ECO LABELING OF SERVICES: THE BLUE FLAG

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Introduction

- Eco-labeling as an information treatment that may help consumers make choices that relieve consumption and production pressures on the environment
- Falls into category of Voluntary Approaches (VA)
- Market-oriented instrument
- Quality signaling to overcome informational asymmetries

Introduction

- Incentives for producers to invest in changes that that will make them eligible for an eco-label?
  - Prospective green price premium
  - Prospective increase in market shares
  - Anticipation of market behavior changes
  - Forestall future mandatory standards

Literature Overview

- Most prior studies focus on eco-labeling of goods
  - Henion (JMR,1972)
    - Detergent phosphate content
  - Hemmelskamp and Brotkmann (Futures,1997)
    - 'Blue Angel' label
  - Nimon and Beghin (AJAE,1998)
    - Apparel and organic textile premium
  - Teisl, Roe and Hicks (JEEM,2001)
    - 'Dolphin Safe' tuna

Contribution

- First paper to address eco-labeling for services
- Hedonic pricing models
- Blue Flag label for beaches and marinas
- Data for Croatian coastal tourism industry in 2008
  - Marinas
  - Sailboat charters
  - Hotels

Geography: Croatian Adriatic Coast

1185 islands

5,835 km coastline:
- mainland 1,777 km
- islands 4,058 km

11 million tourist arrivals in 2007

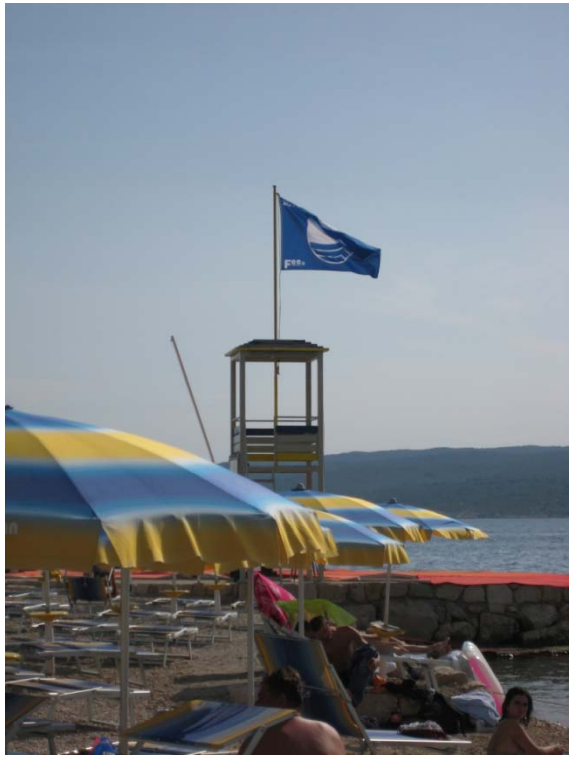
Slogan:
“The Mediterranean As It Once Was”

Blue Flag program

- Voluntary eco-label started in 1987
- Foundation for Environmental Education (FEE)
- Adheres to European Union Bathing Water Directive
- Awarded to over 3200 beaches and marinas in 37 countries across Europe, South Africa, Morocco, Tunisia, New Zealand, Canada and the Caribbean.

Blue Flag

- Beach and Marina Criteria
  - Environmental education
  - Environmental information
  - Water quality
  - Environmental management
  - Safety and services



Data

- Brochure data from three tourism industry segments
  - Marina slip rental prices
    - Daily, monthly and yearly (population)
  - Sailboat charter prices
    - Weekly (convenience sample)
  - Hotel prices
    - Average price per night (stratified sample)
- Blue Flag certification
  - Awarded marinas and beaches

Empirical Methodology: Marina slip rental prices

- Hedonic price equation for the marina slip rental prices

$$\ln Slip\,\Pr ice_{ijt} = \beta_0 + \beta_1 BlueFlag_i + \sum \beta_i X_i + \sum \beta_c Z_c + \sum \beta_{ct} Z_{ct} + \varepsilon_{ijt}$$

  - $SlipPrice_{ijt}$: slip rental price (marina, *i;* boat length, *j;* time, *t)*
  - $BlueFlag_i$: indicator for marina Blue Flag certification
  - X_i : time-invariant marina attributes: number of slips, dry dock berths; category; distance from airport, marine fuel station; travel lifts, laundry facilities, restaurant, groceries?
  - Z_c : time-invariant characteristics of surrounding area: urban, island location; population density
  - Z_{ct} : time-varying characteristics of local area: average monthly county-level tourist arrivals, air temperatures

Empirical Methodology: Marina slip rental prices with endogenous certification

- Endogeneity
  - First stage

$$\text{BlueFlag}_i = \beta_0 + \beta_1 CountyBFMarinas_i + \beta_2 FirmBFMarinas_i + \sum \beta_i X_i + \varepsilon_{il}$$

  - Second stage

$$\ln Slip\,\text{Pr}\,ice_{ijt} = \beta_0 + \beta_1 BlueFlag_i + \sum \beta_i X_i + \sum \beta_c Z_c + \sum \beta_{ct} Z_{ct} + \varepsilon_{ijt}$$

Summary statistics: Marina slip rental prices

Table 1. Summary statistics for marina daily, monthly and yearly slip-rental prices and associated characteristics

	Daily slip-rentals		Monthly slip-rentals		Yearly slip-rentals	
Variables	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Marina characteristics						
Slip rental price (in Euros)	88.1	89.0	1192	1021	5927	3915
1(Blue Flag certified marina)	0.453	--	0.514	--	0.506	--
1(ACI Marina)	0.542	--	0.686	--	0.498	--
Marina category (1 through 3, and uncategorized)	2.21	0.744	1.97	0.637	2.08	0.667
Slips (number of available spots)	307	218	282	164	313	216
Dry dock (number of available spots)	87.6	97.8	80.2	66.4	88.8	90.7
1(Travel lift)	0.366	--	0.388	--	0.403	--
1(Grocery store)	0.950	--	0.941	--	0.951	--
1(Restaurant)	0.977	--	1	--	1	--
1(Laundry facilities)	0.589	--	0.613	--	0.641	--
Locational characteristics						
Marine fuel station distance (in kilometers)	2.80	3.99	2.94	2.65	2.87	3.62
Airport distance (in kilometers)	30.7	19.3	34.1	20.3	31.3	19.5
1(Island location)	0.355	--	0.368	--	0.287	--
Population (of the associated urban area, in thousands)	18.8	37.5	18.3	41.3	20661	38571
1(Urban location)	0.901	--	1	--	0.971	--
Average county monthly temperature (in Fahrenheit)	59.9	44.0	60.2	44.0	--	--
Average county monthly tourist arrivals (in thousands)	140	177	149	182	--	--

Notes: Data on daily slips-rentals have 9396 observations; on monthly slips-rentals have 4644 observations; on yearly slips-rentals have 634 observations.

Results: Marina slip rental prices

Determinants of Daily, Monthly and Yearly log(Marina Slip Rental Prices)

	Daily slip-rentals		Monthly slip-rentals		Yearly slip-rentals	
	(1)	(2)	(3)	(4)	(5)	(6)
Variables	OLS	RE	OLS	RE	OLS	RE
Marina characteristics						
1(Blue Flag certified marina)	**0.234*** **	**0.324*** **	**0.381*** **	**0.450*** **	**0.243*** **	**0.219***
1 (ACI Marina)	0.373***	0.388***	0.164***	0.209**	0.242***	0.255***
1 (Second category marina)	-0.352***	-0.295***	-0.127***	-0.0684	-0.116*	-0.14
1 (Third category marina)	-0.0932***	0.0145	-0.130**	-0.0831	0.0618	0.0366
1 (Uncategorized marina)	0.0369	0.141	--	--	0.135	0.136
log(Slips) (number of available spots)	0.0199	-0.041	-0.00349	-0.104	0.00947	0.0151
1 (Travel lift)	0.255***	0.335***	-0.0287	-0.0258	0.154**	0.16
1 (Grocery store)	0.196***	0.158	0.455***	0.439**	0.138	0.17
1(Restaurant)	0.526***	0.578***	--	--	--	--
1 (Laundry facilities)	0.0414	0.0422	-0.191***	-0.204**	-0.0313	-0.0264
Locational characteristics						
log(Airport distance, in kilometers)	-0.0938***	-0.0873**	0.00634***	0.00751***	-0.0472	-0.047
log(Marine fuel station distance, in kilometers)	0.00487	0.0146	-0.105***	-0.106*	-0.0847***	-0.102*
1 (Island location)	0.131***	0.08	-0.360***	-0.453***	-0.218***	-0.194
log(Population) (of the associated urban area)	0.0435***	0.0386	-0.00883	-0.0197	-0.0093	-0.0108
1 (Urban location)	0.164**	0.114	--	--	0.0351	0.019
log(Average county monthly tourist arrivals)	-0.000839	0.130***	-0.000497	0.0855***	--	--
Constant	2.30***	2.10***	4.78***	4.74***	8.19***	8.21***
Observations	9396		4644		634	
R^2	0.16		0.27		0.18	0.17

Results: Marina slip rental prices with endogenous certification

Determinants of Weekly log(Marina Slip Rental Prices) (n=9369)

	(1) OLS	(2) 2SLS	(3) RE	(4) RE2SLS
Marina characteristics				
1(Blue Flag certified marina)	**0.215*** **	**0.0669***	**0.228*** **	**0.0895**
1 (ACI Marina)	0.359***	0.330***	0.365***	0.338***
1 (Second category marina)	-0.144***	-0.163***	-0.137*	-0.154*
1 (Third category marina)	0.0262	-0.0795**	0.0407	-0.058
1 (Uncategorized marina)	0.272***	0.222***	0.276	0.229
log(Slips) (number of available spots)	-0.0208	0.00941	-0.0369	-0.0098
1 (Travel lift)	0.0963***	0.0449	0.116	0.0688
1 (Grocery store)	0.0377	0.0413	0.0278	0.0303
1(Restaurant)	0.249***	0.251***	0.258	0.261
1 (Laundry facilities)	0.0251	0.0790***	0.0205	0.0712
log(Airport distance, in kilometers)	0.0299**	0.0367**	0.0363	0.0433
Marine fuel station distance(in kilometers)	-0.00645***	-0.0102***	-0.00537	-0.00879
1 (Island location)	0.00263	0.0716**	-0.0117	0.0523
Population (of the associated urban area)	0.00214***	0.00233***	0.00219**	0.00237***
1 (Urban location)	0.601***	0.566***	0.586***	0.551***
log(Average county monthly tourist arrivals)	0.0980***	0.0955***	0.122***	0.122***
Constant	2.688***	2.622***	2.479***	2.397***
R-squared	0.18	0.18	0.17	0.17

Empirical Methodology: Sailboat charter prices

- Hedonic price equation for the sailboat charter prices

$$\ln CharterPrice_{ilt} = \beta_0 + \beta_1 BlueFlag_l + \beta_2 SlipRental_{il}^{HM} + \sum \beta_l S_l + \sum \beta_{ct} Z_{ct} + \varepsilon_{ilt}$$

- $CharterPrice_{ilt}$: weekly price (sailboat, i; marina, l; time, *t*)
- $BlueFlag_l$: indicator for Blue Flag certification
- $SlipRental_{il}^{HM}$: yearly slip rental price for home marina (fixed cost for boat parking incurred by charter company)
- S_i : time-invariant sailboat attributes: length, age, number of cabins and beds, water and fuel capacity; availability of electric refrigerator, gas stove, nautical charts, Global Positioning System (GPS), VFH radio, electric anchor winch
- Z_{ct} : time-varying characteristics of local area: average monthly county-level tourist arrivals, air temperatures.

Empirical Methodology: Sailboat charter prices with endogenous slip rentals

- Endogeneity
  - First stage

$$\ln SlipPrice_{li}^{HM} = \beta_0 + \beta_1 BlueFlag_i + \sum \beta_i X_i + \sum \beta_c Z_c + \varepsilon_{il}$$

  - Second stage

$$\ln CharterPrice_{ilt} = \beta_0 + \beta_1 BlueFlag_l + \beta_2 SlipRental_{il}^{HM} + \sum \beta_l S_l + \sum \beta_{ct} Z_{ct} + \varepsilon_{ilt}$$

Empirical Methodology: Sailboat charter prices with endogenous certification

- Endogeneity
  - First stage

$$\text{BlueFlag}_l = \beta_0 + \beta_1 CountyBFMarinas_l + \beta_2 FirmBFMarinas_l + \sum \beta_l X_l + \varepsilon_l$$

  - Second stage

$$\ln CharterPri\,ce_{ilt} = \beta_0 + \beta_1 BlueFlag + \beta_2 SlipRental_{il}^{HM} + \sum \beta_l S_l + \sum \beta_{ct} Z_{ct} + \varepsilon_{ilt}$$

Summary statistics: Sailboat charter prices

Table 2. Summary statistics for weekly sailboat charter price and associated characteristics

Variables	Mean	Std. Dev.
Marina characteristics		
Yearly slip rental price (in Euros)	3963	916
Blue Flag (1 if awarded, 0 otherwise)	0.831	--
Vessel characteristics		
Weekly sailboat charter price	1976	928
Ship length (in meters)	11.9	1.90
Number of beds	6.92	1.85
Vessel age (in years)	10.5	11.0
Vessel weight (in tons)	4984	4512
Fuel capacity (in liters)	172	95.8
Nautical charts and guides (1 if available, 0 otherwise)	0.935	--
Global positioning system (GPS) (1 if available, 0 otherwise)	0.935	--
Marine VHF radio (1 if available, 0 otherwise)	0.978	--
Electric refrigerator (1 if available, 0 otherwise)	0.601	--
Gas cooker with oven (1 if available, 0 otherwise)	0.380	--
Electric anchor (1 if available, 0 otherwise)	0.558	--
Locational characteristics		
Average county monthly tourist arrivals (in thousands)	116	149
Average county monthly temperature (in Fahrenheit)	59.0	11.1

Notes: Data on weekly sailboat charters have 16307 observations.

Results: Sailboat Charter Prices

Determinants of the log(Weekly Sailboat Charter Price) (n=16651)

Variables	(1) OLS	(2) 2SLS	(3) RE	(4) RE2SLS
Marina characteristics				
1 (Blue Flag certified home marina)	**0.0615*** **	**0.0457*** **	**0.0872*** **	**0.0713** **
log (Marina yearly slip rental price)	0.0389***	0.0894***	-0.00126	0.0487
Vessel characteristics				
log(Ship length) (in meters)	2.06***	2.01***	2.11***	2.05***
Number of beds	-0.0186***	-0.0179***	-0.0200**	-0.0193**
Vessel age (in years)	-0.0172***	-0.0169***	-0.0156***	-0.0154***
Vessel age^2 (in years)/10^6	0.853***	0.840***	0.778***	0.764***
Vessel weight (in tons) /10^3	0.316***	0.322***	0.322	0.327
Fuel capacity (in tons)	0.509***	0.495***	0.526***	0.513***
1 (Nautical charts and guides available)	0.0390***	0.0392***	0.0319	0.032
1 (Global positioning system (GPS) available)	0.0749***	0.0798***	0.0654*	0.0705**
1(Marine VHF radio available)	0.0252**	0.0292***	0.0174	0.0216
1 (Electric refrigerator available)	-0.00762	-0.0115**	-0.0212	-0.0254
1 (Gas stove with oven available)	0.0475***	0.0466***	0.0526**	0.0517**
1 (Electric anchor available)	0.0507***	0.0557***	0.0581***	0.0633***
Locational characteristics				
log(Average county monthly tourist arrivals) (in thousands)	0.0677***	0.0681***	0.0799***	0.0799***
Constant	-0.716***	-0.985***	-0.213	-0.487
R-squared	0.84	0.84	0.83	0.83

Results: Sailboat charter prices with endogenous certification

Determinants of the log(Weekly Sailboat Charter Price) (n=16651)

Variables	(1) OLS	(2) 2SLS	(3) RE	(4) RE2SLS
Marina characteristics				
1 (Blue Flag certified home marina)	**0.105*** **	**0.102*** **	**0.0985*** **	**0.0981*** **
log (Marina yearly slip rental price)	-0.0376***	-0.0369***	-0.0678***	-0.0677***
Vessel characteristics				
log(Ship length) (in meters)	2.311***	2.311***	2.345***	2.344***
Number of beds	-0.0315***	-0.0316***	-0.0305***	-0.0305***
Vessel age (in years)	-0.0148***	-0.0148***	-0.0131***	-0.0132***
Vessel age^2 (in years)/10^6	0.736***	0.735***	0.650***	0.654***
Vessel weight (in tons) /10^3	0.00390***	0.00392***	0.00440**	0.00440**
Fuel capacity (in tons)	0.469***	0.470***	0.451***	0.451***
1 (Nautical charts and guides available)	0.0720***	0.0719***	0.0761**	0.0760**
1 (Global positioning system (GPS) available)	0.0601***	0.0604***	0.0711**	0.0712**
1(Marine VHF radio available)	0.0519***	0.0529***	0.0644	0.0645
1 (Electric refrigerator available)	0.000416	0.000453	-0.0173	-0.0172
1 (Gas stove with oven available)	0.0433***	0.0435***	0.0403*	0.0404*
1 (Electric anchor available)	-0.0454***	-0.0451***	-0.0424	-0.0425
Locational characteristics				
log(Average county monthly tourist arrivals) (in thousands)	0.123***	0.122***	0.130***	0.130***
Constant	0.426***	0.427***	0.35	0.351
R-squared	0.82	0.82	0.81	0.81

Empirical Methodology: Hotel room prices

- Hedonic equation for hotel room prices

$$\ln HotelRoomPrice_{it} = \beta_0 + \beta_1 BlueFlag_i + \sum \beta_i S_i + \sum \beta_{ct} Z_{ct} + \gamma_i + \varepsilon_{ilt}$$

- $HotelRoomPrice_{it}$: Average price (hotel, *i;* month, *t)*
- $BlueFlag_i$: indicator for Blue Flag certification of hotel's beach
- S_i : time-invariant hotel attributes: air-conditioning in rooms, indoor and outdoor pools, sports facilities, distance to the nearest Blue Flag certified beach, beach material composition
- Z_{ct} : time-varying characteristics of local area: average monthly county-level tourist arrivals, air temperatures
- γ_i : city fixed effects

Empirical Methodology: Marina slip rental prices with endogenous certification

- Endogeneity
  - First stage

$$\text{BlueFlag}_i = \beta_0 + \beta_1 CountyBFBeaches_i + \beta_2 FirmBFBeaches_i + \sum \beta_i X_i + \varepsilon_{il}$$

  - Second stage

$$\ln HotelRoomPrice_{it} = \beta_0 + \beta_1 BlueFlag_i + \sum \beta_i S_i + \sum \beta_{ct} Z_{ct} + \gamma_i + \varepsilon_{ilt}$$

Summary statistics: Hotel room prices

Table 3. Summary statistics for hotel room prices and associated characteristics

Variables	Mean	Std. Dev.
Hotel characteristics		
Hotel room price (in Euros)	73.9	52.8
1 (Blue Flag awarded to the hotel beach)	0.0927	--
Hotel category (2 through 5 stars)	3.17	0.799
Number of beds	201	194
1(Air-conditioning)	0.618	--
1(Sports facilities)	0.309	--
1(Open-air swimming pool)	0.329	--
1(Indoor pool)	0.226	--
Locational characteristics		
Nearest Blue Flag beach distance (in kilometers)	6.18	10.6
Airport distance (in kilometers)	35.5	25.4
Population (in associated urban area, in thousands)	22.9	45.7
1(Nearest Blue Flag beach composed of pebbles)	0.608	--
1(Nearest Blue Flag beach composed of sand)	0.402	--
1(Nearest Blue Flag beach composed of concrete)	0.494	--
1(Nearest Blue Flag beach composed of rock)	0.927	--
1(Nearest Blue Flag beach an urban beach)	0.608	--
1(Nearest Blue Flag beach with disabled access)	0.762	--
Average county monthly tourist arrivals (in thousands)	143	175
Average county monthly temperature (in Fahrenheit)	60.3	11.9

Note: Data on hotel room prices have 1164 observations.

Results: Hotel room prices with endogenous certification

Determinants of log(Hotel Room Prices) (n=969)

Variables	(1) OLS	(2) 2SLS	(3) RE	(4) RE2SLS
Hotel characteristics				
1 (Blue Flag awarded to the hotel beach)	**0.453*** **	**2.705*** **	**0.491***	**2.376** **
1(3* hotel)	0.00988	0.101*	-0.00243	0.0851
1(4* hotel)	0.495***	0.337***	0.518***	0.354
1(5* hotel)	1.180***	1.002***	1.166***	1.022**
Log (Number of rooms)	-0.190***	-0.207***	-0.178**	-0.209*
1(Air-conditioning)	0.303***	0.425***	0.338**	0.412*
1(Sports facilities)	0.000312	-0.563***	0.00778	-0.4
1(Island location)	0.0861	2.836***	0.669	-1.266
Locatinal characteristics				
log(Airport distance) (in kilometers)	-0.222*	-1.286***	-0.294	-1.182
log(Population) (in associated urban area, in thousands)	-0.119*	-0.645***	-0.158	-0.352
log(Average county monthly tourist arrivals) (in thousands)	0.122***	0.131***	0.122***	0.122***
Constant	4.477***	8.055***	4.276	9.257*
R^2	0.83	0.56	0.82	0.68

Findings/Conclusions

- The first study to analyze price premia associated with eco-labeling of services
- Blue Flag environmental certification for marinas implies price premia of:
  - ~32% for daily slip rental
  - ~45% for monthly slip rental
  - ~22% for yearly slip rental
- Home marina with Blue Flag certification implies ~ 7% price premium on a weekly sailboat rental
- Hotels managing a Blue Flag certified beach enjoy ~65% price premium on hotel rooms

Caveats/Work-in-progress

- Endogenous eco-labeling
  - Further explore the determinants of Blue Flag certification status
- Certification effects on water quality