Tourism destruction or tourism creation? Assessing rivalness in the European tourism market

Biagi B., Delogu M.

Università degli Studi di Sassari

Outline

Understanding whether and to what extent the improvement in one destination's attractiveness is detrimental or neutral for regions/countries competing on tourism arrivals is crucial

- Example: Does the inflow of tourists to France change if Italy's attractiveness goes up?
  1. Does the total number of tourist increase? Tourism may increase in Italy while France's inflows remains unvaried.
  2. On the contrary, we may expect that the total number of tourists does not change and there is simply a shift from France (↓) to Italy) (↑). Competition!
  3. Important from a policymaker standpoint: **Is tourism a zero sum game among competing destinations?**

Aim: To estimate the degree of **rivalness** by employing a method developed in Brülhart and Schmidheiny (2015; *JRS*) to assess whether tourism competition generates: (1) *Tourism creation* (2) *Tourism destruction*

- **Method**:
  - The method exploits the relationship between Conditional Logit **(CL)**, Poisson **(P)** and Nested logit model **(NL)**.
  - Random Utility framework to model tourists' location decision.
  - Empirical Application relies on inflow of tourists to EU countries belonging to the Euro-area. **Preliminary!**

Competition over tourism flows may generate:

1. *Tourism destruction*: when a country by improving its attractiveness steals tourism from other countries, there is no aggregate effect but merely a reallocation of the overall demand: **zero-sum game**
2. *Tourism creation*: when a country by improving its attractiveness does not steal tourists from other countries, but generates new demand: **positive-sum game**
3. The two effects can be considered as **Polar Cases**

Related Literature

- There exists an extensive literature on the drivers of international tourism demand, (Peng et al., 2015, JTR).
- RUM utility models are widely used to model tourists' location decision, (Seddighi & Theocharous, 2011, TM; Pulina et al. 2013, TMP)
- Several papers highlighted the role of exchange rate and price levels as determinants for tourism' demand (Addessi et al. 2019, WE)
- Given the nature of count data, Poisson regression methods have been widely employed to empirical investigate tourism demand determinants (Martins et al., 2017, TM)
- Little research on how competition affects tourism flow, see (Patsouratis et al., 2015, AE)

A standard RUM model is suitable to model tourists' location decision:

$$U_{ij} = \beta' Z_j + \varepsilon_{ij}$$

where β is a vector of unknown parameters, Z_j is a vector of choice-specific variables and ε_{ij} is the random component. Utility depends on two components: one deterministic and one stochastic. Assuming that the ε_{ij} are independent and have an extreme-type value 1 distribution implies (Mcfadden & Zarembka (1974)) proved that the probability that an individual i visits destination j is given by:

$$P_{ij} = \frac{e^{\beta' Z_j}}{\sum_j e^{\beta' Z_j}}$$

Poisson and Conditional logit: Coincidence

1. Guimares et al. (2003; RES), demonstrates an equivalence between the likelihood function of the **CL** and the **P**: estimates coincides!
2. To take advantage of this equivalence, we must assume that the tourists' location decision is based on a vector of choice-specific variables common to a group of individuals.
3. Schmidheiny and Br$\ddot{u}$lhart (2011; JUE) show that the implied predictions depends on the *baseline model*.

CL: $\frac{\partial E(n_j)}{\partial x_{jk}} = (1 - P_j)\,\beta_k$ and $\frac{\partial E(n_s)}{\partial x_{jk}} = -P_j\beta_k$. **P**: $\frac{\partial E(n_j)}{\partial x_{jk}} = \beta_k$ and $\frac{\partial E(n_s)}{\partial x_{jk}} = 0$. Elasticity bounds!

Polar Cases: CL and P

Schmidheiny and Brulhart (2011; JUE) show that while **P** and **CL** estimates coincides, the models' implications are different:

- **Conditional Logit** implies a *Zero-sum world*, meaning that a change in the attractiveness of one location shifts tourists across destinations, with the overall number of tourists remaining unaffected. ***Tourism Destruction***
- **Poisson** implies a *Positive-sum world* meaning that a change in the attractiveness of one location only generates new demand in the destination experiencing the variation, and the total number of tourists rise up. ***Tourism Creation***
- **P** and **CL** are *polar cases* of a more general framework $\rightarrow$ Nested Logit, **NL**

Nested Logit Framework (1)

Brülhart and Schmidheiny (2015; JRS) develops the case of the general model, **Nested Logit model**, with two choices taken sequentially. The agent decides whether to visit one of the destinations of the choice set and then select the preferred one.

$$P_h = \frac{e^{\delta}}{e^{\delta} + \left(\sum_j e^{\beta' Z_j}\right)^{\lambda}}.$$

$$P_j = \frac{e^{\beta' Z_j}\left(\sum_j e^{\beta' Z_j}\right)^{\lambda - 1}}{e^{\delta} + \left(\sum_j e^{\beta' Z_j}\right)^{\lambda}}.$$

With ε_{ij} and ε_{ih} independent for all j, and that they have a non-negative correlation equal to $\left(1 - \lambda^2\right)$,where $0 < \lambda < 1$.

Nested Logit Framework (2)

Brülhart and Schmidheiny (2015; JRS) assume that δ is large enough. In such case:

$$\rho = 1 - \lambda$$

- $\rho = 0$ the model reduces to the **P** $\rightarrow$ *Tourism creation*
- $\rho = 1$ the model reduces to the **CL** $\rightarrow$ *Tourism destruction*

- ρ captures competitiveness! Brülhart and Schmidheiny (2015; JRS) develop a method to estimate the degree of rivalness (ρ) with panel data.

Estimation of the degree of rivalness, ρ

Schimdeiny and Brulhart (2015; JRS) derive the following estimable empirical relationship for λ:

$$dlog\left(n_t\right) = c + \beta d\hat{x}_{kt} + u_t,$$

with $\beta = (1-\rho)\,\beta_k$, hence $\lambda = 1-\rho$ can be estimated using panel data. However to estimate the above equation we need to determine both $dlog\left(n_t\right)$ and $d\hat{x}_{kt}$. To estimate ρ we need to run a two-step estimation procedure

Two-step estimation

1. **First step**
   - Run a Poisson regression for each year under analysis to estimate the expected number of tourists in each country.
   - Predict the number of tourist for each location. Weight the change in the regressors with the predicted value of tourists. Obtain $d\hat{x}_{kt}$. Calculate the total growth of tourism by summing up tourist arrivals across countries to obtain $dlog\left(n_t\right)$
2. **Second Step**
   - Regress the total yearly change, $dlog\left(n_t\right)$ for the weighted change on the regressors, $d\hat{x}_{kt}$. By doing so an estimate of ρ is produced. ρ captures the degree of rivalness.

Data, dependent variable

Tourism flows of EU19 (Eurozone) from 2000-2018

- Data on tourism flows come from EUROSTAT:
  1. **National**: tourism from and to the country of origin
  2. **Foreign**: tourism coming from another country
  3. **Total**: sum of National and Foreign components

- Shortcoming of the data currently in hand: in the Foreign component we cannot distinguish whether tourists come from foreign countries inside or outside EU19.

- **Variable of interest**: **PPPs**, from OECD, the variable from which we retrieve the estimate of the rivalness parameter. **PPPs** are the rates of currency conversion that try to equalise the purchasing power of different countries taking into account for the price levels, in U.S. dollars.

- **Controls**: **Population**, from EUROSTAT, indicator *demord2jan* to control for the country of destination size **GDP per capita**, from EUROSTAT, to control of the economic situation at destination, from EUROSTAT,indicator *sdg0810* **climate**, heating days from EUROSTAT indicator *nrgchddr2a* to capture the role of climate in the choice of destination

Estimate of ρ. GDP, Pop and PPPs

Table: Estimated Rivalness among EU19 countries (Euro Area)

Type of Tourism	Estimated ρ	Standard Error
Foreign	1.31	0.15
National	1.11	0.12
Total	1.11	0.076

The rivalness parameter ρ derives from a two-step estimation procedure using panel data from 2000-2018. The parameter captures the degree of competitiveness among countries with $\rho = 0$ representing the Poisson-polar case of no competition among countries (tourism creation) while $\rho = 1$ representing the conditional logit polar case of maximum competition among countries (tourism destruction). If the estimated ρ does not belong to the interval [0 1] the estimation procedure rejects the general model (Nested Logit with outside option).

Estimate of ρ (2) including Climate

Table: Estimated Rivalness among EU19 countries (Euro Area)

Type of Tourism	Estimated ρ	Standard Error
Foreign	1.1	0.13
National	1.02	0.12
Total	1.06	0.055

The rivalness parameter ρ derives from a two-step estimation procedure using panel data from 2000-2018. The parameter captures the degree of competitiveness among countries with $\rho = 0$ representing the Poisson-polar case of no competition among countries (tourism creation) while $\rho = 1$ representing the conditional logit polar case of maximum competition among countries (tourism destruction). If the estimated ρ does not belong to the interval [0 1] the estimation procedure rejects the general model (Nested Logit with outside option).

Estimate of ρ, dummy join to euro (3)

Table: Estimated Rivalness among EU19 countries (Euro Area)

Type of Tourism	Estimated ρ	Standard Error
Foreign	1.06	0.23
National	0.97	0.16
Total	1.08	0.08

The rivalness parameter ρ derives from a two-step estimation procedure using panel data from 2000-2018. The parameter captures the degree of competitiveness among countries with $\rho = 0$ representing the Poisson-polar case of no competition among countries (tourism creation) while $\rho = 1$ representing the conditional logit polar case of maximum competition among countries (tourism destruction). If the estimated ρ does not belong to the interval [0 1] the estimation procedure rejects the general model (Nested Logit with outside option).

Estimate of ρ (2) including Med dummy

Table: Estimated Rivalness among EU19 countries (Euro Area)

Type of Tourism	Estimated ρ	Standard Error
Foreign	1.03	0.19
National	0.69	0.37
Total	1.08	0.063

The rivalness parameter ρ derives from a two-step estimation procedure using panel data from 2000-2018. The parameter captures the degree of competitiveness among countries with $\rho = 0$ representing the Poisson-polar case of no competition among countries (tourism creation) while $\rho = 1$ representing the conditional logit polar case of maximum competition among countries (tourism destruction). If the estimated ρ does not belong to the interval [0 1] the estimation procedure rejects the general model (Nested Logit with outside option).

Estimate of ρ full model (4)

Table: Estimated Rivalness among EU19 countries (Euro Area)

Type of Tourism	Estimated ρ	Standard Error
Foreign	0.96	0.27
National	0.56	0.42
Total	1.09	0.10

The rivalness parameter ρ derives from a two-step estimation procedure using panel data from 2000-2018. The parameter captures the degree of competitiveness among countries with $\rho = 0$ representing the Poisson-polar case of no competition among countries (tourism creation) while $\rho = 1$ representing the conditional logit polar case of maximum competition among countries (tourism destruction). If the estimated ρ does not belong to the interval [0 1] the estimation procedure rejects the general model (Nested Logit with outside option).

- **Findings** suggest that tourism is a **zero-sum game**. However differences arise between the national and the foreign components with stronger evidence of tourism destruction for the latter. **Preliminary!**
- **Limitations**: the sample and the time span should be larger.
- **Next Step**: (1) Get better data and produce new estimates. (2) Focus also on the determination of elasticity bounds.