations. Table 3 divides OECD countries into three groups and Caribbean countries into four based on the cultural and fundamentals clustering in Figure 8. These groupings form the basis for modeling changes in tourism patterns after a hypothetical Cuba-U.S. tourism liberalization.

Tourism patterns are also affected by both natural and man-made phenomenon. As far as natural phenomenon, Table 4 gives hurricanes making landfall in Caribbean countries during the years 1995–2004.[18] Each year, hurricane season extends from July to November, and the tourism season extends from mid-December to the following March. Hence, one would expect the bulk of the impact on tourism from a hurricane to be felt in the next calendar year. As far as man-made phenomenon, factors such as market concentration and the patterns of air routes, while generally outside of an individual country's control, nevertheless shape regional tourism patterns. Figure 10 measures market concentration using hotel capacity, and contrasts the years 1996 with 2004. One can observe a lower tail of countries decline to miniscule shares of Caribbean hotel capacity, while the large countries consolidate their positions at the top of the industry. Using the Herfindahl index (per the *Merger Guidelines* of the U.S. Department of Justice) the Caribbean reached about 0.1 in 2000 (the threshold at which the market is considered to be moderately concentrated). Theory suggests that as market concentration increases, larger countries restrict tourism entry to raise prices and improve profits. Small countries are naturally constrained from increasing supply despite higher prices. Another important concern is the availability of air travel.
Figure 11 shows the number of OECD flag carriers (including regular OECD based charters) reaching Caribbean destinations, as well as international Caribbean flag carriers with Cancun and the Dominican Republic standing out. Of the largest destinations, only the Dominican Republic has not had an airline that competed with OECD carriers (although one has just been launched).

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[16] See Ng, et. Al (2007) on cultural distance guiding tourism destination choices, and Padilla and McElroy (2007) and Sahay et. Al. (2006) on fundamentals and industrial drivers of tourism.

[17] Fundamentals are: average GDP growth, GDP divided by its standard deviation, length of stay, the share of hotels with 100 or more rooms in each country, and the language spoken.

[18] As recorded by the EM-DAT Emergency Disasters Data Base, where landfall is recorded for hurricane force winds.

IV. ESTIMATION

There is no recent data recording open Cuban-U.S. tourism, so that identifying the impact of such a hypothetical event must be done indirectly. To this end, the estimations identify significant determinants of tourist arrivals after controlling for the Cuba-U.S. tourism restrictions, and test for a relative hypothetical easing of the current policy. The tests reveal that arrivals to Cuba from OECD countries culturally different from the U.S. would respond to relative easing or tightening of U.S. restrictions. Moreover, the estimates confirm that language and colonial ties, scale economies in general (i.e. large islands) and also in servicing European tourists, and regional spillovers, were Cuba to reach capacity, also would increase arrivals. Finally, the estimations show that the U.S. policy imposes significant costs on U.S. tourists traveling to Cuba. Taken together, the evidence suggests that were U.S. restrictions to be removed, this would sharply increase U.S. arrivals to Cuba (as costs would drop significantly), while redirecting non-U.S. tourists currently in Cuba to other regional destinations. The evidence suggests that non-U.S. tourists would redistribute away from Cuba toward destinations that are related by colonial or national ties or specialize in receiving them. This section explains the estimation results and projects potential arrival scenarios.

Table 5 gives the results of estimating Equation (5), first including only basic tourism costs, and then progressively adding other costs outlined above. The basic estimation controls for distance, continents, common language and common country, for Puerto Rico and poor countries, and for September 11, 2001 (into 2002). Indicators also control for petroleum producers and subsidies, NAFTA, CARICOM, the U.S. Caribbean Basin Initiative, and U.S. tourism policy with Cuba. Finally, an indicator for destinations receiving over 40 percent of European visitors in a given year captures increases in arrivals from this specialization.

Each successive column in Table 5 augments the previous estimation with additional costs. The second column, labeled *Model 2*, adds market concentration variables to the basic estimation, to capture the effects of market power and spillovers. Specifically, Model 2 adds a Caribbean-wide dummy for years when the legal definition of moderate market concentration is met. A dummy is also included between Caribbean and OECD countries with colonial ties for years when Cuba was at full capacity (1997–98). In this situation, the indicator tests whether OECD clients revert to former colonies. Next, *Model 3* tests incremental tightening and loosening of Cuba-U.S. tourism restrictions. This model interacts Cuba and other Caribbean country indicators with clustered OECD groups during such periods. *Model 4* includes indicators for destinations where a hurricane made landfall in the prior year. *Model 5* adds measures of OECD airlines flying into a destination, and Caribbean airlines flying into OECD visitor countries.[19] The sixth and seventh models keep only the hurricane tests and the most basic gravity cost measures (distance, language and nationality), respectively, for robustness. The gravity model's success in explaining observed trade data noted in other studies occurs here as well. The model explains 85 percent of the observed variation in tourism arrivals from 21 OECD countries across 33 Caribbean destinations over

[19] Airlines included as the log of one plus the number of airlines; estimation details in the Appendix.

ten years. Moreover, estimated coefficients remain broadly constant as different proxies for trade costs are added to the basic model, indicating stable parameters.

The core determinants of trade commonly included in gravity models—distance, common language, and common country—are significant and with expected signs. These anchor long-term expectations of tourism that would hold in the wake of a hypothetical opening of Cuba to U.S. tourism. For countries in Europe and Asia, the cost proxied by bilateral distance is augmented by the highly significant coefficients for their respective continents. The Puerto Rico indicator appears to pick up the same effect observed in Figure 3—a very large number of arrivals despite few hotels. This likely reflects recording problems for arrivals to Puerto Rico due to its status as a cruise ship and airline hub, as well as returning expatriates. The PRGF indicator appears insignificant, but with a negative sign as expected for extremely poor countries that may not meet basic tourism services threshold.

The indicator for September 11 is significantly negative, but changes magnitude as the oligopoly indicator is introduced. Since the two periods partially overlap, the data may have insufficient power to separate these effects completely. Nevertheless, market concentration precedes 2001 and extends through 2004, so the two effects are distinct. The dummy reflecting economies of scale for Europeans, which is unity when over 40 percent of total arrivals are Europeans, is also highly significant. This suggests that destinations with 40 percent of their arrivals from Europe observe a jump in these arrivals not explained by other costs in the model. The significant indicator for Cuba at full capacity suggests that Caribbean countries capture tourist spillover from their former colonial relationships during those periods. This suggests limited regional substitutability. Taken together, these results suggest that Caribbean competitors would be able to capitalize on non-U.S. tourists were Cuba to open to U.S. tourism. Moreover, larger islands and those that draw a critical mass of tourists from Europe (or have colonial ties with Europe) are in a better position to do so.

Turning to natural disasters, the results suggest that the impact of hurricanes is not uniformly detrimental to tourism. That is, a hurricane making landfall on an island in the previous autumn does not necessarily reduce tourism arrivals and indeed may substantially increase them. While surprising on first glance, there are several factors that may explain this result.[20] First, hurricanes that helped tourism, particularly *Michelle* and *Hortense*, affected the greater Antilles, and particularly Cuba and the Dominican Republic (see Table 4). Other smaller islands may not have either the geographic span to slow down hurricane wind speeds or construction that can withstand these pressures. International Wind Code Evaluation studies for Caribbean countries in 2003 found that the wind load standards and building codes of Cuba and the Dominican Republic were state of the art. Similar evaluations of building codes in the Eastern Caribbean and CARICOM during the sample years were judged as outdated

[20] One might argue that large enough hurricanes could affect countries where landfall did not occur. This result might then reflect less tourism loss for islands where landfall did occur relative to others where a hurricane did no strike directly. This is assumed not to be the driving the results here since it would mean that very large storms do less damage during direct hits than indirect hits.

and in need of review because of poor performance during hurricanes.[21] Moreover, hurricane damage forces the public and private sectors to bring forth projects and refurbishments, and triggers the release of emergency funds from national and international sources, in effect increasing tourism sector investment.[22] Previous work has found that hurricanes trigger large increases in foreign aid to developing countries. For poor countries, hurricanes increase remittances sharply, whereas for wealthier developing countries, they trigger increases multilateral lending.[23] While offsetting declines in private financial flows can be large, for countries that rely more on remittances, the evidence suggests that new flows could fully compensate hurricanes damage.[24]

The results indicate that (not surprisingly) the current Cuba-U.S. travel restrictions significantly lower bilateral tourism between these two countries across all models and specifications. The magnitude of the estimated coefficient suggests that this restriction increases the cost of travel to Cuba for a U.S. tourist beyond what Asian tourists pay. Its magnitude is comparable but opposite in sign to Puerto Rico. Hence, the reduction in U.S. tourists to Cuba mirrors the increases in arrivals to Puerto Rico from its expatriates, as well as its status as a U.S. overseas territory, an airline hub, and a cruise ship port.

In a context of a perceived bias toward bilateral tourism normalization (1999–2000), there were significantly lower arrivals from the U.S. and culturally similar countries to Cuba, and conversely, increased arrivals from culturally different countries.[25] Hence, were the United States to loosen tourism flow constraints (or even be perceived to be about to do so)—in effect lowering bilateral travel costs—Cuba would (consistent with the past) make efforts to increase arrivals from visitors culturally different from the U.S.; thus, protecting its existing market share against losses to other Caribbean destinations. In contrast, Caribbean competitors (consistent with the past) would fail to increase arrivals of Southern European tourists to hedge U.S. losses during this period. The results, however, indicate that U.S. arrivals decrease insignificantly for Caribbean competitors, which could be consistent with decreasing dependence on U.S. markets.

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[21] For example, the Base Code (CUBiC) building code used in CARICOM countries was placed under review and judged outdated in light of the performance of the region following hurricanes/storms Gilbert (1988), Hugo (1989), and Andrew (1992). IADB (2005) measured Jamaica as the highest (PVI) index of vulnerability conditions of the countries in the Western Hemisphere, with Trinidad and Tobago and the Dominican Republic, and Costa Rica all rated less vulnerable. United Nations International Secretariat for Disaster Reduction (ISDR) cited Cuba as a model for hurricane preparation after its response to the four hurricanes in 2004.

[22] For example, after Hurricane Ivan, in 2004, Jamaica's Minister for Industry and Tourism characterized the impact of the hurricane as: "..a lot of properties took the opportunity to really refurbish and make some meaningful changes." Caribbean Net News (2005). The United States released $116 million in assistance to Caribbean in the wake of the hurricanes in 2004.

[23] For example, the World Bank initiated in 2007 the *Caribbean Catastrophe Risk Insurance Facility* for this purpose.

[24] Yang (2007) provides a comprehensive study of hurricane damage around the world, and gives evidence of capital inflows in support of countries in the aftermath of hurricanes, particularly, bilateral and multilateral official lending as well as remittances, for the Caribbean.

[25] Both the tightening and loosening tests are robust to changes in the definition Caribbean competitors consistent with U.S. tourism dependence.

In a context of a perceived bias against bilateral tourism normalization (1996–97), Cuba increases (significantly) arrivals of Southern European visitors, i.e., those culturally dissimilar to the U.S. Moreover, this increase is greater than in the loosening sub-period considered above. The sharper increase in non-U.S. tourism in this sub-period relative to potential opening suggests that Cuba either faces increased non-U.S. tourist demand or is more responsive to tightening than to loosening of tourism restrictions. Caribbean competitors, however, significantly lower their share of U.S. visitors even as the U.S. increases tourism barriers. That is, Caribbean competitors to Cuba fail to exploit an increase in travel costs for U.S. tourists to Cuba, despite a declining probability of reversal of this barrier. This suggests that were Cuba to be opened to U.S. tourists; this would likely drive some but not all non-U.S. tourists to competing neighboring destinations.

While the model fits the data well, some caveats apply when interpreting results for specific bilateral country pairs. For example, Figure 12 fits Model 2 for U.S. tourist arrivals to Caribbean destinations in 2004. The model approximates U.S. arrivals to most destinations well, with the bilateral restriction driving a wedge between the projection of U.S. tourism to Cuba (dotted line) and observed arrivals (smooth line). The (dotted line) projection of the gravity model in Table 5 serves as the basis for determining both the impact of a potential tourism liberalization in Cuba and its long-term costs. For destinations other than Cuba, the gap between projected and observed U.S. arrivals reflects either costs not captured by the model or fundamental misalignments. For example, Aruba appears to have "excess" U.S. arrivals while Belize falls short of model predictions. This could reflect future declines for Aruba and gains for Belize in U.S. arrivals. Alternatively, Aruba may be competitive and Belize less so in a dimension that the model does not capture. In either case, the gap between observed and projected U.S. arrivals to Aruba or Belize is unlikely to have resulted solely from Cuba-U.S. tourism restrictions. Hence, the gap between projected and observed arrivals for most countries is interpreted as reflecting long-term costs rather than just the impact Cuba-U.S. tourism restrictions. Figure 13 graphs model projections against arrivals to Cuba from differing OECD countries. Here, the model predicts more U.S. visitors to Cuba than is observed, which is very likely driven by the bilateral tourism restriction, as its size dwarfs other costs in the model. Moreover, tourism from the southern Europe end of the cultural spectrum outlined above is higher than the model would predict. Hence, the current restrictions may attract "excess" tourists from OECD countries that are culturally different from the U.S., and these would be likely to leave once the restriction were to be removed.

In a hypothetical scenario of unrestricted Cuba-U.S. tourism, arrivals are projected from the model's fit absent the estimated embargo coefficient. In this event, all models project between 3–3.5 million U.S. tourists would enter Cuba. The increase in U.S. arrivals to Cuba could imply losses for competing destinations or, alternatively, this could be new U.S. tourists to the region. This section presents the impact of a hypothetical normalization of Cuba-U.S. tourism as:

A. being completely new tourists to the Caribbean, (other destinations do not lose U.S. tourists as Cuba were gaining);

B. coming entirely from existing U.S. tourists in the Caribbean (U.S. visitors to Cuba would represent lost U.S. arrivals for competing destinations, and non-U.S. visitors in Cuba would redistribute through the Caribbean);

C. assuming arrivals that are $^1/_3$ new to the region and $^2/_3$ diverted from existing destinations, an intermediate scenario suggested by Padilla and McElroy (2003); and

D. reflecting fitted Gravity model estimates for each country, given by summing the results shown in Figure 12 across all OECD countries for each destination, reflecting long-term costs.

Scenarios (A) and (B) represent bounds on any potential future outcome. Some tourists could divert away from neighboring destinations towards Cuba, but the massive cost reduction given Cuba's tourism fundamentals is also likely to motivate new arrivals. Scenario (C) represents a midpoint suggested in other studies and yields similar aggregate results to the long-term fitted gravity estimates. Scenario (D) is presented to anchor long-term expectations of tourism growth or decline in the region. That is, scenarios (A), (B) and (C) focus on the distributional effects of this supply shock, while scenario (D) guides expectations on long-term regional development, where the gravity panel results are most robust. A scenario in which the region as a whole gains no new U.S. tourists and existing non-U.S. tourists in Cuba do not redirect to competing destinations is ruled out, as price adjustments would likely fill empty hotels. All results are presented as averages based on arrivals between 2003–04 to smooth idiosyncratic shocks, particularly in smaller destinations. Puerto Rico is assumed not to suffer U.S. tourist losses to a hypothetical Cuba-U.S. tourism liberalization.[26] In scenarios A, B, and C, non-U.S. tourists in Cuba are assumed to be redistributed across Caribbean destinations on the basis of existing shares. That is, destinations that cater to European tourists under the current policy are in a better position to pick up spillover as Cuba was to fill to capacity.

Table 6 breaks down actual and predicted tourist arrivals to Cuba averaged across 2003–04 by country of origin. Cuba retains about 20 percent of its non-U.S. tourists after a hypothetical opening to U.S. tourism and overall arrivals to Cuba more than double, as approximately 3 million U.S. tourists would visit the country.[27] In terms of short-term supply constraints, Figure 14 compares capacity utilization (rooms used per visitor per year) across large Caribbean destinations. In 2004, the average for such large destinations was 55 visitors per room. At 30 visitors per room, Cuba appears to have substantial excess capacity. Assuming conservatively that Cuba can increase short-run hotel utilization to the regional average, there would be roughly capacity for almost double the current visitors, leaving an

[26] Estimates based on UNWTO (2007) suggest that Caribbean tourism arrivals have increased by a cumulative 11 percent in the years 2005-2007, so that one could gross up the figures presented proportionally to make the estimates "current," although bilateral arrivals data is not available after 2004.

[27] Three million U.S. arrivals is broadly consistent across fitted models shown, including model 7, which employs only the most basic gravity cost measures and predicts a visitor value of 3 million U.S. arrivals in 2004. This figure is also consistent with Padilla and McElroy (2003).

excess demand of 500,000 tourists. Long-run investment to accommodate the 3.6 million annual projected visitors would require roughly 10,000 new hotel rooms in Cuba. At US$300,000 per room construction cost, the estimated investment to accommodate this demand in Cuba is US$3 billion.[28]

Table 7 shows projected tourist arrivals under a hypothetical normalization of Cuba-U.S. tourism relations, based on Model 1 in Table 5. For each destination listed on the left, the gain/loss in arrivals from the U.S. and OECD clusters are shown (see Table 3). The *Non-U.S.* column shows the net gain in non-U.S. tourists that would be redistributed from Cuba. The *net* column shows the net gain across all OECD visitors. The *current* column shows total tourist arrivals in each country for 2003–2004.

Scenario (A)—the benign scenario—is the same for all models. In this scenario, current non-U.S. visitors in Cuba redistribute regionally. That is, destinations competing for displaced non-U.S. tourists exiting Cuba receive the same allotment under all models. In this scenario, Cuba, the Dominican Republic, Guadeloupe, Martinique, and most British Overseas Territories would gain arrivals. These destinations have strong links to non-U.S. tourism. Table 5 suggests that economies of scale in capturing European tourism, common language, and colonial ties, and cultural proximity drive market share for non-U.S. arrivals; hence, countries that excel in these dimensions gain as non-U.S. tourists would be displaced from Cuba. Figure 15 graphs the impact of a hypothetical liberalization of Cuba-U.S. tourism on Caribbean destinations under scenario (A). For each destination, the red bars (left) represent observed average tourist arrivals across 2003–04 for the top five OECD visitors, while the blue bars (right) represent predicted arrivals. Scenario A is benign since every country does at least as well, as non-U.S. tourists in Cuba redistribute across the Caribbean.
Figure 16 breaks down arrivals for each destination into a pie chart. Comparing with Figure 4, the U.S. would grow to a majority of visitors in Cuba, while declining as a proportion everywhere else. Furthermore, destinations such as the U.S. Virgin Islands, or Puerto Rico that depend heavily on U.S. tourism would gain few visitors due to their limited success in attracting non-U.S. tourism.

Scenario (B)—Table 7 shows Model 1 tourist redistribution as U.S. visitors would be exiting Caribbean destinations and non-U.S. tourists would be exiting Cuba in the wake of a hypothetical opening of Cuba-U.S. tourism. Table 8 shows the results for Models 2 and 3. The three models differ only with respect to the size of U.S. tourist arrivals to Cuba, which is the size of the U.S. tourist losses for competing destinations. For destinations that are heavily or exclusively U.S. dependent, the loss of arrivals and the inability to attract non-U.S. tourism are inextricably linked. For example, it is unlikely that UK visitors in Cuba now would compensate the U.S. Virgin Islands for losses of U.S. visitors, as the British Virgin

[28] HVS International's Hotel Development Cost Survey Per-Room Range for 2004 and 2005 suggest *Full-Service Hotels* and *Luxury Hotels* range from (thousands) US$77.1–339.7 and US$343.5–1,406.5, respectively, giving a wide cost range, depending on the luxury appointments, costs of land, soft costs, and other factors. Estimates based on audits of the Sandals Whitehouse in Jamaica and the International Finance Corporation's lending for construction of the Sao Paolo Intercontinental confirm a figure of approximately US$300,000 per room.

Islands (among many others) have a history of attracting UK visitors and are right next door. Hence, the tables show the redistribution of non-U.S. visitors to Cuba to destinations where these OECD countries visit historically. The clear winners are destinations that have diversified away from the U.S., as this redistribution is unlikely to favor countries heavily dependent on U.S. tourism. Figure 17 shows arrivals before and after a hypothetical Cuba-U.S. tourism liberalization for each destination. Shorter bars on the right indicate visitor losses, e.g., Cancun or the Bahamas. The Dominican Republic, for example, regains visitors from Canada, Spain, etc. that would compensate U.S. losses. Guadeloupe, Martinique, the Dominican Republic, and Barbados are the countries that would gain the most in this scenario.
Figure 18 shows pie charts for each destination. In this scenario, the presence of the U.S. would be diminished the most across non-Cuba destinations in the Caribbean. Compared with the actual pie charts shown in Figure 4 countries would grow more diversified in their tourist base, so that on balance, arrivals would decline and would become more diversified across OECD visitors in this scenario.

Figure 19 maps Scenario (B), with shading indicating gains/losses. In the Lesser Antilles, one can observe Aruba showing losses as well, as the contrast between the U.S. and U.K. Virgin Islands. The Greater Antilles, the Bahamas, Cancun, and Jamaica show the largest losses were this scenario to materialize. Figure 20 maps the Caribbean scaled by predicted U.S. tourist arrivals and the OECD mapped by arrivals to Cuba. U.S. visitors would dominate the OECD map, as they would become a majority of the visitors to Cuba in line with the current totals for the region. For the Caribbean, Cuba would grow to be the largest destination for U.S. tourists, while destinations such as Jamaica, Cancun, and the Bahamas would decline compared with Figure 2.

Scenario (C), presented in Table 7, shows tourist arrivals assuming one-third of tourists that would go Cuba would be new to the region, and the other two thirds would be drawn from competing Caribbean destinations. Hence, in this scenario, two-thirds of U.S. arrivals to Cuba would come from other Caribbean destinations, which would receive, in turn, their share of current non-U.S. visitors to Cuba. The destinations that reverse losses relative to Scenario (B) are largely British or Dutch overseas territories. Hence, this intermediate scenario underscores that while declines in U.S. arrivals vary in size, vulnerability to these losses remains in all but the most benign projections.

Scenario (D) is presented in Table 9 and in Table 10 for Models 1 and 3. The strength of the gravity model is its ability to project region-wide results. Focusing on individual country-visitor-year triplets—particularly those showing large changes relative to observed arrivals—can lead one to focus on outliers. Instead, the model suggests an overall increase in regional arrivals of 2.4–11 percent, consistent with Scenarios A–C. The results also suggest a larger U.S. tourist presence in the region, as potential long-term declines in the cost of travel to Cuba would represent real U.S. income gains. Figure 21 shows the impact on arrivals before and after a hypothetical opening of tourism to the U.S. The model projects a stronger U.S. presence across most countries, driven largely by distance and other cost proxies. For example, losses shown for Aruba reflect lower average travel costs for U.S. tourists to the Caribbean, who are therefore unlikely to travel as far as Aruba to vacation.

Figure 22 distributes OECD visitors in a pie chart under a hypothetical liberalization of Cuba-U.S. tourism. Compared with the actual charts shown in Figure 4, U.S. visitors would make up between one half and three-quarters of arrivals to most destinations in the long-run.

Figure 23 shades a map of the Caribbean based on Model 1 in Table 5 in comparison with observed arrivals in Figure 1. In the Lesser Antilles, colonial ties drive gains in the British Virgin Islands, even as the next islands over, the U.S. Virgin Islands, lose. Similarly, destinations such as Trinidad and Tobago would gain tourists as they receive very little tourism now relative to comparable competitors. In the Greater Antilles, Cuba and Belize would appear poised for strong growth. In contrast to Scenarios (A) and (B), countries such as the Dominican Republic would stand to gain U.S. tourists but lose non-U.S. tourists, as the model projects a long-term U.S. presence in Caribbean tourism would increase. Figure 24 maps the OECD with bubbles scaled by estimated visitors to Cuba, and the Caribbean scaled by U.S. arrival estimates. This figure contrasts the distortion in the U.S.-Cuba bilateral tourism trade relationship shown in Figure 2. The U.S. would grow to be the largest source of arrivals to Cuba by far, followed by Canada. On the Caribbean side, Cuba would become the largest destination in the Caribbean (not including Puerto Rico), and Belize would grow to approximately the size of Costa Rica. Trinidad would grow larger than Barbados in terms of U.S. visitors, and Aruba would decline to about the size of St. Lucia.

V. CONCLUSIONS

Imposing trade barriers raises costs and distorts the flow of commerce. Using tourist-mile as a cost proxy for current tourism restrictions, the cost to U.S. consumers of traveling to Cuba is estimated to be at least 7,000 nautical miles. This cost increase has permitted distant tourist destinations to accommodate artificially high numbers of U.S. arrivals for decades, when in the absence of this restriction, less costly alternative destinations would be available.

The results presented suggest an increase of Caribbean tourism arrivals of roughly 10 percent, and a shift toward U.S. tourism. U.S. consumers would experience an increase in purchasing power as the dead weight loss of the current policy were to be eliminated. For Caribbean competitors, a hypothetical opening of Cuba to U.S. tourists would imply hedging toward alternative tourist sources, as U.S. visitor losses would occur on impact. The results suggest that binding capacity constraints in Cuba would likely displace current tourists as new U.S. arrivals with immensely lower travel costs would compete for limited hotel rooms. Capturing this short-term dislocation is important for offsetting potential U.S. tourist losses. The results also suggest that permanent declines in travel costs for U.S. tourists alongside their importance in this market would increase their long-term presence in the region. As U.S. tourists would be able to spend less on getting to their destination, they would be able to outbid other visitors for greater tourism quality and quantities.

While future industry uncertainty is unavoidable, a long-term strategy to deal with the hypothetical elimination of the implicit trade protection afforded by restricted tourism is needed. The results suggest a number of directions for competing in a potentially unrestricted Caribbean tourism industry. First, there is scope for breaking up the value chain, specializing, and delivering customized services to clients that base demand on differing cultures and

nationalities. Secondly, while there is no evidence that having a domestic airline significantly helps tourism, access to OECD airlines is important, so that increasing overall access to airlines (including charters) helps. Natural disasters affect countries differently, and the evidence presented here and in other studies supports improving building codes and preparedness, lowering transaction costs, and improving financial sector soundness and the macro framework to cope with net capital inflows in the wake of these storms. Opening to trade in other areas through, for example, free trade agreements, also boosts arrivals, as does strengthening historical and colonial links. Most importantly, delaying until a time when this policy is potentially reversed is a missed opportunity that could prove costly—deliberately acting to reform ahead of this large loss in implicit trade preferences is crucial.

Table 1. Descriptive Statistics of Caribbean Tourism

	Caribbean					OECD			
	Arrivals	Standard deviation	Weighted Avg. Distance	Rooms	Average Stay		Arrivals	Standard deviation	Weighted Avg. Distance
	(thousands)		*(naut. miles)*		*(days)*		*(thousands)*		*(naut. miles)*
Anguilla	38	3.3	1,742	905	8.3	Australia	12	2.0	9,208
Antiguaandbarbuda	165	22.0	2,626	…	…	Austria	40	2.5	4,549
Aruba	536	45.1	1,881	7,440	7.5	Belgium	85	12.8	4,071
Bahamas	1,483	21.7	1,102	15,310	4.5	Canada	1,467	181.3	1,624
Barbados	408	13.3	2,933	6,420	7.0	Denmark	16	4.7	4,342
Belize	157	15.9	2,094	4,842	7.2	Finland	10	2.0	4,695
Bermuda	263	10.2	980	3,132	6.4	France	992	43.4	3,820
Bonaire	50	5.3	2,828	1,233	9.1	Germany	562	65.7	4,287
Britishvirginislands	247	9.4	1,743	2,688	10.5	Greece	8	1.4	5,127
Cancun	1,997	95.4	1,671	54,522	4.6	Ireland	14	1.7	3,589
Caymanislands	271	25.4	1,426	5,264	4.7	Italy	391	31.6	4,570
Costa_rica	732	116.3	2,576	34,034	11.0	Japan	48	4.5	6,823
Cuba	1,380	112.4	3,254	42,612	10.5	Netherlands	241	35.1	4,259
Curacao	120	13.4	3,374	3,423	8.5	New Zealand	3	0.1	7,067
Dominica	27	0.8	2,386	…	8.4	Norway	13	0.6	4,355
Dominican_republic	2,273	266.3	2,682	56,019	9.4	Portugal	58	4.6	3,604
Grenada	79	4.6	2,879	1,752	7.4	Spain	405	51.5	3,875
Guadeloupe	113	9.6	3,503	7,350	4.2	Sweden	33	11.0	4,458
Haiti	115	…	1,420	…	…	Switzerland	106	4.2	4,302
Jamaica	1,263	58.5	1,767	20,699	6.5	UK	1,228	97.0	3,822
Martinique	391	11.8	3,632	6,613	9.2	USA	10,931	493.7	1,294
Montserrat	5	0.3	2,645	…	13.1				
Panama	172	18.3	2,492	14,463	2.2				
Puerto_rico	2,948	94.3	1,379	12,693	2.7				
Saba	7	1.8	2,823	85	…				
Saint_kitts	48	11.5	1,862	1,591	9.6				
Saint_lucia	196	14.8	2,588	4,131	9.9				
Saint_vincent	45	2.5	2,576	1,728	11.1				
St_eustatius	6	0.4	2,846	89	…				
St_maarten	305	15.4	1,959	3,540	…				
Trinidad	264	17.9	2,595	5,066	…				
Turksandcaicos	153.3	6.4	1,300	2,369	7.6				
USvirginislands	512.3	27.1	1,438	5055	4.5				

Sources: WTO, CTO, Country Authorities, Author's estimates.
Notes: Data for 2000–2004.

Table 2. Destination Tourist Base Concentration

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
					(Concentrated tourist base)					
Anguilla	0.77	0.73	…	…	…	…	…	…	…	…
Aruba	…	…	…	0.73	0.76	0.77	0.78	…	…	…
Bahamas	0.74	0.73	0.75	0.88	0.88	…	…	0.80	0.80	0.81
Belize	…	0.76	…	…	…	…	…	…	…	…
Britishvirginislands	…	0.74	0.79	…	…	…	…	…	…	…
Caymanislands	…	…	…	…	…	0.77	0.79	0.78	0.77	…
Guadeloupe	…	…	…	0.73	0.76	…	…	…	…	…
Martinique	0.75	0.82	0.81	0.83	0.84	0.87	0.90	0.85	0.88	0.88
Puerto_rico	0.95	0.95	0.95	0.95	0.96	0.96	0.96	0.96	0.96	0.96
Saba	…	…	…	…	…	…	…	…	…	0.78
USvirginislands	0.9	0.86	0.89	0.9	0.89	0.93	0.95	0.96	0.95	0.93
					(Diversified tourist base)					
Barbados	0.25	…	0.27	0.29	…	…	…	…	…	…
Cuba	0.17	0.17	0.15	0.13	0.13	0.13	0.14	0.14	0.16	0.19
Dominican_republic	…	0.2	0.17	0.18	0.16	0.16	0.17	0.18	0.18	0.18
Grenada	0.26	0.26	0.26	0.28	0.29	0.31	…	0.35	0.34	0.34
Saba	…	…	…	…	…	…	…	0.32	…	…
Saint_vincent	…	0.26	…	…	0.29	0.3	0.30	0.33	0.34	0.35
Trinidad	…	…	…	…	…	…	0.29	…	…	…

Source: Author's estimates; WTO; CTO; Country tourism offices.

Notes: Herfindahl index calculated on the basis of each visiting countries' "market share" of the total tourist base for each Caribbean destination.

Table 3. OECD and Caribbean Country Groups

Group	OECD Clustered by Cultural Index	Caribbean Clustered by Fundamentals
1	Australia Canada Denmark Finland Ireland Netherlands New Zealand Norway Sweden UK USA	Anguilla Antiguaandbarbuda Aruba Bahamas Barbados Costa_rica Cuba Jamaica Puerto_rico St_maarten USvirginislands
2	Austria Germany Italy Japan Switzerland	Belize Bonaire Curacao Dominica Grenada Guadeloupe Haiti Martinique Montserrat Panama Saba Saint_kitts Saint_lucia Saint_vincent St_eustatius Trinidad Turksandcaicos
3	Belgium France Greece Portugal Spain	Bermuda Britishvirginislands Caymanislands
4		Cancun Dominican_republic

Notes: Selected OECD and Caribbean countries are clustered and tested during years when the bilateral tourism regime becomes more or less restricted. Presented are the full groupings. Groups for OECD visitors are based the underlying variables of the Hoefsted cultural similarity indices. Neighbors are Caribbean destinations clustering around hotel size, average length of stay, language, and the ratio of the growth of GDP to its standard deviation.

Table 4. Hurricanes Making Landfall, 1995–2004

Storm	Year	Countries
Luis	1995	Saint_kitts, Dominica, Puerto_rico, Saba, St_maarten, St_eustatius, Antigua and Barbuda
Marilyn	1995	Britishvirginislands, USvirginislands
Hortense	1996	Puerto_rico, Dominican_republic
Georges	1998	Antiguaandbarbuda, Saint_kitts, Cuba, Haiti, Dominican_republic
Lenny	1999	Dominica, Saint_vincent, USvirginislands, Saint_lucia, Martinique, Guadeloupe, Anguilla, Grenada, Saint_kitts, Antiguaandbarbuda
Michelle	2001	Bahamas, Jamaica, Cuba
Lili	2002	Haiti, Saint_vincent, Cuba, Jamaica, Caymanislands, Barbados
Charley	2004	Cuba, Caymanislands, Jamaica
Frances	2004	Bahamas, Dominican_republic, Puerto Rico, Turksandcaicos
Ivan	2004	Barbados, Cayman Islands, Cuba, Dominican_republic, Grenada, Haiti, Jamaica, Trinidad, Saint_lucia, Saint_vincent
Jeanne	2004	Bahamas, Dominican_republic, Haiti, Puerto_rico, USvirginislands

Source: EM-DAT Emergency Disasters Data Base;
Notes: Countries where hurricane force winds were recorded as making landfall.

Table 5. Gravity Estimates of Caribbean Tourism

Dependent variable: log(arrivals)			***Model 1*** Baseline	***Model 2*** Market Power	***Model 3*** Relative Tightening	***Model 4*** Storms	***Model 5*** Airlines	***Model 6*** Just Storms	***Model 7*** Basic Tests
Distance (nautical miles)			-1.54***	-1.50***	-1.62***	-1.62***	-1.00**	-2.12***	-1.78***
Additional distance costs:									
europe			-1.16**	-1.21**	-1.09**	-1.09**	-1.19***	-0.23	-0.90
asia			-2.11***	-2.02**	-1.79**	-1.79**	-2.27***	-1.19	-2.14**
Language and Nationality:									
comlan			1.43***	1.42***	1.39***	1.39***	1.23***	1.51***	1.34***
comcou			1.60***	1.57***	1.58***	1.58***	1.54***	1.57***	1.83***
Poverty (PRGF) & Puerto Rico:									
prgf			-0.89	-0.90	-0.90	-0.90	-0.81	-0.44	…
prusa			2.64***	2.65***	2.60***	2.60***	0.16	2.92***	…
Sept. 11			-0.93**	-0.21***	-0.23***	-0.28***	-0.30***	-0.99**	…
Petroleum									
Caracas/PetroCaribe			1.83***	1.81***	1.81***	1.81***	1.68***	1.79***	…
Oil Producers			1.36*	1.34*	1.33*	1.33*	1.20*	1.53**	…
European Scales, Market Concentration, Colonial Spillover									
Over 40% European			0.86***	0.86***	0.85***	0.85***	0.78***	…	…
Oligopoly			…	-0.90*	-0.87*	-0.81	-0.94*	…	…
Cuba busy			…	0.49**	0.51**	0.51**	0.53***	…	…
Trade & Regional Agreements:									
nafta			1.08***	1.03***	1.08***	1.08***	-1.39***	1.25***	…
caricom			-0.61	-0.62	-0.62	-0.62	-0.52	-0.65	…
uscbi			0.50*	0.48*	0.49*	0.49*	0.29	0.48	…
US Trade Embargo			-2.40***	-2.42***	-2.40***	-2.40***	-2.00***	-2.97***	-3.21***
Likely to End (1999-2000)	S. Euro.	Carib	…	…	-0.07	-0.07	-0.08	…	…
		Cuba	…	…	0.78***	0.79***	0.75***	…	…
	N. Euro.	Carib	…	…	-0.30	-0.30	-0.32	…	…
		Cuba	…	…	-0.67***	-0.67***	-0.49***	…	…
	USA	Carib	…	…	-0.34	-0.34	-1.28***	…	…
		Cuba	…	…	-0.28*	-0.28*	-0.30*	…	…
Unlikely to End (1996-1997)	S. Euro.	Carib	…	…	-0.03	-0.03	-0.03	…	…
		Cuba	…	…	1.05***	1.05***	1.01***	…	…
	N. Euro.	Carib	…	…	-0.43	-0.43	-0.51	…	…
		Cuba	…	…	-0.29	-0.29	-0.11	…	…
	USA	Carib	…	…	-0.64**	-0.64**	-1.60***	…	…
		Cuba	…	…	-0.24	-0.24	-0.27	…	…
Hurricanes	hGeorges98		…	…	…	1.10	1.40	0.82	…
	hHortense96		…	…	…	1.67***	1.67**	1.60***	…
	hLenny99		…	…	…	-0.15	-0.24	-0.92*	…
	hLili02		…	…	…	1.60**	1.90***	1.13	…
	hLuis95		…	…	…	-2.12**	-1.50*	-2.09**	…
	hMarilyn95		…	…	…	0.56	0.78	0.26	…
	hMichelle01		…	…	…	3.62***	3.69***	3.62***	…
Air	OECD		…	…	…	…	0.24***	…	…
	Caribbean		…	…	…	…	0.10	…	…
Constant			20.11***	19.85***	20.80***	20.80***	15.66***	24.35***	22.44***
N			3,936	3,936	3,936	3,936	3,936	3,936	3,936
R^2			0.86	0.86	0.86	0.86	0.87	0.85	0.83
R^2 Adj.			0.84	0.84	0.84	0.84	0.85	0.83	0.81

Sources: Author's estimates, WTO, CTO, Country authorities. Significance: ***=0.01; **=0.05; *=0.1.

Notes: Great circle distance nautical miles, "comlan" and "comcou" indicate common language and country with visitors, "prgf" captures poverty, "power" captures market concentration, "oecdair" and "localair" measure international OECD and Caribbean air carriers, respectively. Clusters given by (1) the U.S., (2) similar N. Europeans, and (3) culturally different S. Europe. Least squares estimation with Huber-White robust standard errors, country-year dummies not presented.

Table 6. Cuba: Estimates of Bilateral Tourist Arrivals

	Observed	Baseline	+ Market Power	+ Restric.
Australia	4	1	1	1
Austria	18	6	6	6
Belgium	23	5	5	5
Canada	508	110	110	110
Denmark	7	2	2	2
Finland	4	1	1	1
France	132	27	27	27
Germany	151	50	50	50
Greece	8	2	2	2
Ireland	6	1	1	1
Italy	178	59	59	59
Japan	6	2	2	2
Netherlands	31	7	7	7
New Zealand	1	0	0	0
Norway	6	1	1	1
Portugal	27	6	6	6
Spain	137	28	28	28
Sweden	6	1	1	1
Switzerland	24	8	8	8
UK	141	30	30	30
USA	67	3,112	3,056	3,400
Total	**1,485**	**3,458**	**3,401**	**3,745**

Source: Author's estimates; WTO; CTO; Country tourism offices.

Notes: The table shows the average fitted value of the Gravity estimates for Cuba's arrivals for the years 2003–2004, and compares with the observed amounts for that year from the selected OECD countries. Non-U.S. tourists are assumed redistributed out of Cuba on the basis of existing shares in the wider Caribbean. Rounding error drives differences in totals with Table 6.

Table 7. The Impact on the Caribbean of Opening U.S. Tourism to Cuba

								Model 1					
								Scenario A		*Scenario B*		*2/3 A & 1/3 B*	
	US	N Eur.	S Eur.	Other	Non-US	Net	Current	Total	Percent	Total	Percent	Total	Percent
Anguilla	-12	1	0	1	2	-11	40	41	4.0	29	-27.4	33	-17.0
Antiguaandbarbuda	-25	21	0	3	25	0	178	203	14.0	177	-0.3	186	4.5
Aruba	-186	14	0	2	17	-169	570	586	2.9	401	-29.7	463	-18.8
Bahamas	-499	25	4	7	36	-463	1,490	1,526	2.4	1,027	-31.1	1,193	-19.9
Barbados	-48	58	1	5	64	16	419	483	15.3	435	3.7	451	7.6
Belize	-49	5	1	4	10	-39	172	182	5.8	133	-22.8	149	-13.3
Bermuda	-76	10	0	1	11	-65	254	266	4.4	190	-25.5	215	-15.5
Bonaire	-10	5	0	1	7	-3	55	62	12.1	52	-5.5	55	0.4
Britishvirginislands	-71	7	2	4	14	-57	246	260	5.5	189	-23.3	212	-13.7
Cancun	-614	63	9	21	93	-521	2,045	2,139	4.6	1,524	-25.5	1,729	-15.5
Caymanislands	-82	6	0	1	7	-75	251	258	2.8	176	-29.9	203	-19.0
Costa_rica	-214	26	13	24	63	-151	833	896	7.6	682	-18.1	753	-9.6
Cuba	**3,112**	**154**	**64**	**124**	**342**	**342**	**1,485**	**3,454**	**132.6**	**3,454**	**132.6**	**3,454**	**132.6**
Curacao	-16	18	1	2	20	5	133	153	15.2	138	3.5	143	7.4
Dominica	-6	2	0	0	2	-4	28	30	8.7	24	-13.7	26	-6.2
Dominican_republic	-318	144	117	137	398	80	2,532	2,930	15.7	2,612	3.1	2,718	7.3
Grenada	-12	8	0	2	10	-2	78	88	13.3	76	-2.4	80	2.8
Guadeloupe	-2	0	17	3	20	18	104	124	19.6	122	17.6	123	18.3
Jamaica	-368	57	3	17	77	-291	1,317	1,394	5.9	1,026	-22.1	1,149	-12.8
Martinique	-1	1	73	3	77	76	390	467	19.8	466	19.5	466	19.6
Montserrat	-1	1	0	0	1	0	5	5	13.3	4	-1.1	5	3.7
Panama	-50	5	3	5	13	-37	189	202	6.9	151	-19.8	168	-10.9
Puerto_rico	0	9	2	2	13	13	3,030	3,044	0.4	3,044	0.4	3,044	0.4
Saba	-2	1	0	0	1	0	9	11	12.4	9	-4.1	10	1.4
Saint_kitts	-16	3	0	0	3	-13	58	61	5.7	45	-21.9	50	-12.7
Saint_lucia	-38	20	1	2	23	-15	209	232	11.2	194	-7.2	207	-1.1
Saint_vincent	-9	4	0	1	5	-4	46	51	11.0	42	-8.2	45	-1.8
St_eustatius	-1	1	0	0	1	0	7	8	13.8	7	0.2	7	4.7
St_maarten	-89	10	12	2	23	-66	345	368	6.6	279	-19.1	309	-10.5
Trinidad	-56	25	1	4	29	-27	278	307	10.4	251	-9.7	270	-3.0
Turksandcaicos	-49	5	0	1	6	-43	158	164	3.9	115	-27.0	132	-16.7
USvirginislands	-191	3	0	0.76	4	-188	528	532	0.7	341	-35.5	404	-23.4
Total	0	715	327	376		-1,695	17,482	20,527	17.4	17,415	-0.4	18,452	5.6

Source: Author's estimates,

Notes: At one extreme, US tourists to Cuba are assumed new to the region, and all countries redistribute existing non-US tourists in Cuba to other destinations ba
At the other extreme, all US tourists redirect to Cuba from other destinations, and these destinations lose US tourists based on existing shares of total US arrivals
Model 1, the first estimation assuming a free trade regime and scale effects for countries projected receiving 40 percent European arrivals. Model 2, includes Cul
market power, and scale effects for countries projected receiving 40 percent European arrivals. Model 3, fits historical tightening/loosening onto model 2.

Table 8. Alternative Estimates of U.S.-Cuba Unrestricted Tourism in the Caribbean

	Model 2								Model 3							
	Scenario B								*Scenario B*							
	US	N Europe	S Europe	Other	Net	Current	Total	Percent	US	N Europe	S Europe	Other	Net	Current	Total	Percent
Anguilla	-12	1	0	1	-11	40	29	-26.9	-14	1	0	1	-12	40	28	-30.3
Antiguaandbarbuda	-25	21	0	3	0	178	178	0.0	-28	21	0	3	-3	178	175	-1.6
Aruba	-182	14	0	2	-166	570	404	-29.1	-203	14	0	2	-186	570	384	-32.7
Bahamas	-490	25	4	7	-454	1,490	1,036	-30.5	-545	25	4	7	-509	1,490	981	-34.2
Barbados	-48	58	1	5	16	419	436	3.9	-53	58	1	5	11	419	431	2.6
Belize	-48	5	1	4	-38	172	134	-22.3	-54	5	1	4	-44	172	128	-25.4
Bermuda	-75	10	0	1	-64	254	191	-25.0	-83	10	0	1	-72	254	182	-28.3
Bonaire	-10	5	0	1	-3	55	52	-5.2	-11	5	0	1	-4	55	51	-7.1
Britishvirginislands	-70	7	2	4	-56	246	190	-22.7	-77	7	2	4	-64	246	182	-25.9
Cancun	-603	63	9	21	-510	2,045	1,536	-24.9	-671	63	9	21	-578	2,045	1,468	-28.2
Caymanislands	-80	6	0	1	-73	251	177	-29.3	-90	6	0	1	-82	251	168	-32.9
Costa_rica	-210	26	13	24	-147	833	686	-17.7	-234	26	13	24	-171	833	662	-20.5
Cuba	**3,056**	**154**	**64**	**124**	**342**	**1,485**	**3,398**	**128.8**	**3,400**	**154**	**64**	**124**	**342**	**1,485**	**3,742**	**152.0**
Curacao	-15	18	1	2	5	133	138	3.7	-17	18	1	2	3	133	136	2.4
Dominica	-6	2	0	0	-4	28	24	-13.3	-7	2	0	0	-4	28	23	-15.7
Dominican_republic	-313	144	117	137	85	2,532	2,618	3.4	-348	144	117	137	50	2,532	2,583	2.0
Grenada	-12	8	0	2	-2	78	76	-2.1	-13	8	0	2	-3	78	75	-3.9
Guadeloupe	-2	0	17	3	18	104	122	17.7	-2	0	17	3	18	104	122	17.5
Jamaica	-362	57	3	17	-284	1,317	1,033	-21.6	-402	57	3	17	-325	1,317	992	-24.7
Martinique	-1	1	73	3	76	390	466	19.5	-1	1	73	3	76	390	466	19.5
Montserrat	-1	1	0	0	0	5	4	-0.8	-1	1	0	0	0	5	4	-2.4
Panama	-49	5	3	5	-36	189	152	-19.3	-55	5	3	5	-42	189	147	-22.3
Puerto_rico	0	9	2	2	13	3,030	3,044	0.4	0	9	2	2	13	3,030	3,044	0.4
Saba	-2	1	0	0	0	9	9	-3.8	-2	1	0	0	-1	9	9	-5.6
Saint_kitts	-16	3	0	0	-12	58	45	-21.4	-17	3	0	0	-14	58	44	-24.5
Saint_lucia	-38	20	1	2	-14	209	195	-6.9	-42	20	1	2	-19	209	190	-8.9
Saint_vincent	-9	4	0	1	-4	46	42	-7.9	-10	4	0	1	-5	46	41	-10.0
St_eustatius	-1	1	0	0	0	7	7	0.4	-1	1	0	0	0	7	7	-1.1
St_maarten	-87	10	12	2	-64	345	281	-18.6	-97	10	12	2	-74	345	271	-21.4
Trinidad	-55	25	1	4	-26	278	252	-9.3	-61	25	1	4	-32	278	246	-11.5
Turksandcaicos	-48	5	0	1	-42	158	116	-26.4	-53	5	0	1	-47	158	111	-29.9
USvirginislands	-188	3	0	1	-184	528	344	-34.9	-209	3	0	1	-205	528	323	-38.9
Total	0	715	327	376	-1,638	17,482	17,415	-0.4	0	715	327	376	-1,982	17,482	17,415	-0.4

Source: Author's estimates,

Notes: At one extreme, US tourists to Cuba are assumed new to the region, and all countries redistribute existing non-US tourists in Cuba to other destinations based on existing shares. At the other extreme, all US tourists redirect to Cuba from other destinations, and these destinations lose US tourists based on existing shares of total US arrivals to the Caribbean. Model 1, the first estimation assuming a free trade regime and scale effects for countries projected receiving 40 percent European arrivals. Model 2, includes Cuba at full capacity, market power, and scale effects for countries projected receiving 40 percent European arrivals. Model 3, fits historical tightening/loosening onto model 2.

Table 9. Model 1: Projected Arrivals from Gravity Estimates

	Predicted					Observed					Difference					
	USA	N Eur	S Eur	Other	Total	USA	N Eur	S Eur	Other	Total	USA	N Eur	S Eur	Other	Total	Percent
Anguilla	29	24	0	1	55	33	4	0	2	40	-4	20	0	-1	15	38.1
Antiguaandbarbuda	115	24	1	3	144	67	100	1	9	178	48	-76	0	-6	-34	-19.1
Aruba	77	45	2	10	133	496	65	3	6	570	-419	-21	-1	4	-436	-76.6
Bahamas	1,376	177	12	19	1,584	1,333	117	20	20	1,490	43	60	-8	-2	94	6.3
Barbados	164	42	5	7	218	129	271	4	15	419	34	-229	1	-7	-202	-48.1
Belize	400	64	4	9	476	131	25	5	11	172	268	39	0	-3	304	176.6
Bermuda	121	58	1	3	183	203	48	1	3	254	-83	11	0	0	-71	-28.0
Bonaire	11	10	2	2	25	26	24	1	4	55	-15	-14	0	-1	-30	-54.7
Britishvirginislands	274	130	4	6	415	189	34	9	13	246	85	96	-5	-7	169	68.6
Cancun	1,260	236	45	50	1,591	1,641	294	48	63	2,045	-381	-58	-3	-13	-454	-22.2
Caymanislands	91	50	2	3	146	219	28	1	2	251	-128	21	1	0	-105	-41.9
Costa_rica	551	121	59	69	799	572	121	68	72	833	-21	-1	-9	-3	-34	-4.0
Cuba	**3,112**	**277**	**108**	**120**	**3,618**	**67**	**715**	**327**	**376**	**1,485**	**3,045**	**-438**	**-219**	**-256**	**2,133**	**143.6**
Curacao	28	17	1	4	49	42	83	3	5	133	-14	-67	-2	-2	-84	-63.3
Dominica	31	7	1	1	40	17	8	3	1	28	15	-1	-2	0	12	42.8
Dominican_republic	1,413	259	124	134	1,931	851	668	597	417	2,532	562	-409	-473	-283	-602	-23.8
Grenada	41	10	1	2	54	33	38	2	5	78	8	-28	0	-4	-24	-30.5
Guadeloupe	6	4	32	4	46	5	2	88	8	104	1	2	-57	-4	-58	-55.9
Jamaica	1,254	201	16	26	1,497	984	265	16	52	1,317	270	-64	0	-27	180	13.7
Martinique	13	7	72	10	101	3	5	373	9	390	10	2	-301	1	-289	-74.0
Montserrat	2	1	0	0	3	2	3	0	0	5	1	-2	0	0	-1	-23.8
Panama	138	29	15	17	199	134	23	17	14	189	4	6	-2	3	10	5.5
Puerto_rico	3,412	17	9	9	3,446	2,971	43	10	6	3,030	440	-26	-2	2	415	13.7
Saba	4	3	0	0	8	4	4	1	0	9	0	-2	0	0	-2	-17.9
Saint_kitts	63	13	0	0	75	43	15	0	0	58	20	-2	0	0	18	30.5
Saint_lucia	69	16	2	3	89	103	94	7	5	209	-34	-78	-6	-3	-120	-57.4
Saint_vincent	58	14	1	2	75	24	18	2	2	46	34	-4	-1	0	29	63.5
St_eustatius	2	1	0	0	3	2	4	0	0	7	-1	-3	0	0	-4	-59.2
St_maarten	159	79	12	8	258	237	45	59	5	345	-77	35	-47	3	-87	-25.1
Trinidad	222	57	6	10	295	149	114	3	12	278	73	-57	3	-2	17	6.1
Turksandcaicos	39	22	1	1	63	130	24	2	2	158	-91	-2	-1	-1	-95	-60.3
USvirginislands	256	17	1	2	277	511	13	1	2	528	-256	4	0	0	-251	-47.6
Total	14,793	2,030	539	534	17,895	11,352	3,316	1,670	1,143	17,482	3,441	-1,286	-1,131	-610	414	2.4

Source: Author's estimates

Notes: Model 1, the first estimation assuming a free trade regime and scale effects for countries projected receiving 40 percent European arrivals.

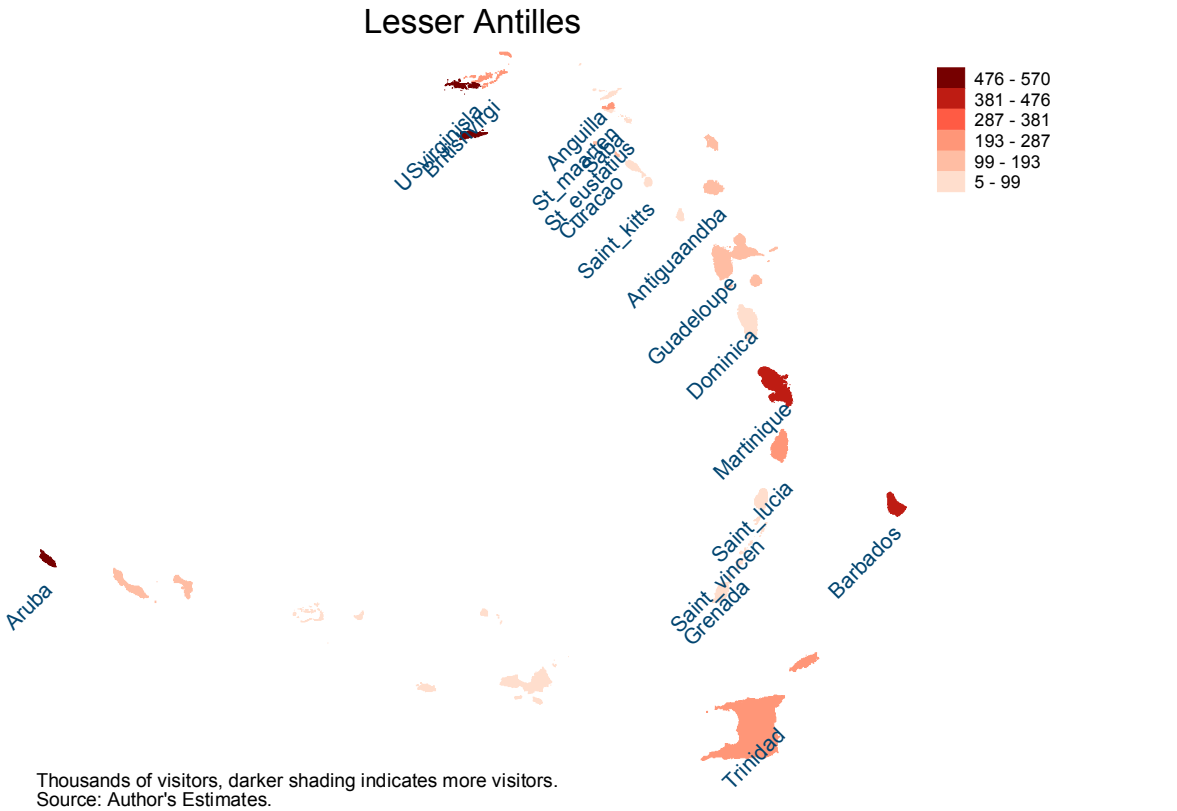
Table 10. Model 3: Long-term Gravity Estimation with Industry Costs

	Predicted					Observed					Difference					
	USA	N Eur	S Eur	Other	Total	USA	N Eur	S Eur	Other	Total	USA	N Eur	S Eur	Other	Total	Percent
Anguilla	19	46	0	2	66	33	4	0	2	40	-14	42	0	0	27	67.7
Antiguaandbarbuda	114	31	1	3	150	67	100	1	9	178	47	-69	0	-6	-28	-15.7
Aruba	78	48	2	10	138	496	65	3	6	570	-418	-18	-1	4	-432	-75.8
Bahamas	1,435	298	12	19	1,764	1,333	117	20	20	1,490	102	181	-8	-1	274	18.4
Barbados	163	54	5	7	229	129	271	4	15	419	33	-217	1	-7	-190	-45.3
Belize	399	78	4	9	490	131	25	5	11	172	268	53	0	-3	318	184.4
Bermuda	128	84	1	3	216	203	48	1	3	254	-75	36	0	0	-38	-15.0
Bonaire	11	19	3	3	37	26	24	1	4	55	-15	-5	2	-1	-18	-33.4
Britishvirginislands	270	194	4	6	475	189	34	9	13	246	81	160	-5	-7	229	93.0
Cancun	1,335	384	56	50	1,826	1,641	294	48	63	2,045	-306	91	8	-13	-220	-10.7
Caymanislands	95	73	2	3	172	219	28	1	2	251	-124	44	1	1	-78	-31.3
Costa_rica	563	123	74	69	830	572	121	68	72	833	-9	2	7	-3	-4	-0.4
Cuba	**3,400**	**290**	**108**	**123**	**3,921**	**67**	**715**	**327**	**376**	**1,485**	**3,333**	**-424**	**-219**	**-254**	**2,436**	**164.0**
Curacao	29	47	2	8	85	42	83	3	5	133	-13	-36	-1	3	-48	-35.8
Dominica	31	9	1	1	41	17	8	3	1	28	14	1	-2	0	13	47.7
Dominican_republic	1,477	378	159	136	2,150	851	668	597	417	2,532	626	-290	-438	-281	-382	-15.1
Grenada	41	13	1	2	57	33	38	2	5	78	8	-25	0	-4	-21	-26.9
Guadeloupe	6	4	31	4	45	5	2	88	8	104	1	2	-58	-4	-59	-56.7
Jamaica	1,278	334	16	26	1,655	984	265	16	52	1,317	294	69	1	-26	338	25.7
Martinique	13	7	69	10	100	3	5	373	9	390	10	2	-304	1	-290	-74.5
Montserrat	2	2	0	0	4	2	3	0	0	5	1	-1	0	0	0	-9.4
Panama	142	30	19	17	208	134	23	17	14	189	8	7	2	3	20	10.5
Puerto_rico	3,349	24	11	9	3,392	2,971	43	10	6	3,030	378	-19	1	2	362	11.9
Saba	4	3	1	1	8	4	4	1	0	9	0	-2	0	0	-1	-12.0
Saint_kitts	62	16	0	0	78	43	15	0	0	58	20	1	0	0	21	35.7
Saint_lucia	67	20	2	3	92	103	94	7	5	209	-35	-73	-6	-3	-117	-55.8
Saint_vincent	56	17	1	2	77	24	18	2	2	46	33	0	-1	0	31	68.0
St_eustatius	2	1	0	0	3	2	4	0	0	7	-1	-3	0	0	-3	-52.3
St_maarten	162	183	45	17	406	237	45	59	5	345	-74	138	-14	12	61	17.7
Trinidad	218	73	6	10	307	149	114	3	12	278	69	-41	3	-2	29	10.5
Turksandcaicos	40	31	1	1	73	130	24	2	2	158	-90	8	-1	-1	-85	-53.5
USvirginislands	256	29	1	3	289	511	13	1	2	528	-255	15	0	0	-239	-45.3
Total	15,247	2,945	639	555	19,387	11,352	3,316	1,670	1,143	17,482	3,895	-371	-1,031	-588	1,905	10.9

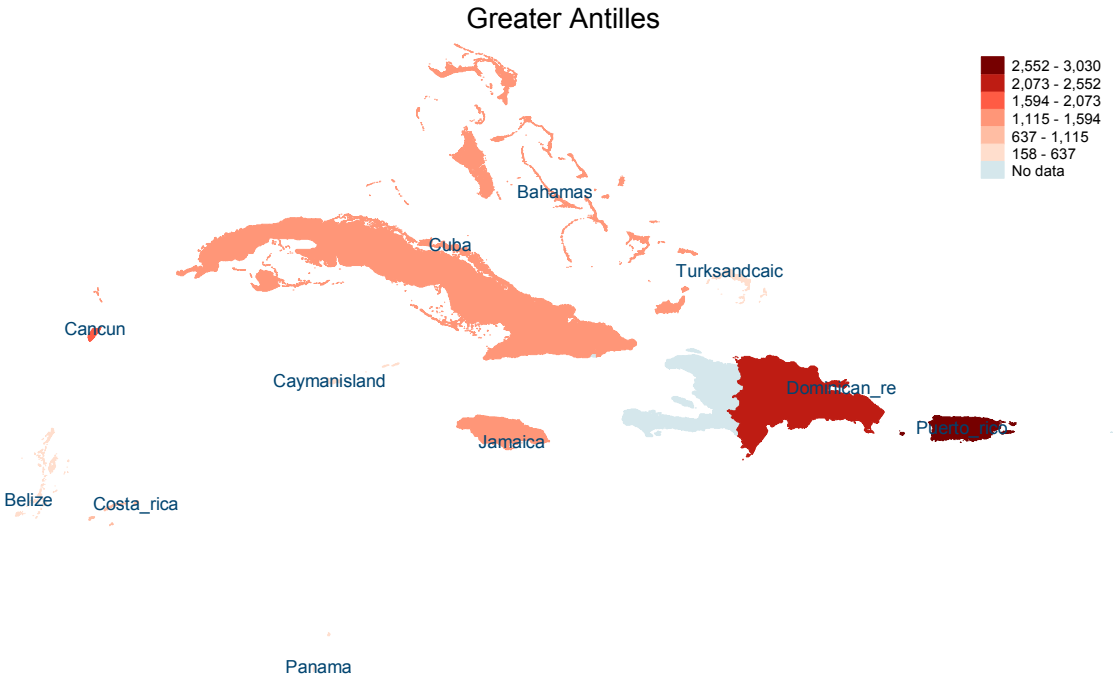
Source: Author's estimates

Notes: Model 3, fits historical tightening/loosening onto model 2.

Figure 1. OECD Tourist Arrivals
(thousands, average of 2003–2004)

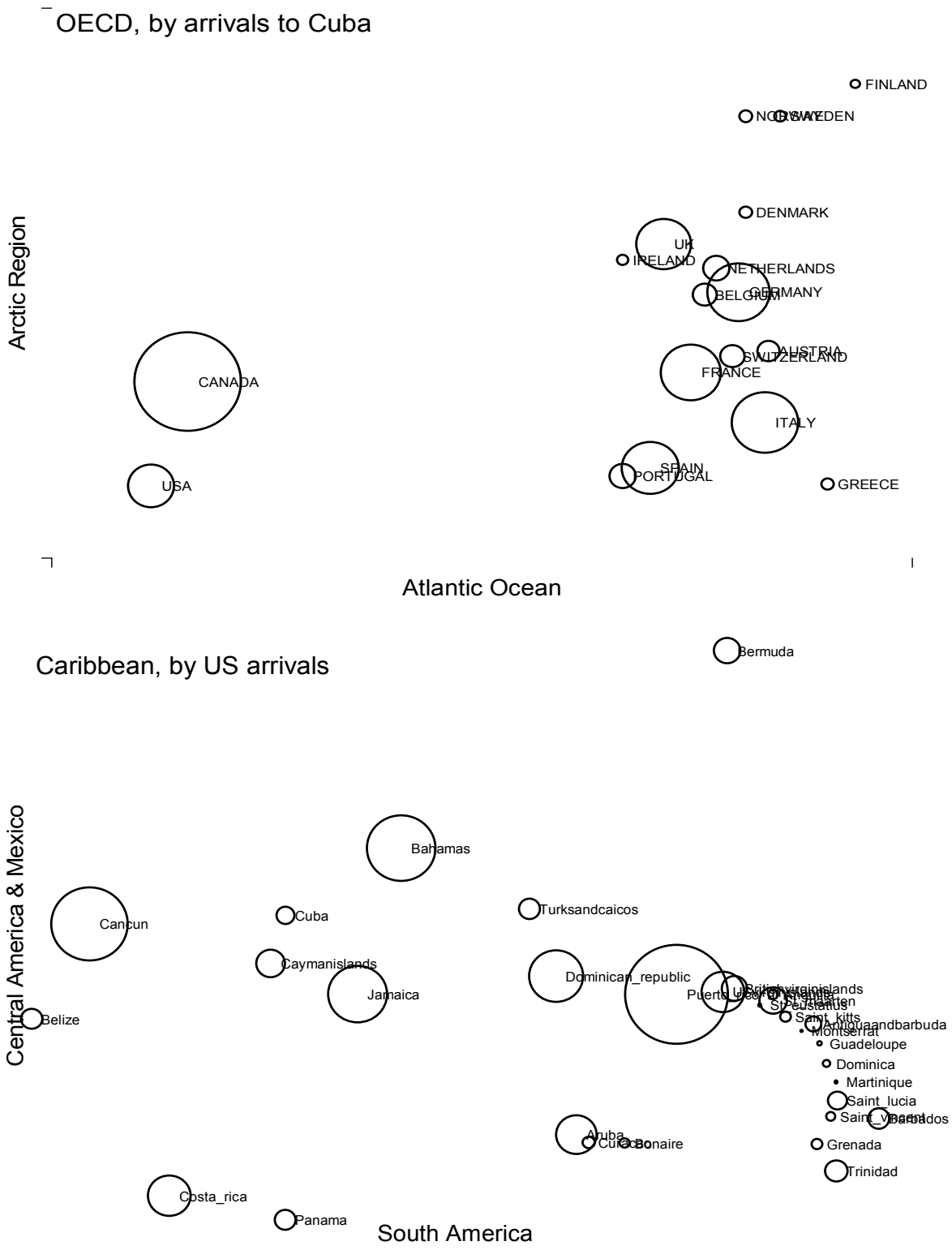


Thousands of visitors, darker shading indicates more visitors.
Source: Author's Estimates.



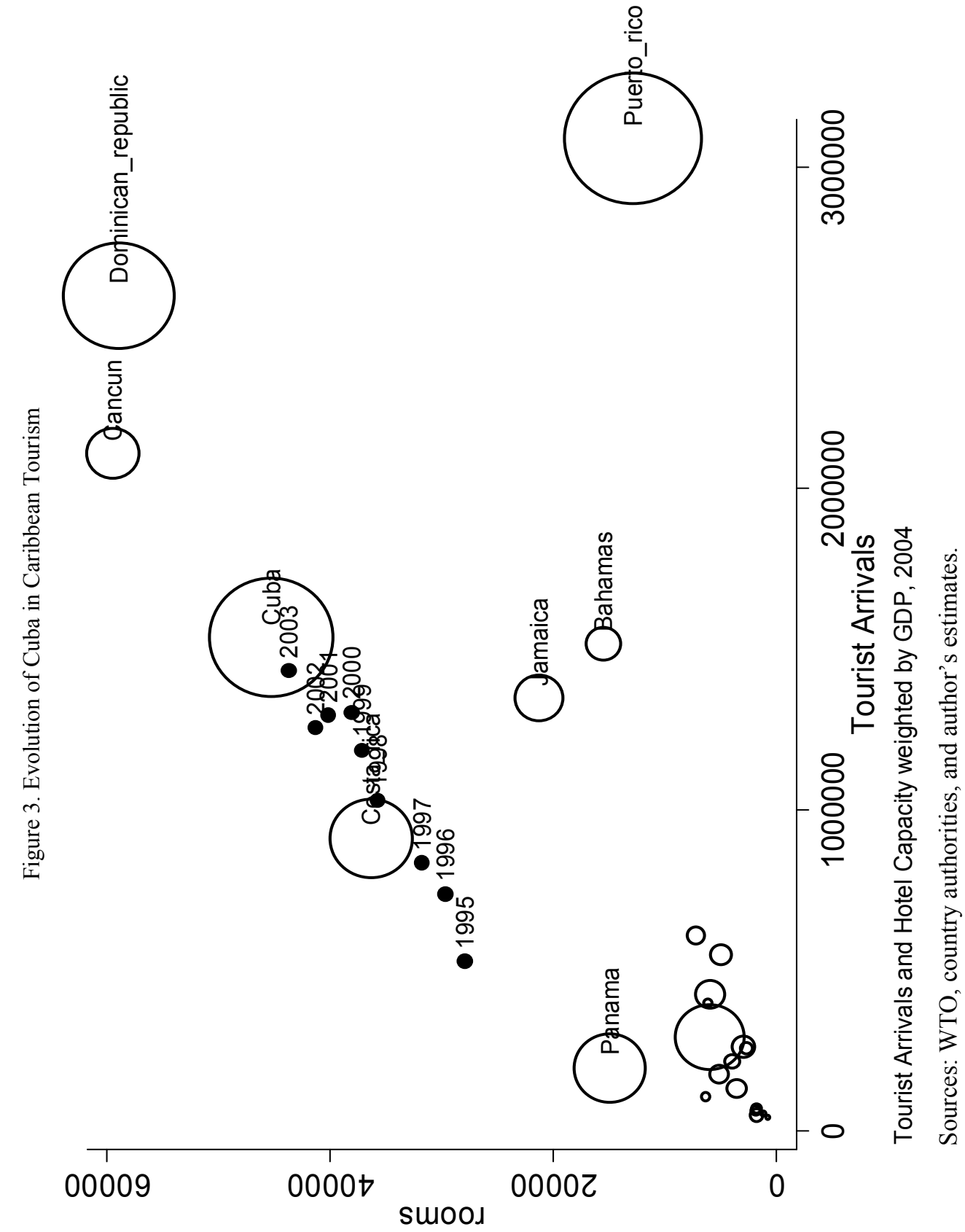
Thousands of visitors, darker shading indicates more visitors.
Source: Author's Estimates.

Figure 2. Cuba-U.S. Tourism Distortions
(OECD bubbles scaled by tourism to Cuba, Caribbean bubbles scaled by U.S. arrivals)



Source: Author's estimates.

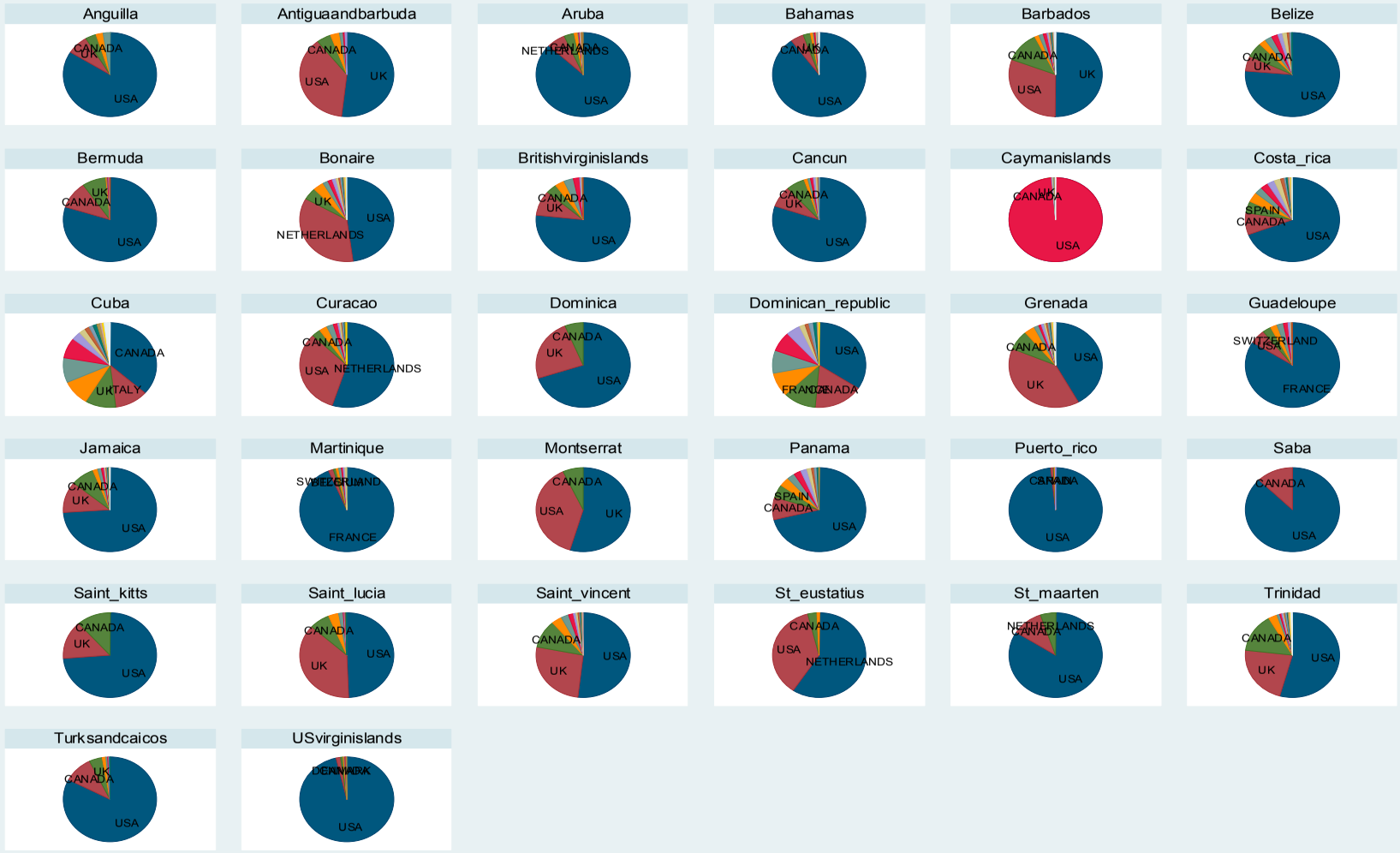
Figure 3. Evolution of Cuba in Caribbean Tourism



Tourist Arrivals and Hotel Capacity weighted by GDP, 2004

Sources: WTO, country authorities, and author's estimates.

Figure 4. Distribution of Tourist within Destinations

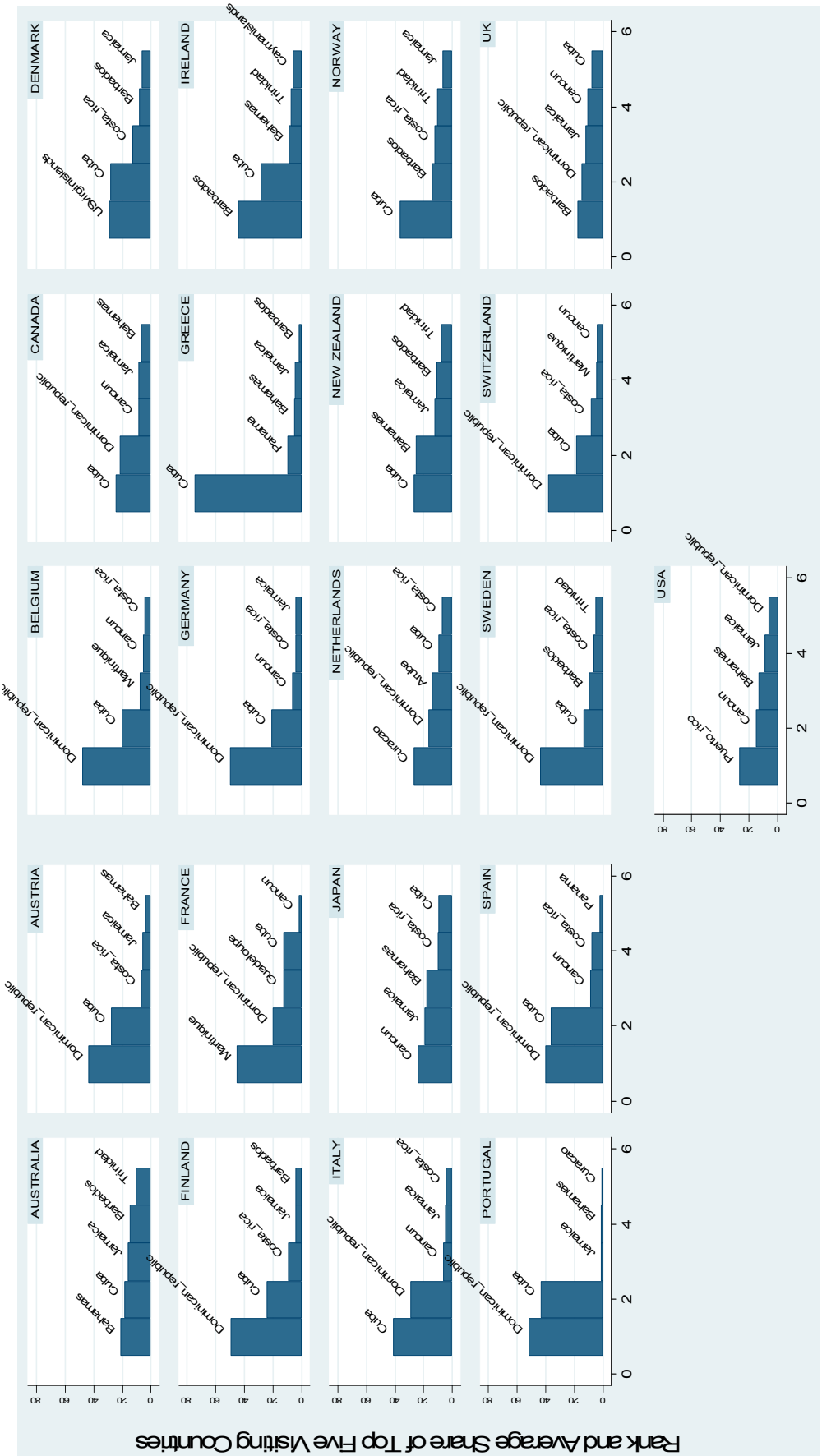


Sources: WTO, country authorities, and author's estimates.

Figure 5. Top Five Clients of Caribbean Destinations, 1995–2004

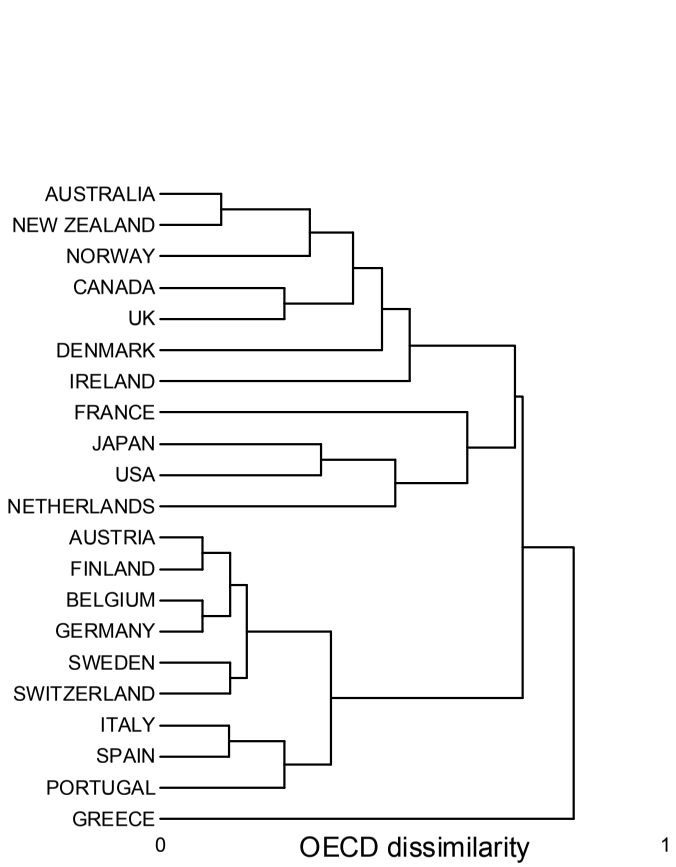
Sources: WTO, country authorities, and author's estimates.

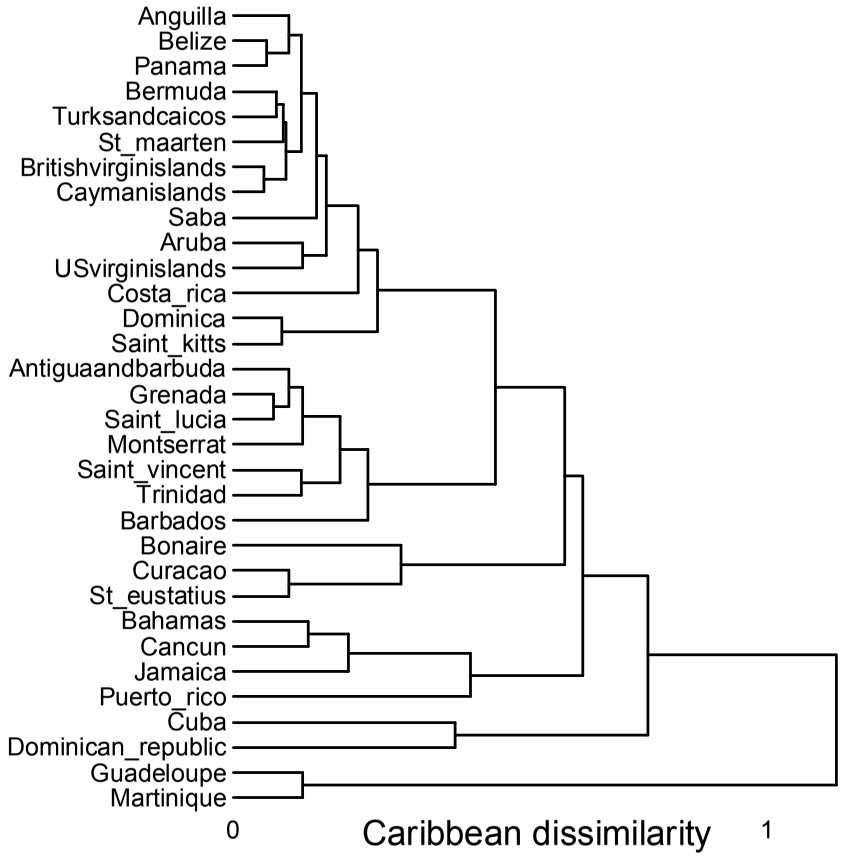
Figure 6. Top Five Destinations of OECD Visitors, 1995–2004



Sources: WTO, country authorities, and author's estimates.

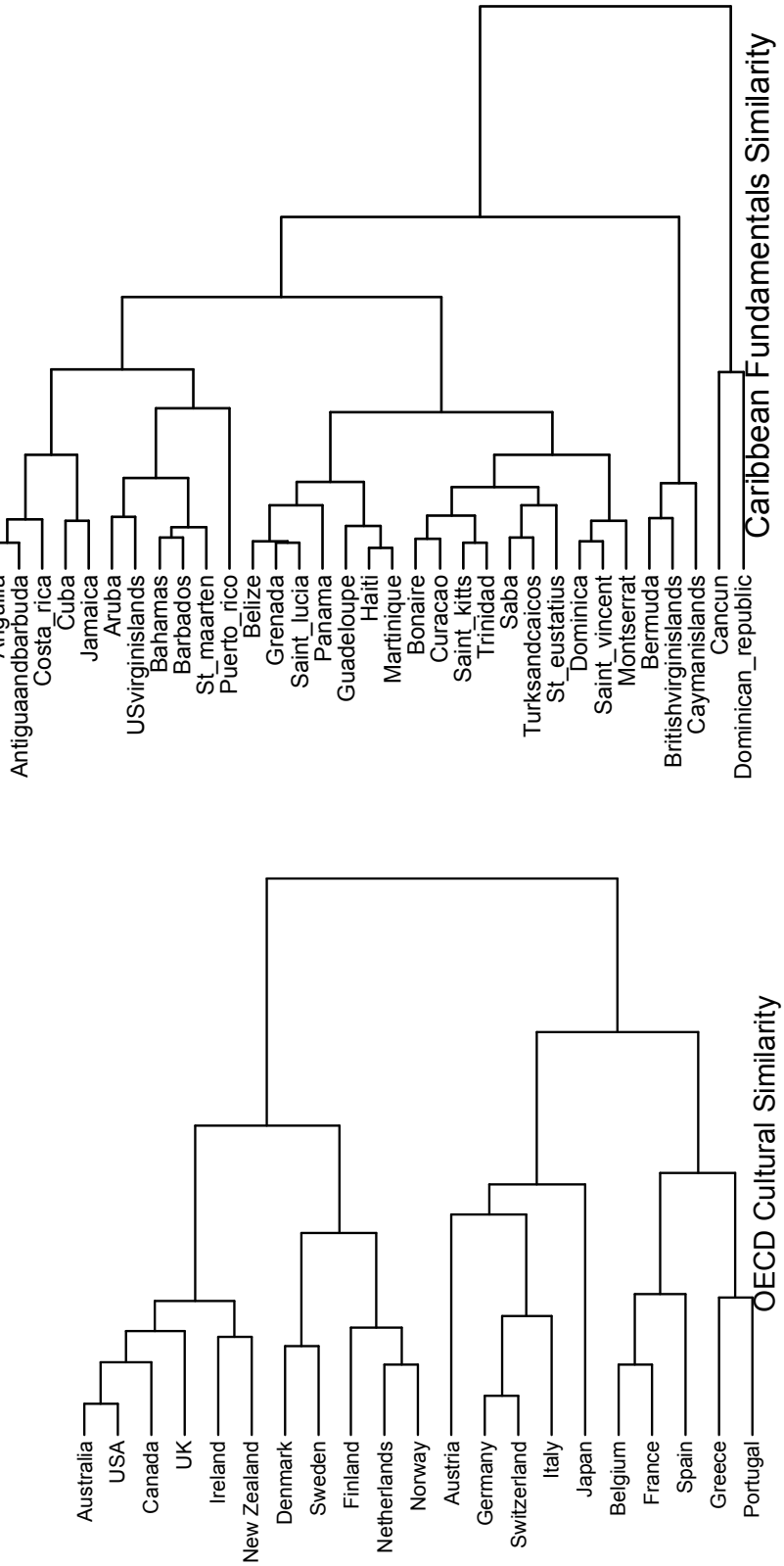
Figure 7. Clustering by Tourism Preferences 1995–2004





Source: Author's estimates.

Figure 8. Clustering by Fundamentals and Culture



Source: Author's estimates.

Figure 9. Cost Comparison Across Caribbean

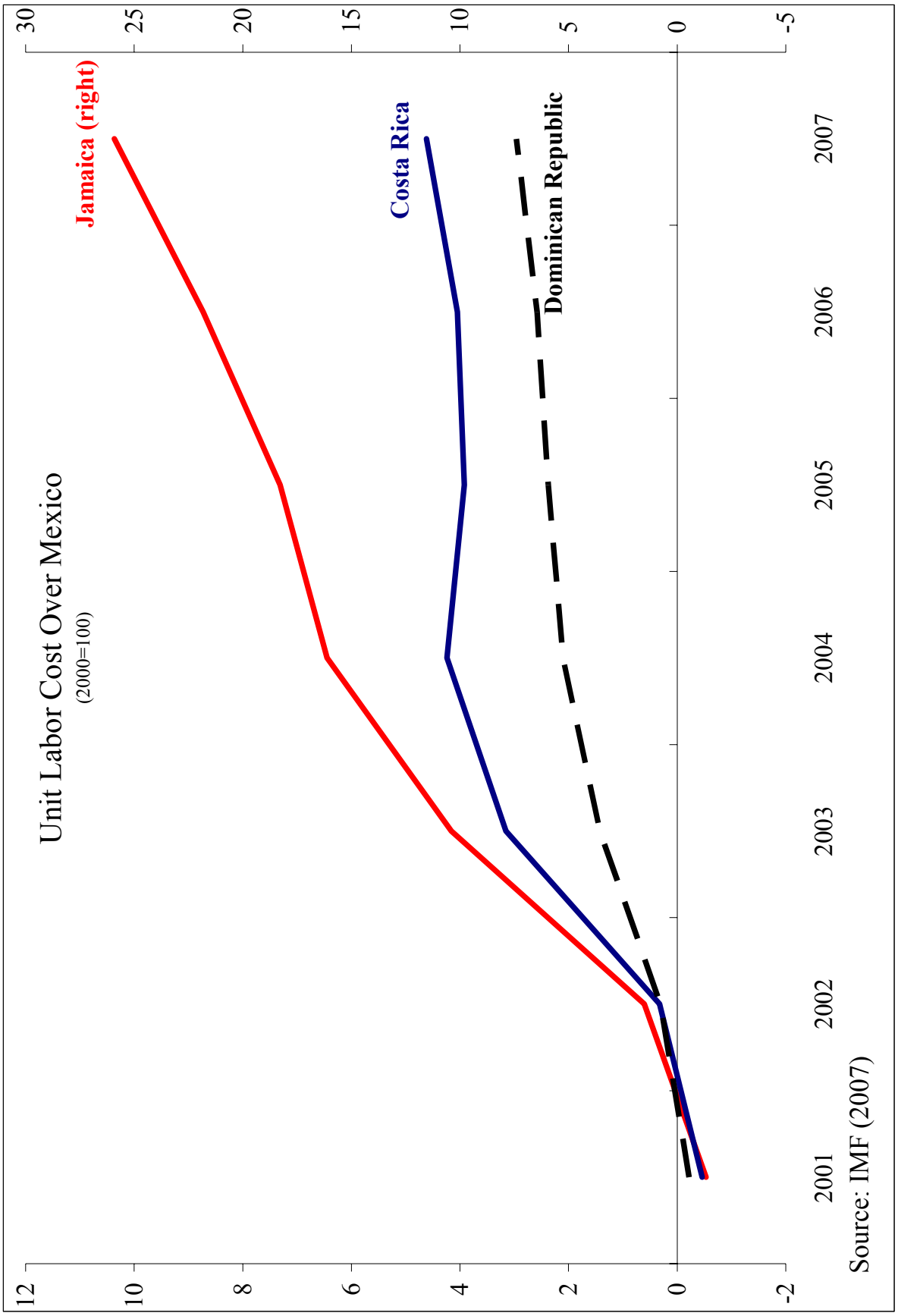
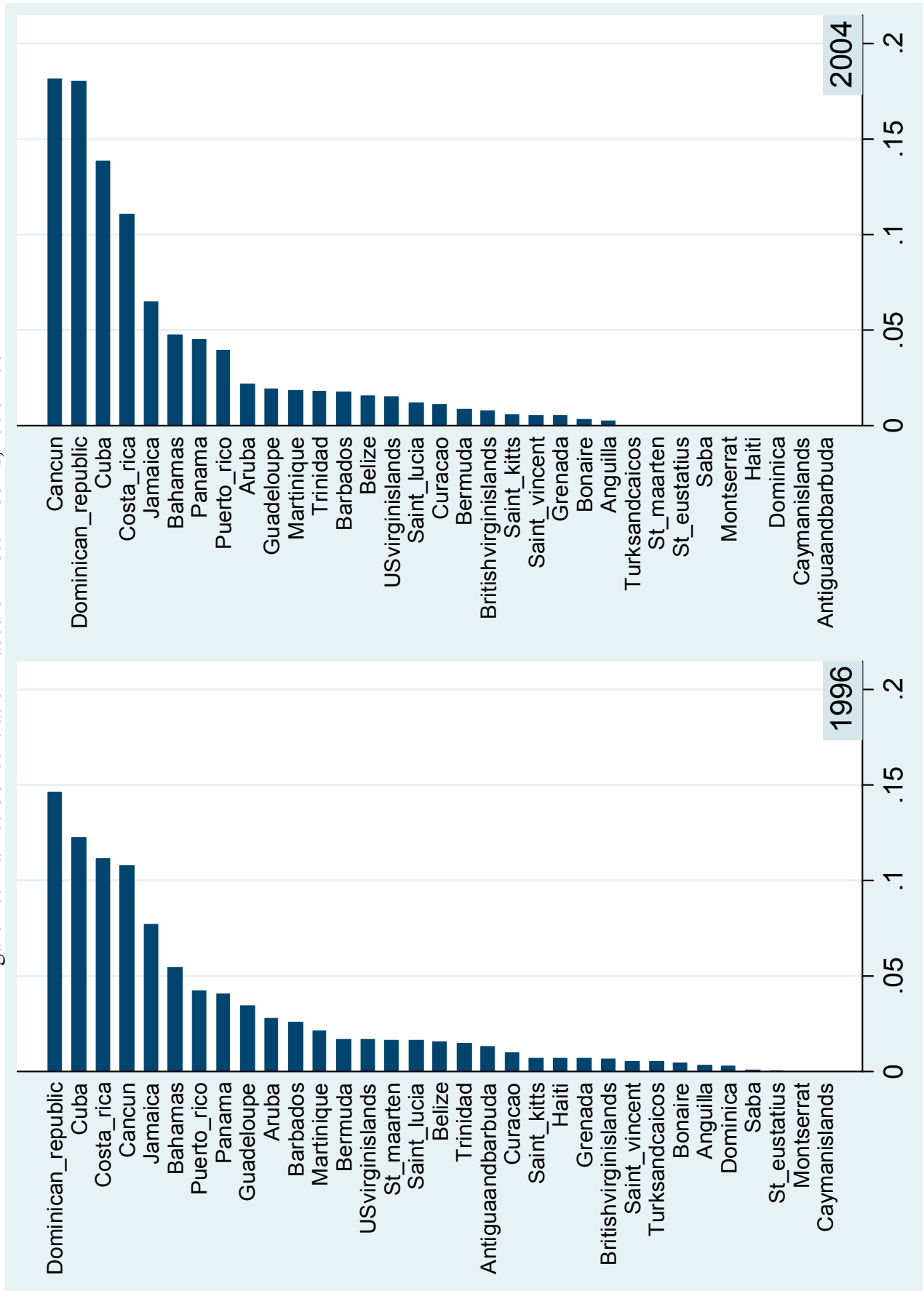
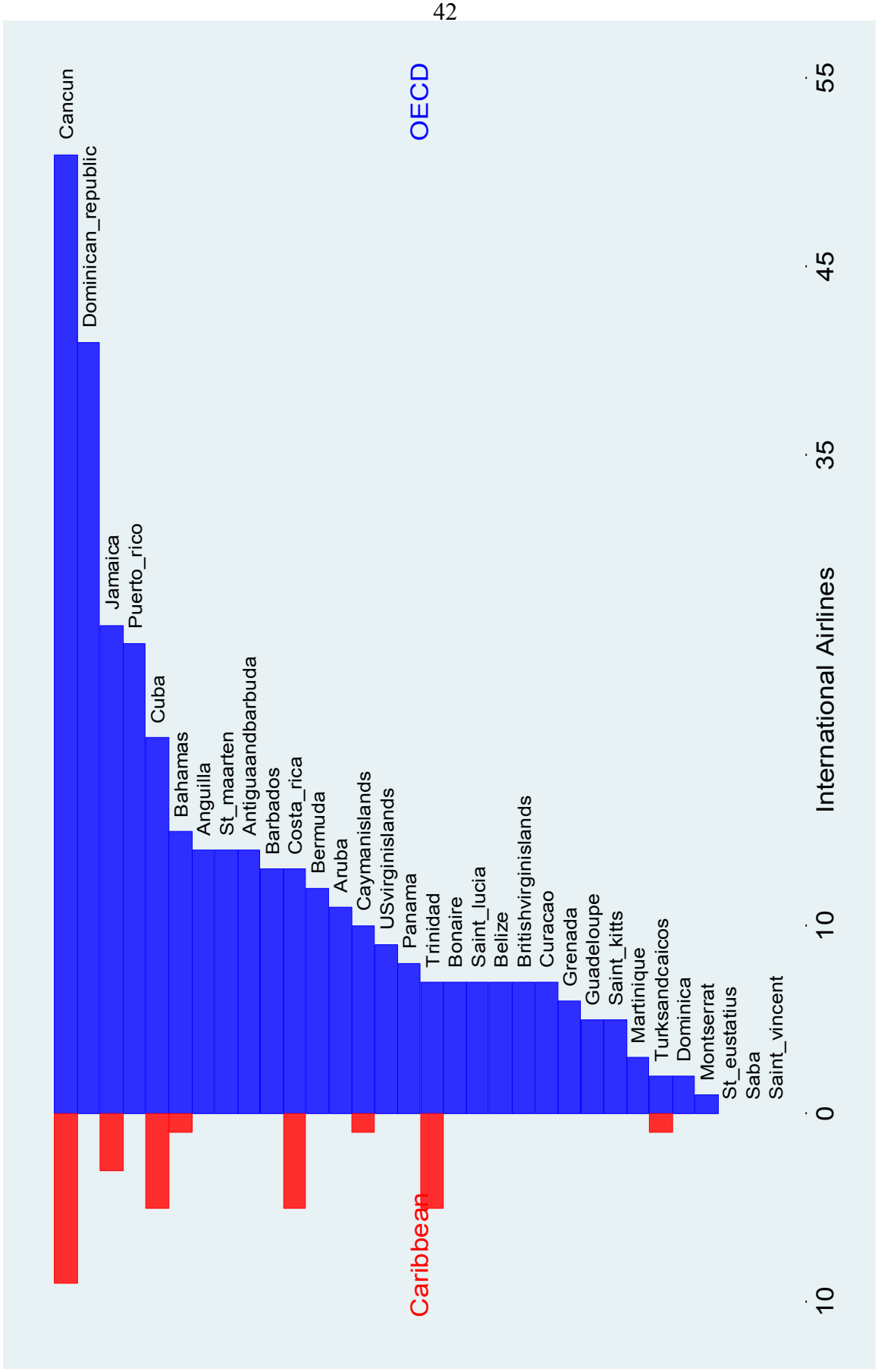


Figure 10. Market Concentration Based on Hotel Rooms, 1996–2004



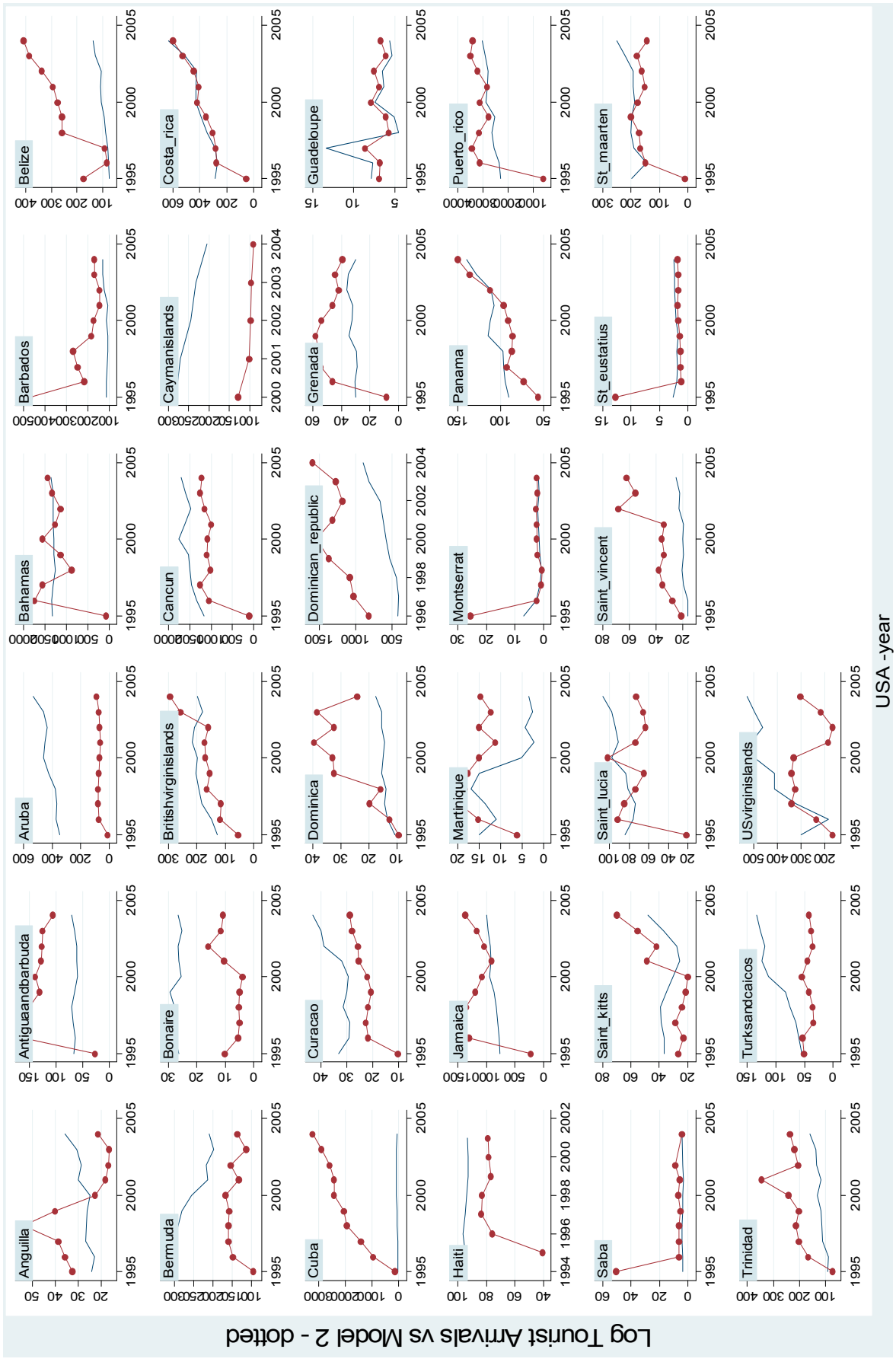
Sources: WTO, country authorities, and author's estimates.

Figure 11. Airlines Owned by OECD and Caribbean Countries



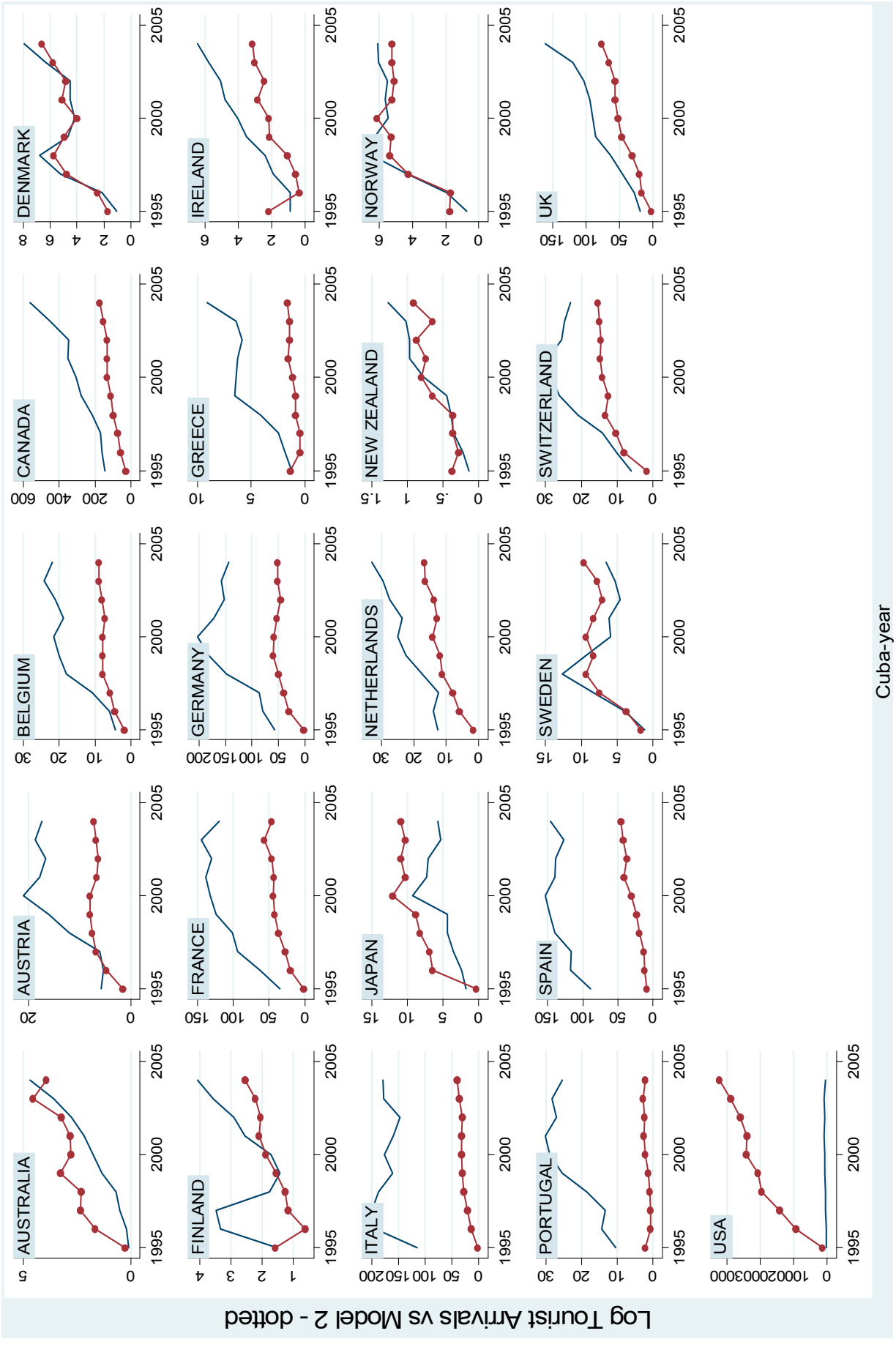
Sources: WTO, country authorities, and author's estimates.

Figure 12. Modeling of Tourist from the U.S.A



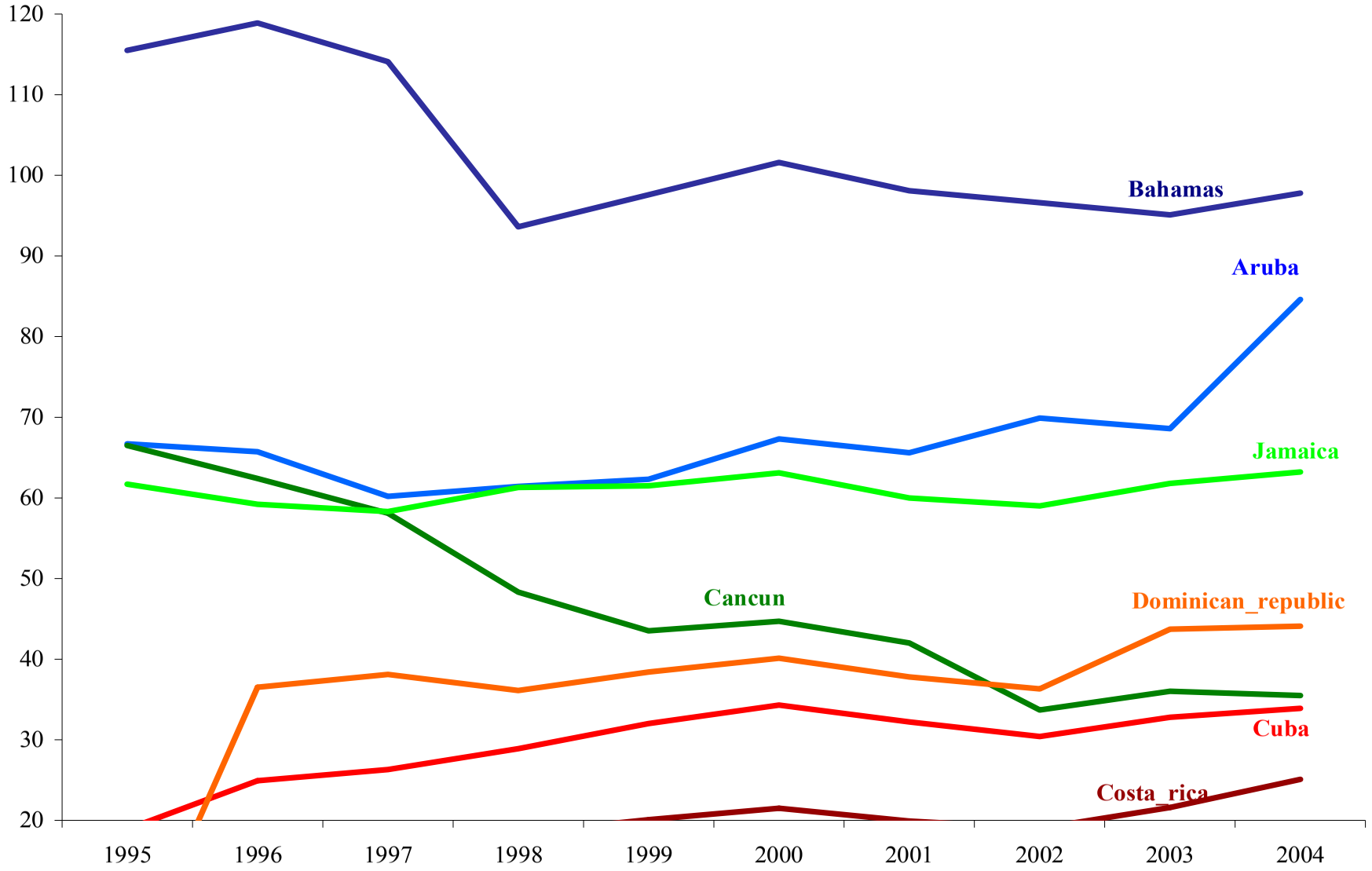
Source: Author's estimates.

Figure 13. Modeling of Tourist Arrivals to Cuba



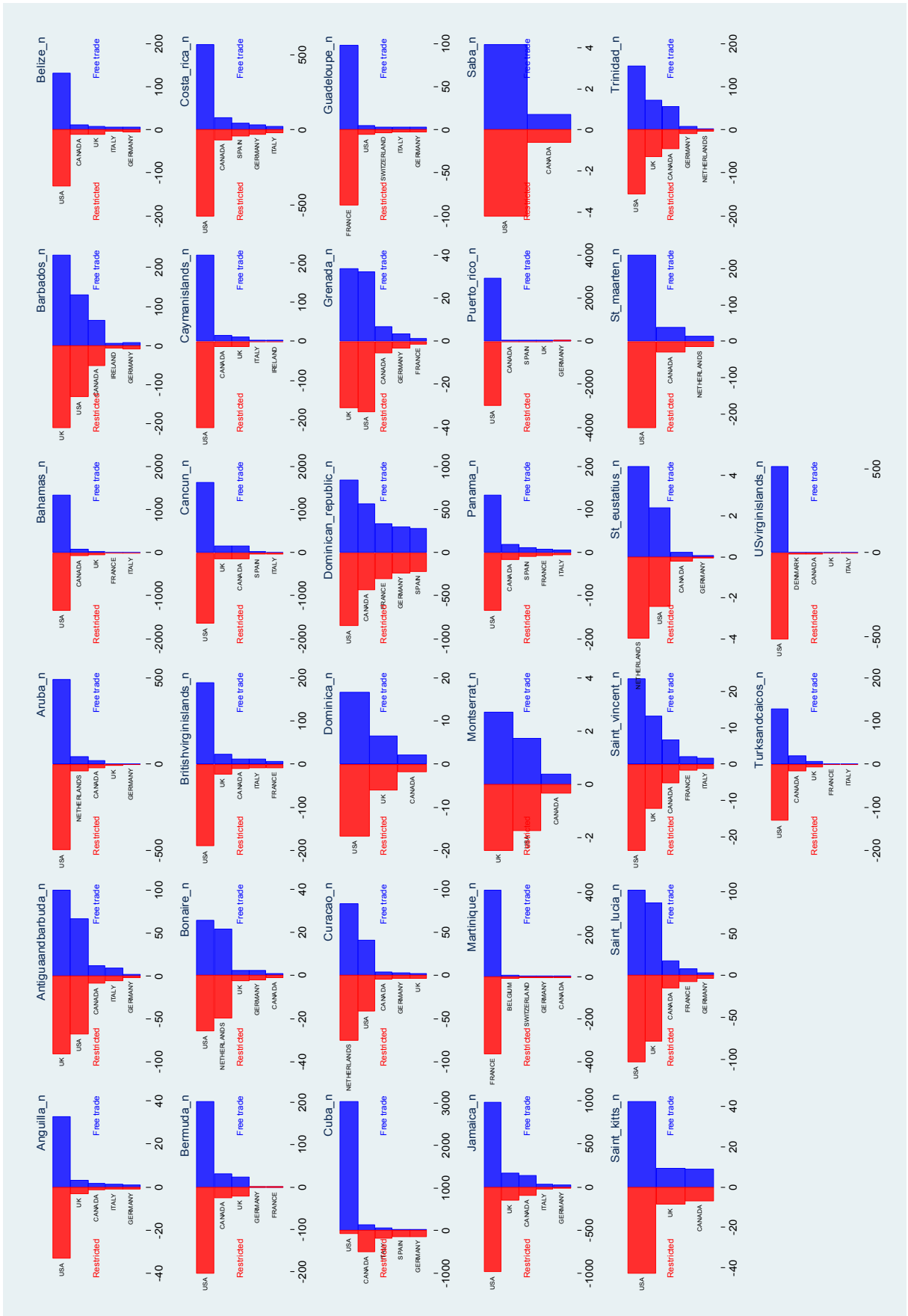
Source: Author's estimates.

Figure 14. Hotel Capacity Utilization
(Rooms Per Visitor)



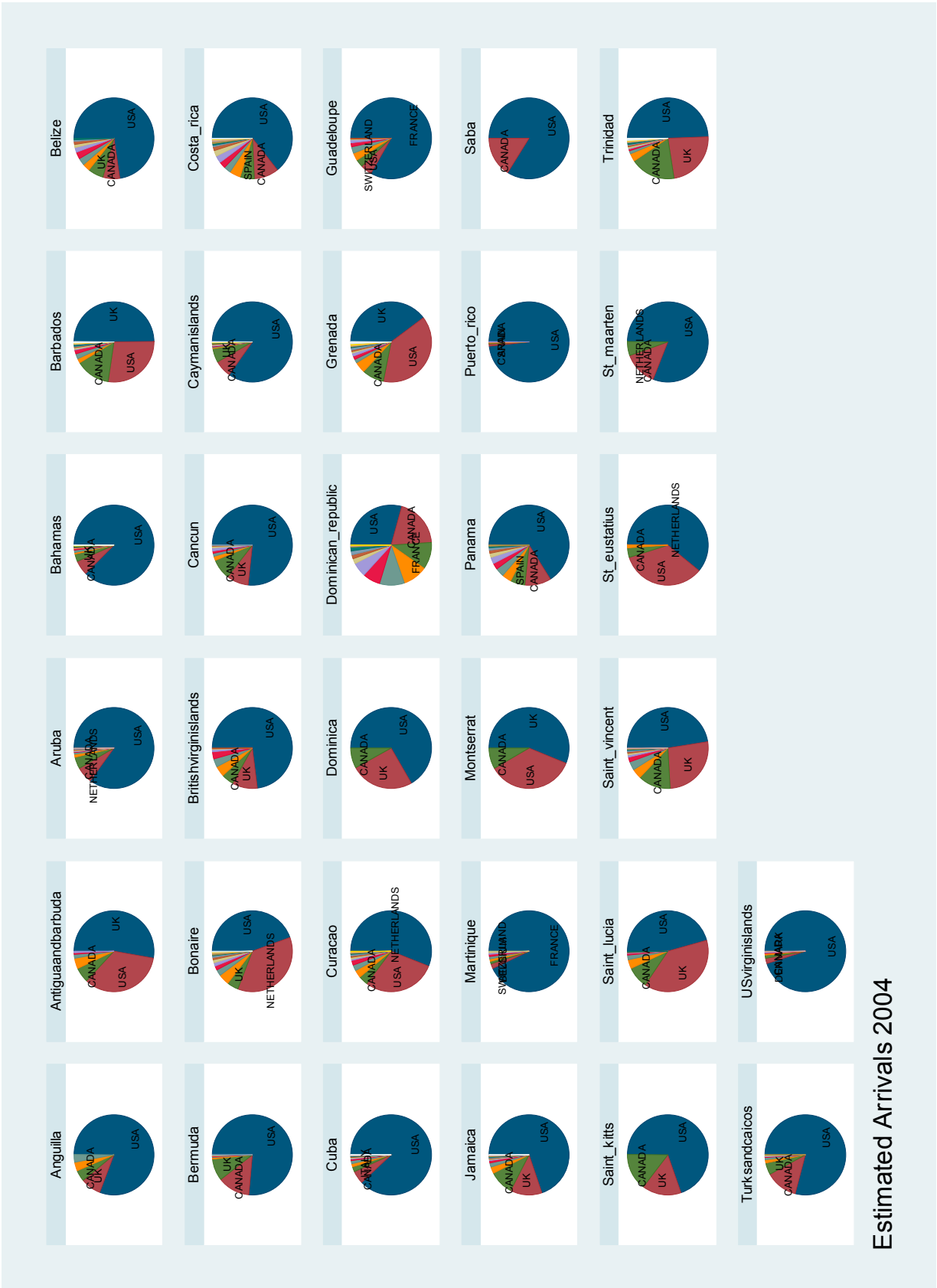
Sources: WTO, country authorities, author's estimates.

Figure 15. Before and After Assuming U.S. Tourists New to Caribbean



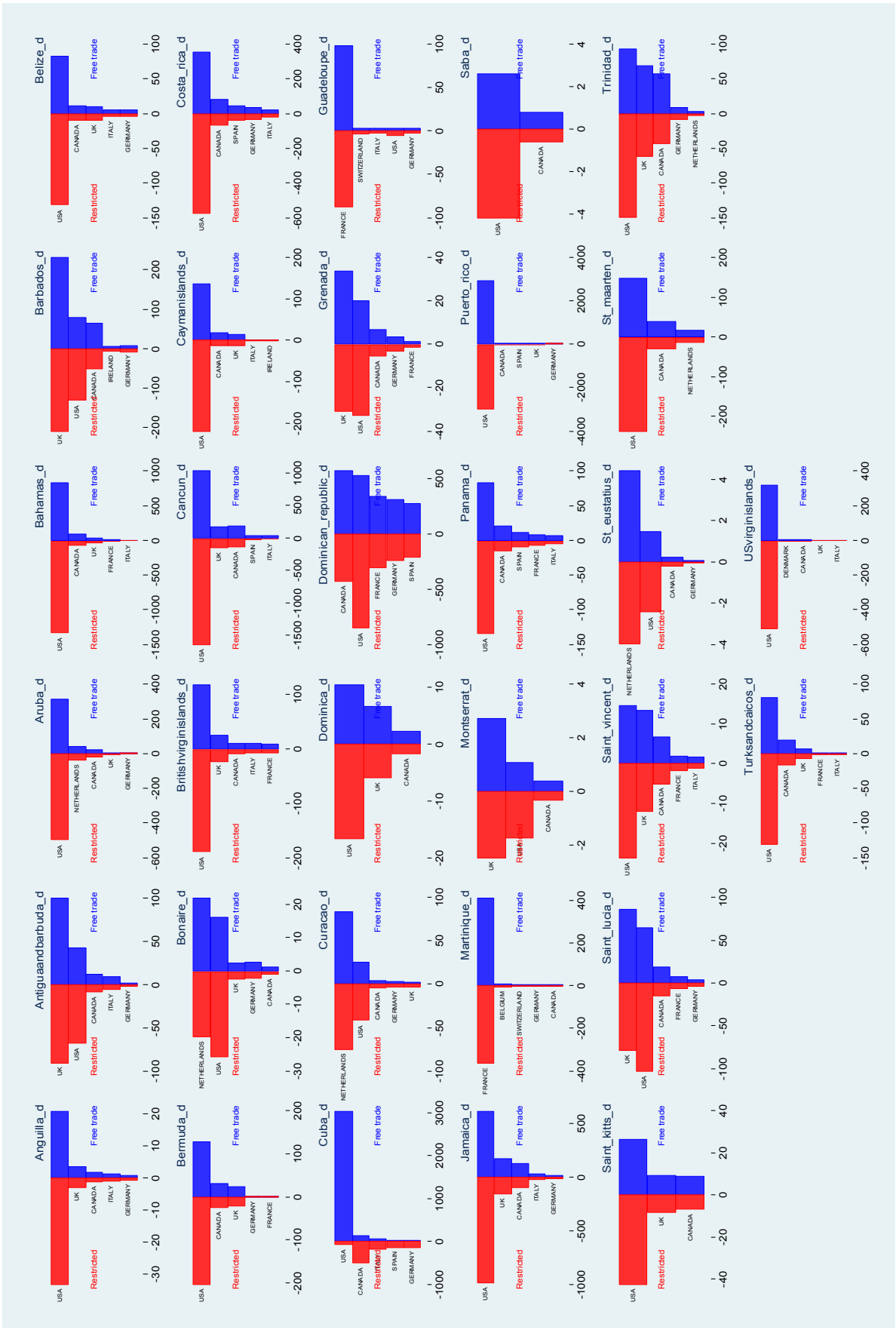
Source: Author's estimates.

Figure 16. Pie Chart of Visitor Distribution Assuming All New U.S. Tourists



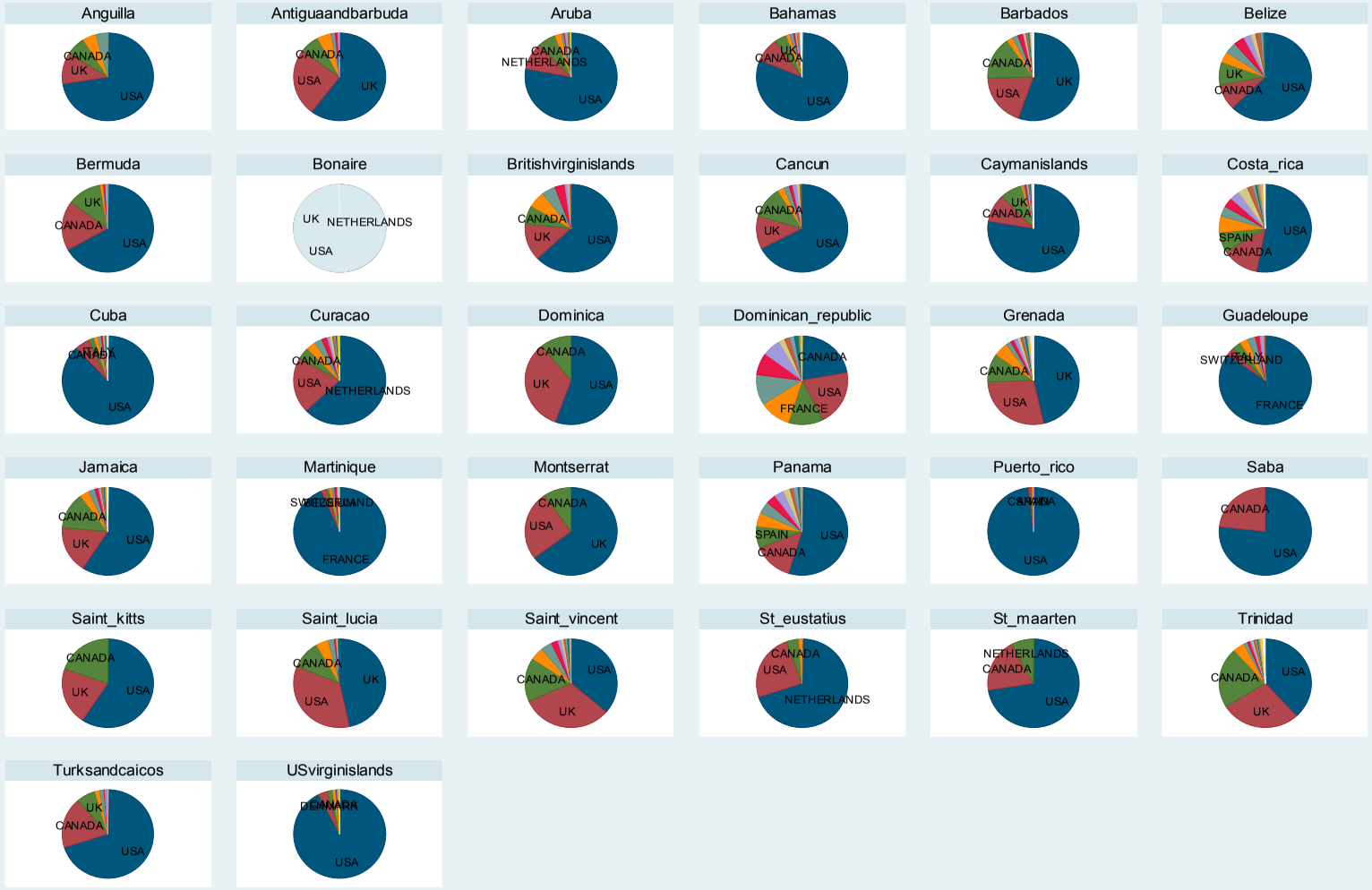
Source: Author's estimates.

Figure 17. Before and After Assuming No New U.S. Tourists



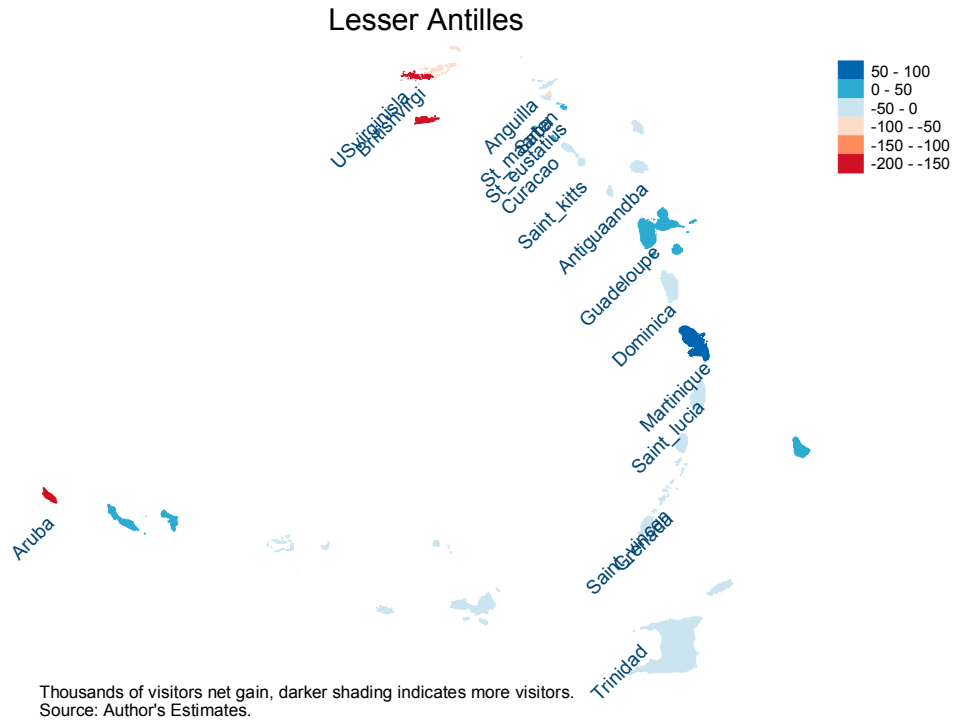
Source: Author's estimates.

Figure 18. Pie Chart of Visitor Distribution Assuming No New U.S. Tourists

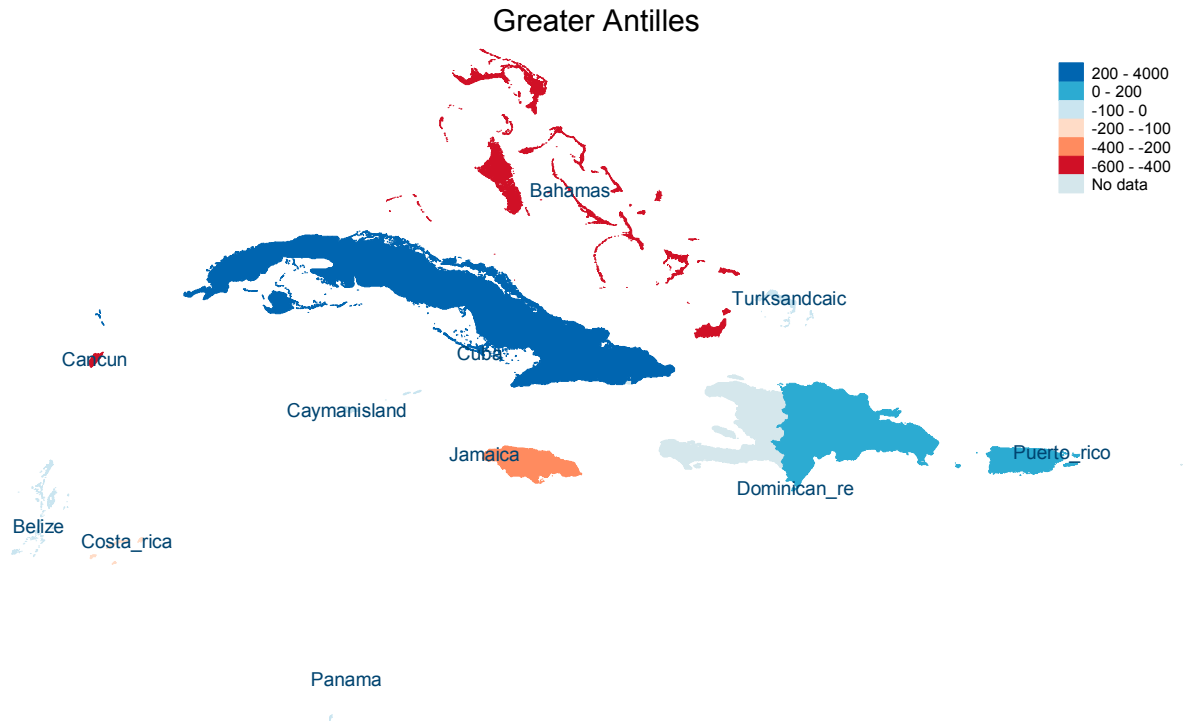


Source: Author's estimates.

Figure 19. Map Assuming U.S. Arrivals Divert from the Rest of the Caribbean

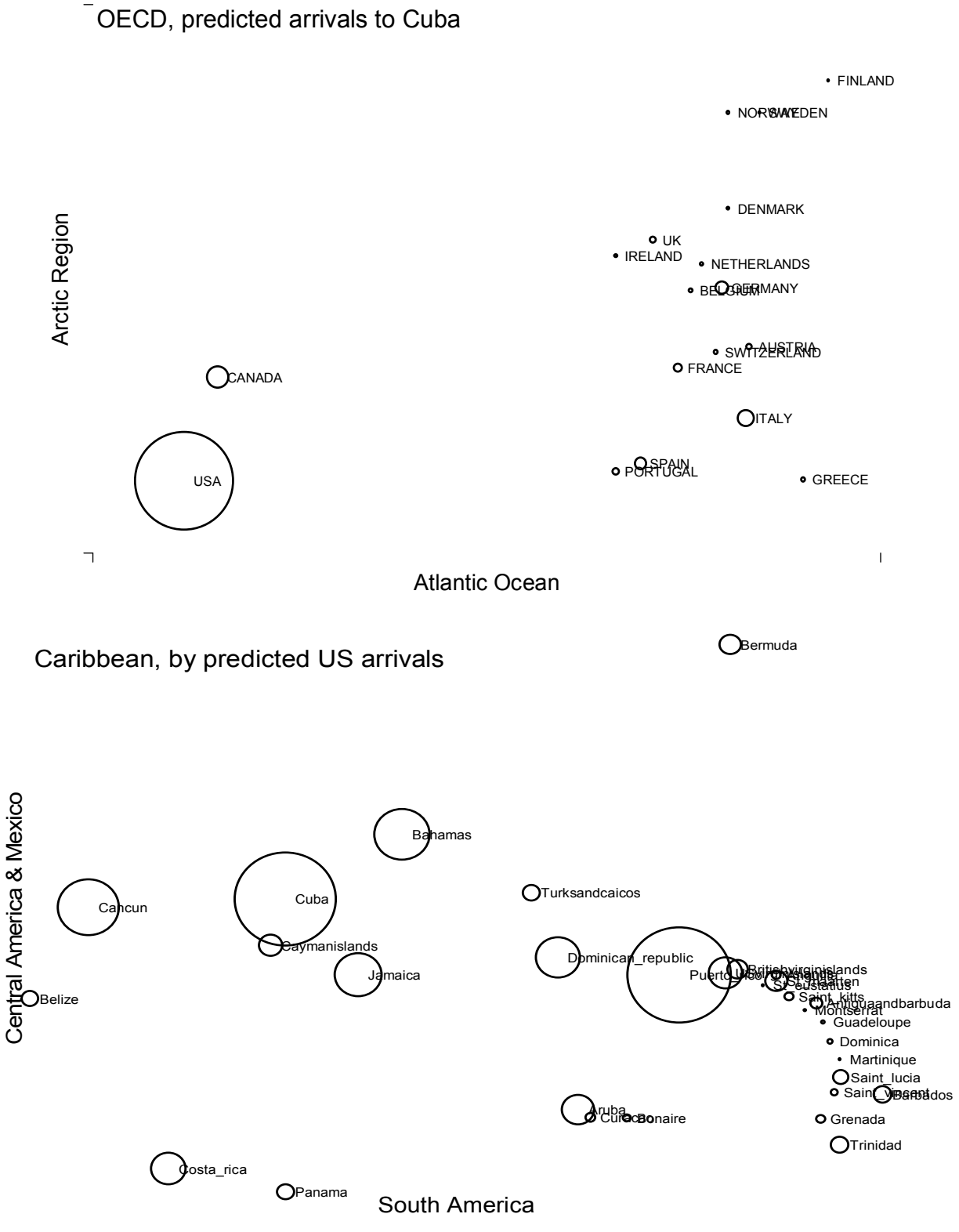


Thousands of visitors net gain, darker shading indicates more visitors.
Source: Author's Estimates.



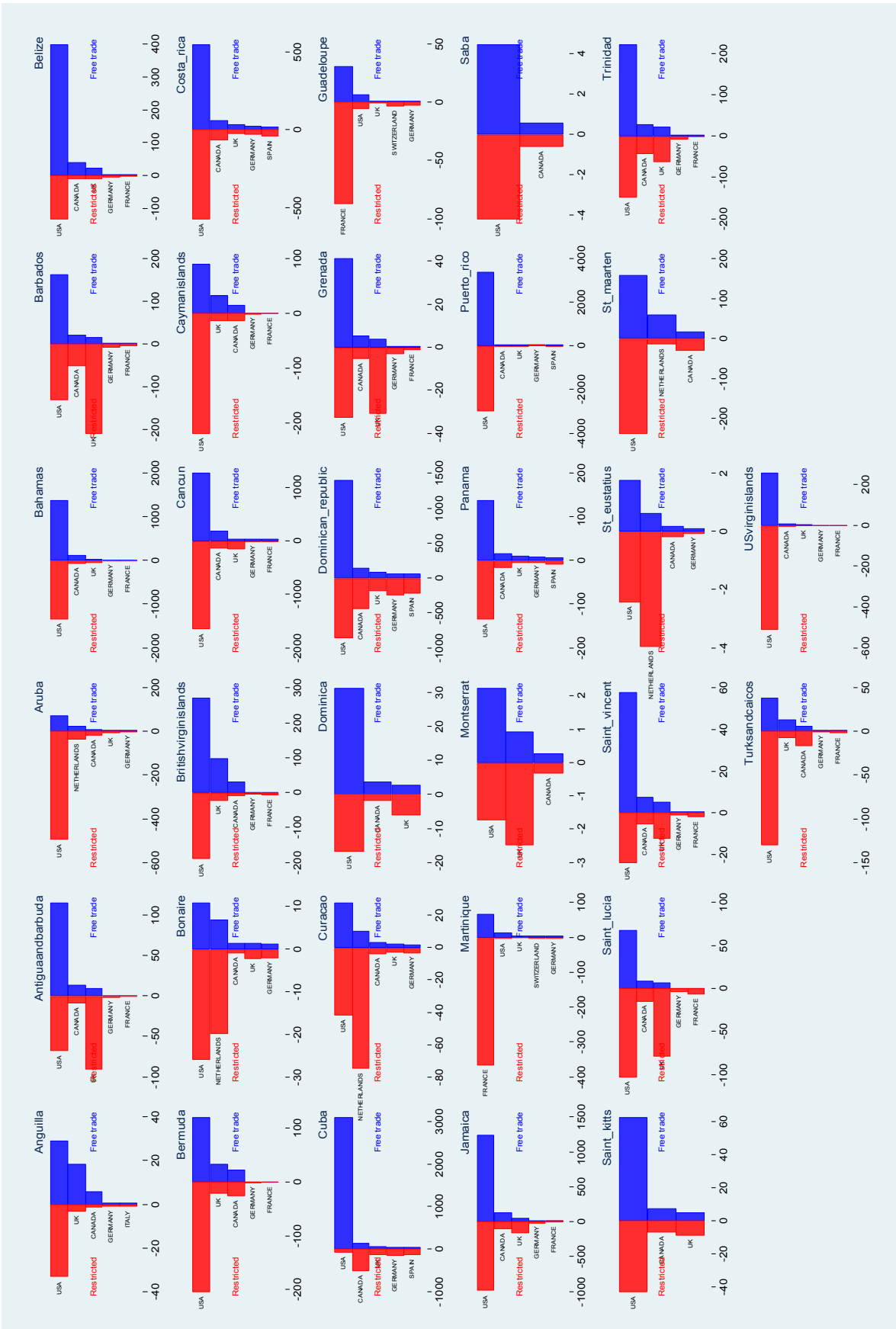
Thousands of visitors net gain, darker shading indicates more visitors.
Source: Author's Estimates.

Figure 20. Caribbean by U.S. Arrivals and OECD by Arrivals to Cuba
(assuming no new U.S. tourists post tourism liberalization)



Source: Author's estimates.

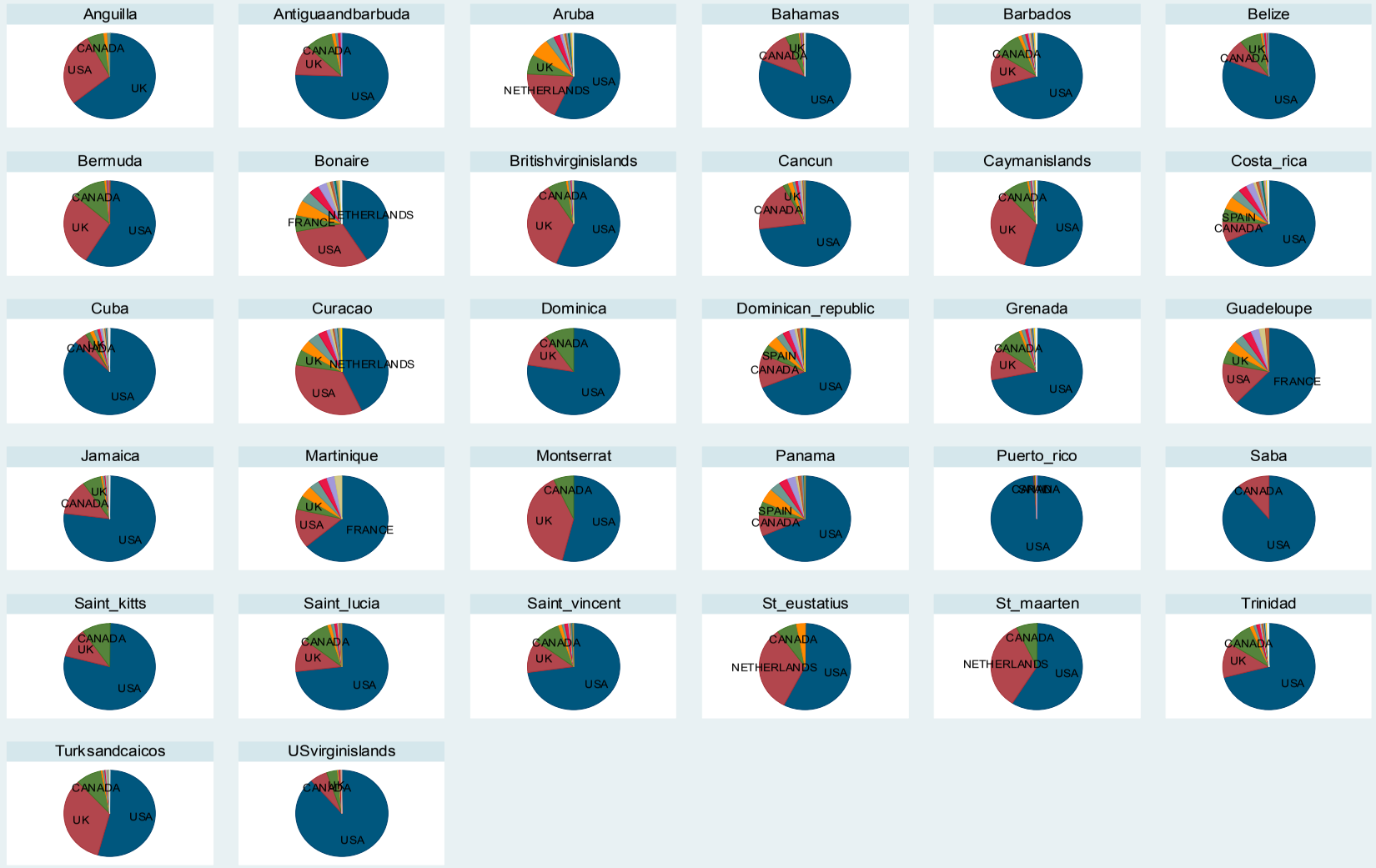
Figure 21. Gravity Estimates of Long-term Adjustment of Destinations



Source: Author's estimates.

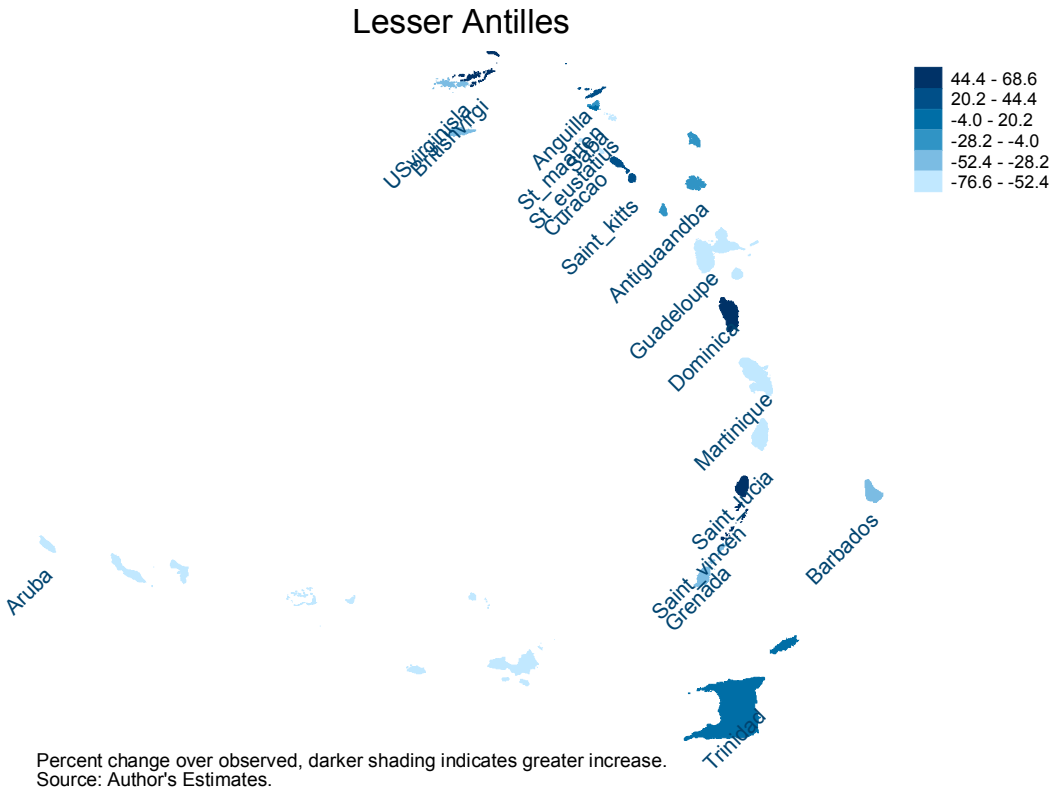
Figure 22. Pie Charts of Gravity Estimates

(Model 3)



Source: Author's estimates.

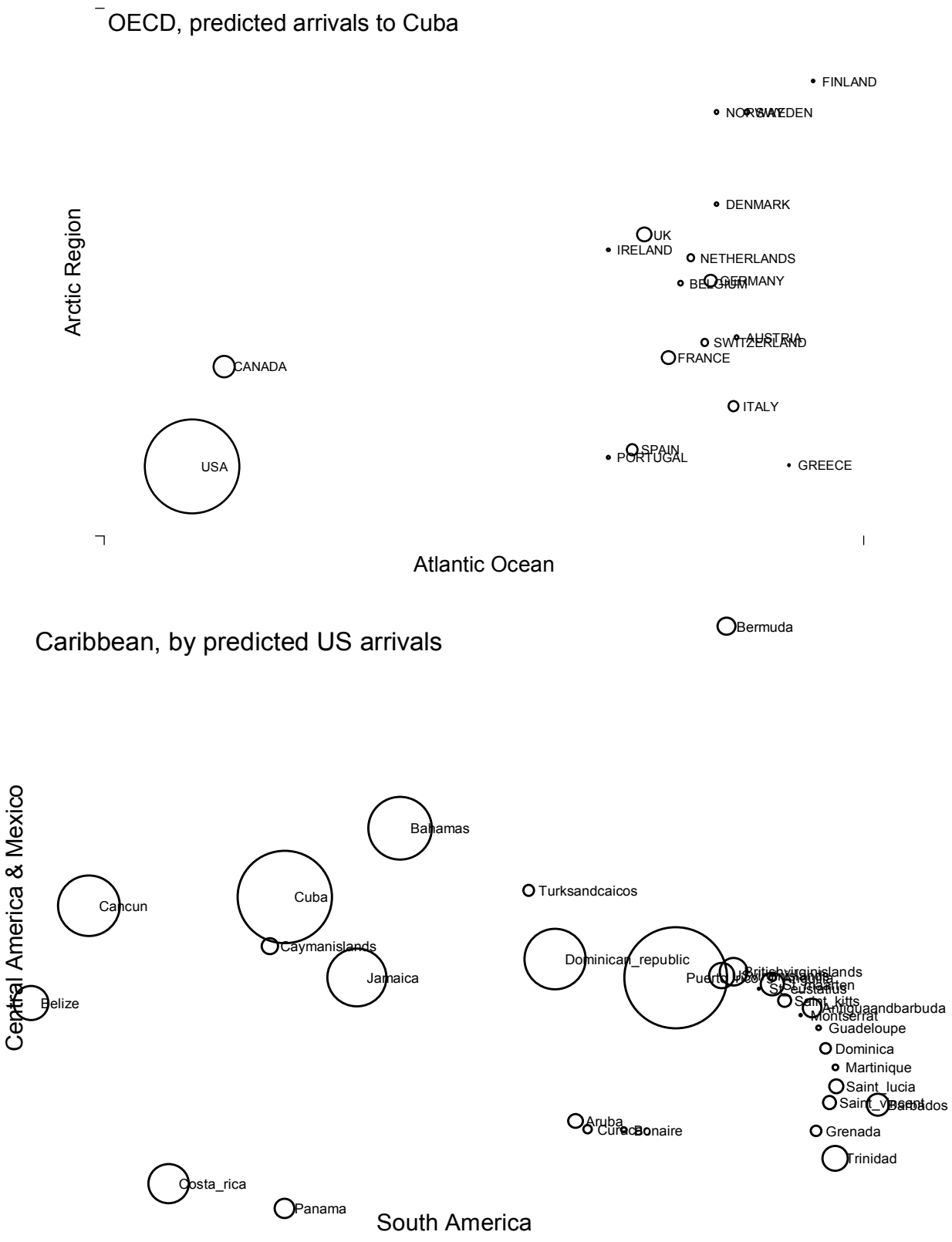
Figure 23. Gravity Estimates of Percent Change in Arrivals



Percent change over observed, darker shading indicates greater increase.
Source: Author's Estimates.

Percent change over observed, darker shading indicates greater increase.
Source: Author's Estimates.

Figure 24. OECD, Caribbean, Relative Size with Open Tourism
(OECD scaled by Gravity estimates of arrivals to Cuba, Caribbean bubbles by projected U.S. arrivals)



Source: Author's estimates.

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VII. APPENDIX

Appendix Table 1. Number of OECD Airlines to the Caribbean

	Austr	Austr	Belgi	Cana	Denn	Finla	Franc	Germ	Gree	Irelar	Italy	Japar	Nethe	New	Norw	Portu	Spair	Swed	Switz	UK	USA	Total
Anguilla	…	…	…	1	…	…	…	1	…	…	1	…	…	…	…	…	…	…	…	3	8	14
Antiguaandbarbuda	…	…	…	1	…	…	…	1	…	…	1	…	…	…	…	…	…	…	…	3	8	14
Aruba	…	…	…	1	…	…	…	1	…	…	…	…	1	…	…	…	…	…	…	…	8	11
Bahamas	…	…	…	1	…	…	1	…	…	…	…	…	…	…	…	…	…	…	…	2	11	15
Barbados	…	…	…	1	…	…	…	1	…	…	…	…	1	…	…	…	…	…	…	3	7	13
Belize	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	1	6	7
Bermuda	…	…	…	1	…	…	…	1	…	…	…	…	…	…	…	…	…	…	…	1	9	12
Bonaire	…	…	…	…	…	…	1	…	…	…	1	…	1	…	…	…	…	…	…	…	4	7
Britishvirginislands	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	7	7
Cancun	…	…	1	10	…	…	1	2	…	…	4	…	2	…	…	…	5	…	2	5	19	51
Caymanislands	…	…	…	1	1	…	…	…	…	…	…	…	…	…	…	…	…	…	…	1	7	10
Costa_rica	…	…	…	1	…	…	…	1	…	…	…	…	1	…	…	…	2	…	1	1	6	13
Cuba	…	…	…	1	…	…	2	2	…	…	4	…	1	…	…	…	5	…	…	1	4	20
Curacao	…	…	…	…	…	…	…	1	…	…	…	…	1	…	…	1	…	…	…	1	3	7
Dominica	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	2	2
Dominican_republic	…	2	1	7	…	…	2	2	…	…	3	…	1	…	…	3	3	…	1	5	11	41
Grenada	…	…	…	1	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	2	3	6
Guadeloupe	…	…	…	1	…	…	2	…	…	…	…	…	1	…	…	…	…	…	…	…	1	5
Haiti	…	…	…	1	…	…	1	…	…	…	…	…	…	…	…	…	…	…	…	…	2	4
Jamaica	…	…	1	4	…	…	…	2	…	…	1	…	2	…	…	…	2	…	2	4	8	26
Martinique	…	…	…	…	…	…	2	…	…	…	…	…	…	…	…	…	…	…	…	…	1	3
Montserrat	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	1	1
Panama	…	…	…	…	…	…	1	…	…	…	…	…	…	…	…	…	2	…	…	1	4	8
Puerto_rico	…	…	1	1	…	…	1	1	…	…	…	1	1	…	…	…	2	…	1	1	15	25
Saba	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	0
Saint_kitts	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	5	5
Saint_lucia	…	…	…	1	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	2	4	7
Saint_vincent	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	0
St_eustatius	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	0
St_maarten	…	…	…	4	…	…	2	…	…	…	…	…	2	…	…	…	…	…	…	…	8	16
Trinidad	…	…	…	1	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	6	7
Turksandcaicos	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	2	2
USvirginislands	…	…	…	…	…	…	…	…	…	…	…	…	…	…	1	…	…	…	…	…	8	9

Source: OAG, Author's estimates.

Appendix Table 2. Regression Notes

Cost	Regressors	
Distance (nautical miles)	Distance	Europe dummy Asia dummy
Common language/country	Language dummy	Country dummy
Measurement Error	Puerto Rico dummy	PRGF dummy
Exogenous Shock	Sept. 11	
Petroleum	*Caracas/PetroCaribe*	*Oil Producers*
	Barbados	Barbados
	Belize	Cancun
	Costa_rica	Cuba
	Cuba	Trinidad
	Dominican_republic	
	Haiti	
	Jamaica	
	Panama	
European Scales, Market Concentration, Colonial Spillover		
Over 40% European	A dummy is included for destination-years where 40% of arrivals are from Europe.	
Oligopoly	A dummy is included for years when moderate concentration is present, according to the US DOJ.	
Cuba busy	A dummy is included for colonial pairs on years when Cuba is at 75 percent capacity or greater, 1997-98	
Trade Regimes	Nafta dummy	Caricom dummy US Caribbean Basin Initiative dummy
US Trade Embargo		
Regime tight/loose	Helms-Burton, 1996-97	Clinton Administration, 1999-2000
Indicators included for:		
Non-USA Clusters	European Countries not in USA cluster	
USA Cluster	European countries in USA cluster, but not USA	
USA	USA	
Hurricanes:	Indicators included in affected countries on the year following the hurricane.	
Airlines from:	OECD	Caribbean

Appendix Table 3. Data Definitions

Airlines measured from Official Airline Guide Worldwide Travel Database of International and Domestic Air Service.

Airline coefficients adjusted as follows: loecdair: ln(1+oecdair)

Busy captures the extra tourists arriving to colonial relationship countries on years when Cuba has been at 75 percent or greater occupancy. It corrects so that Canada is released from its colony status and travels to Dominican republic, Cancun, Puerto Rico, Jamaica, Bahamas, U.S. Virgin Islands.

Common Territories: France -Guadeloupe, Martinique, the Netherlands - Bonaire, Curacao, Saba, St. Eustatius, St. Maarten, the UK -Anguilla, Bermuda, UKVI, Cayman Islands, Montserrat, Turks and Caicos, and the U.S. -Puerto Rico, U.S.VI).

Cultural Distance—clustering on Hoefsted index values for Long-Term Orientation, Uncertainty Avoidance Index, Masculinity, Individualism, Power Distance Index.

Herfindahl Index below 0.1 (or 1,000) indicates an unconcentrated index, HI index between 0.1 to 0.18 (or 1,000 to 1,800) indicates moderate power, and above 0.18 (above 1,800) indicates high power, per Merger Guidelines of the U.S. Department of Justice.

Natural Disaster data: EM-DAT: The OFDA/CRED International Disaster Database www.em-dat.net, Université Catholique de Louvain, Brussels, Belgium.