How free admittance affects charged visits to museums: An analysis of the Italian case

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Motivation

Two recent facts

<1>

- The BBC websites,
- on December 1st 2011 (the day marking the 10th anniversary of the government's decision to end charges at England's national museums),

reported that:

- "Government-sponsored museums that have stopped charging since 2001 have seen combined visitor rates more than double in the past decade, figures show. [...] Almost 18 million people visited the 13 attractions in 2010-11, compared with 7 million in 2000-01. "

Motivation

Free museums: Visits more than double - BBC News

BBC | News | Sport | Weather | Shop | Earth | Travel

Free museums: Visits more than double

1 December 2011 | UK

Government-sponsored museums that have stopped charging since 2001 have seen combined visitor rates more than double in the past decade, figures show.

Almost 18 million people visited the 13 attractions in 2010-11, compared with 7 million in 2000-01.

Thursday marks the 10th anniversary of the Labour government's decision to end charges at England's national museums.

Motivation

<2>

- In different recent interviews, the Italian Minister for Culture and Tourism, underlined the spectacular increase in numbers of museum attendance in 2014, 2015, and 2016 thanks to the fact that free admission was established for each first Sunday every month in all Italian state museums, starting from July 2014.
- The official MIBACT website:
  - ✓ in the 2.nd semester 2014, w.r.t. the previous year :
    - free visits +5% , charged visits +7%.
  - ✓ in 2015 (w.r.t. 2014):
    - free visits +4% , charged visit +6% , revenues +14%.
  - ✓ in 2016 (w.r.t. 2015):
    - free visit +4%, charged visits +4%, revenues +12%.

Motivation

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➢ **These data would suggest, according to the Italian Government, that the policy of promoting free admission has benefitted charged admission too.**

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Motivation

- Several other references to specific cases, in which free admission led to positive effect on charged visits (or, more in general on museum revenues) can be provided.

In general,

- The effect of tickets upon museum attendance has been widely studied by academic scholars too, from different scientific perspectives.
- Pros and cons of free admission to museums (and monuments) is an ever-green in cultural economics (Frey and Steiner, 2006), and marketing.
- The fee policies differ, across countries, and across museums in any country.

Motivation

- All possible combinations of rules concerning entrance to museums are present, in any country:
  - admission fee is required without exception;
  - charged admission joint with strict or large policy concerning free or reduced admission to certain sub-groups,
  - free admission for all (sometimes joint with a plea for voluntary contribution).
- This variety of admission fee rules holds also within a group museums which are similar in nature or managed by the same company. (E.g., within the Smithsonian group)

Motivation

A recent study: Chen et al. (ATR, 2016):

- they examine the effects of the introduction of universal free admission to public museums in Taiwan,
- they find that the new free-admission policy in public museums leads to larger number of visits to both public and private museums (with charged visits).
- (Positive externality: free entry to public museums can also benefit private museums, increasing their paying visitors).

❖ *Here we investigate whether a similar effect exists over time:*

❖ *Does a larger free-admission policy in public museums enhance (contemporary and future) charged visits?*

Literature

Available studies (/1):

- Studies on demand: Price is not a serious barrier to visit to museum, and the price elasticity of museum visitors is low (Steiner, 1997; Luksetich and Partridge, 1997);
- At most, price can represent a perceived subjective barrier.
- Contingent valuation studies to measure willingness to pay
  - Ref.: Santagata & Signorello (2000), Sanz, Herrero & Bedate (2003); Bedate et al. (2004, 2009); Lampi & Orth (2009)
- Free-entry, joint with voluntary contributions, may maximise museum revenues, and charged admission does not hurt museum attendance, and may have positive aggregate effects.

Literature

Available studies (/2):

- The merit good nature of heritage is a theoretical reason supporting the free attendance of public museum (O'Hagan, 1995).
- The addiction in cultural consumption may also suggest that promoting the free admission of (young, but not only) people will enhance future demand.
- Most part of scientific evidence concerning the effect of tickets on museum attendance is based on **individual surveys**, or research at specific museums,
  - (See the comprehensive reviews in Kirchberg, 1998; Frateschi et al., 2009; Brida, Meleddu & Pulina, 2013).

Literature

The novelty of our present analysis:

Instead of focussing on case studies (individual surveys; specific museums), ...

We examine **aggregate data** on visits to a large set of museums and monuments.

Specifically, we examine the attendance at the Italian State museums and monuments, over the period 1996-2015.

Our data: time series of monthly data, Jan. 1996 - Dec. 2015.

Outline of the presentation

Outline:

- 1) The statistic properties of the monthly time series at hand: seasonality and its nature.
- 2) Relations between free visits, charged visits and tourist flows.
- 3) Theoretical considerations and policy suggestions.

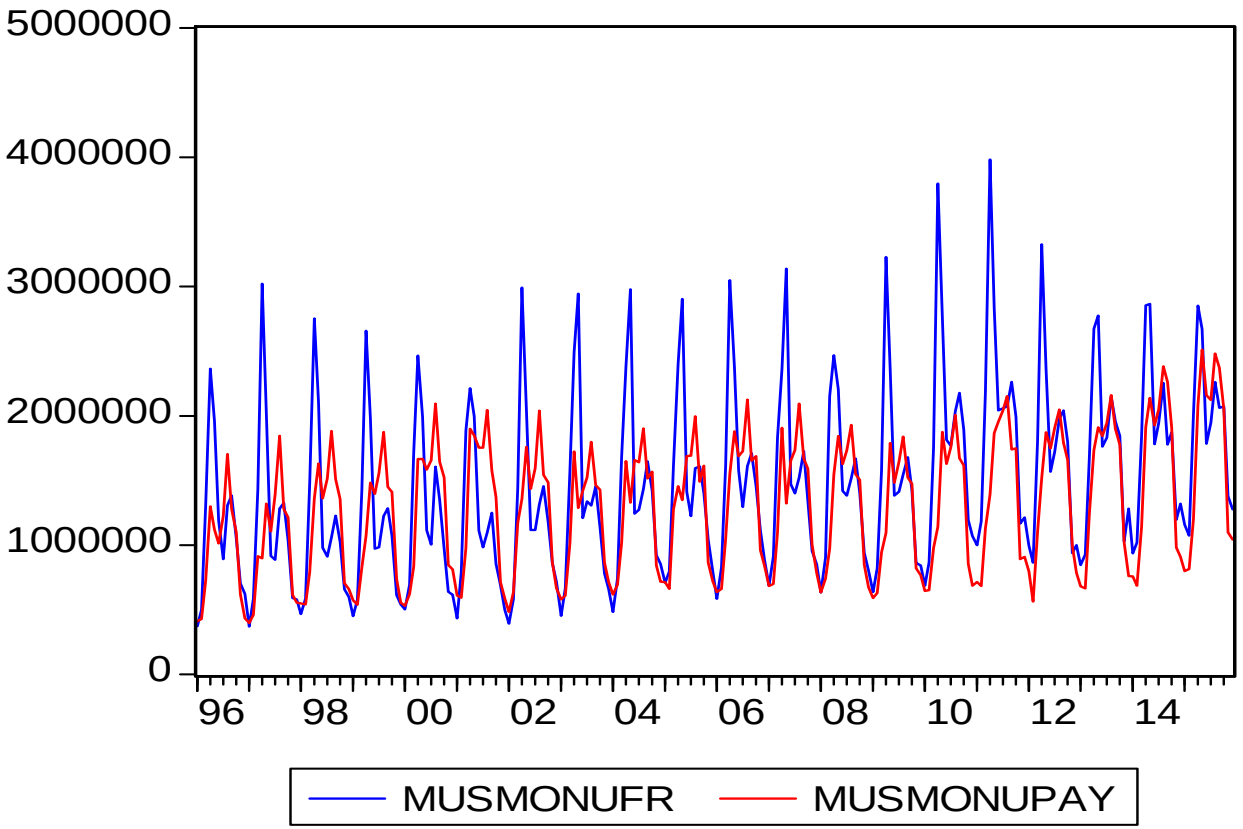
Data

Data at hand:

- from MIBACT - the Italian Ministry of Culture and Tourism
- freely available from *www.statistica.beniculturali.it* .
- Monthly series of free and charged visits to all State museums, monuments, historical parks and gardens and archaeological areas.
- A total number of (12*20)=240 observations
- The group of sites is very large (made by more than 400 spots), and heterogeneous: it includes superstar museums (like Uffizi in Firenze), superstar archaeological areas (i.e., Pompei, Foro Romano), superstar monuments (i.e., Colosseo) but also minor heritage attractions, spread over Italy.

Data

Free (blue) and charged (red) visits



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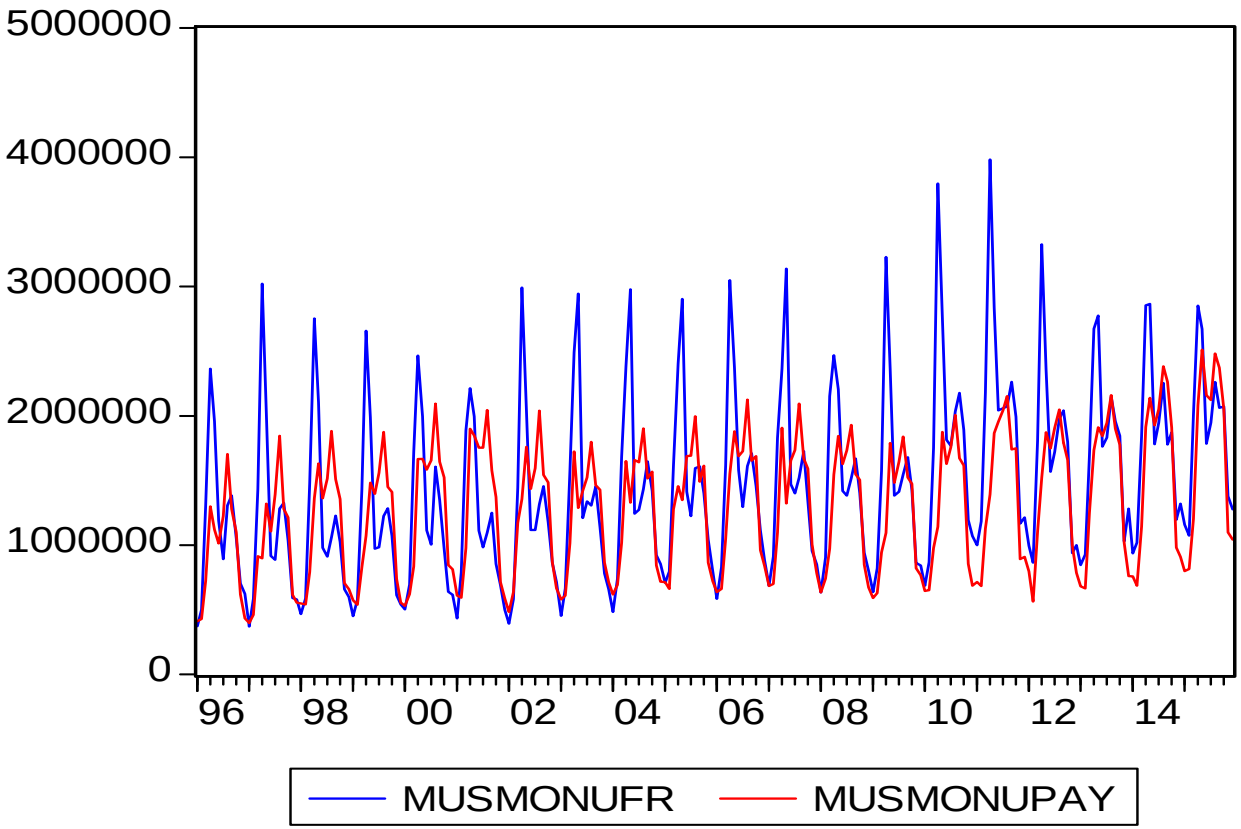


. Strong seasonal patterns

. Larger flows of free visits

. (especially due to peak month)

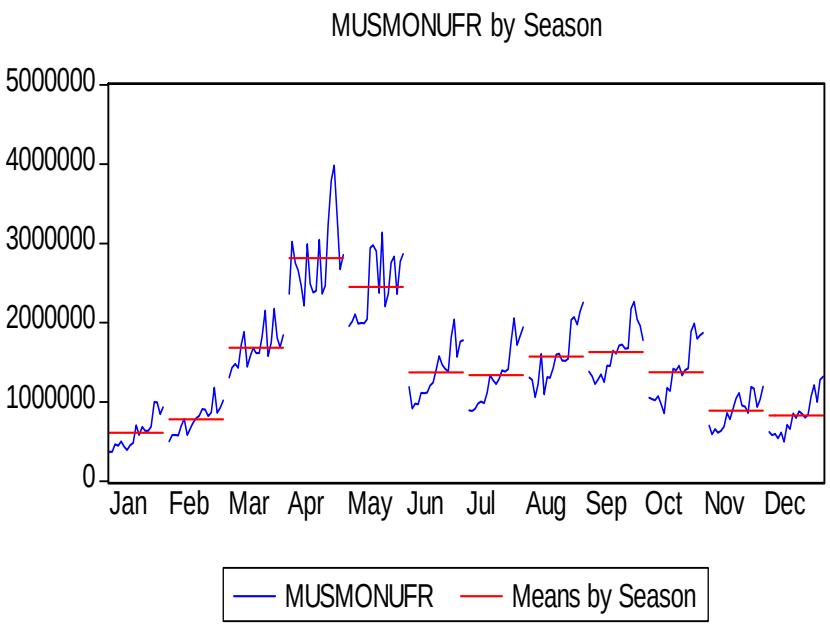
. Larger seasonal variation for free visits

. Peaks occur at different months

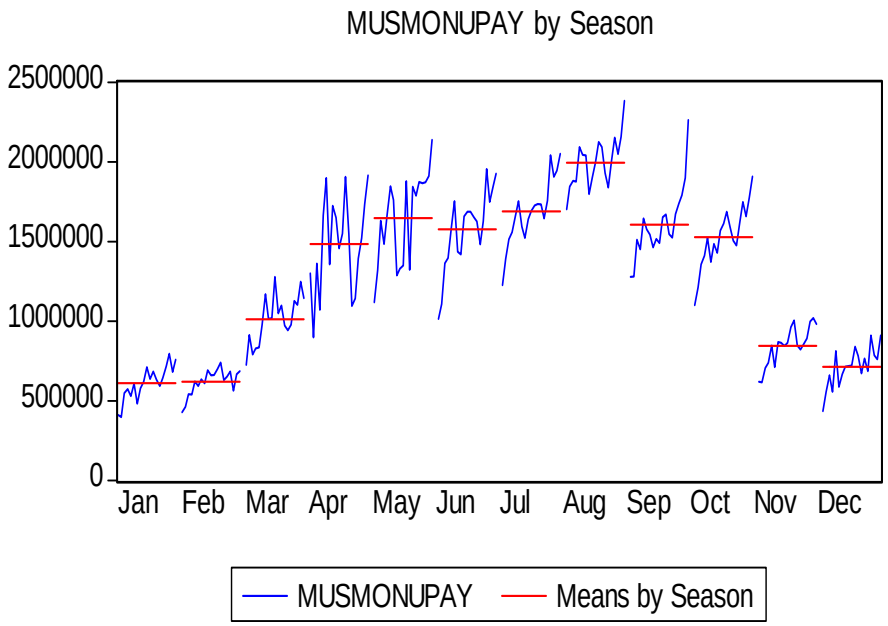
Data

(The same, month by month)

Free



Payment



Data

A very clear story:

- The peak months for free visits are the Spring months (April and, in the second place, May).

  This is due to the visits of school students in organized tours, which typically take place in Springs.

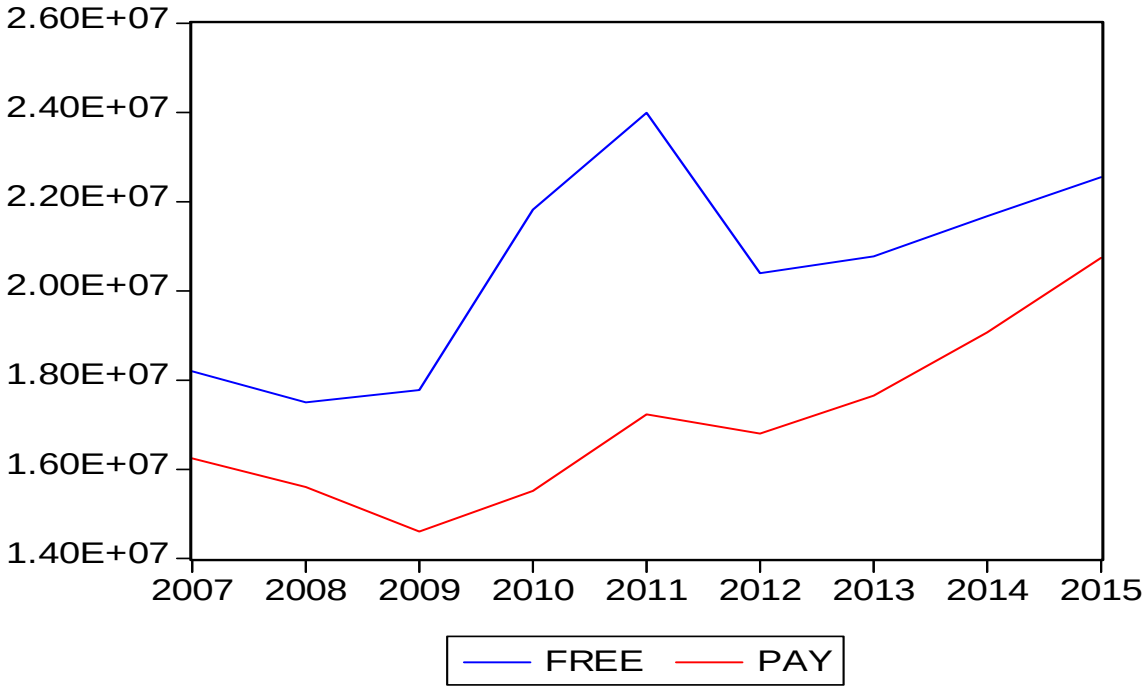
- The peak months for charged visits are in Summer (August, and in the second place, July).

  This clearly suggests that tourist flows (whose peak is in August and July) have an effect on the size of visits to museums and monuments.

- The fact that tourist arrivals drive visits to museum and monuments is widely documented (see Cellini and Cuccia, 2013, for a specific application to the Italian case).

Data

The same (over the years of the “Great recession”)



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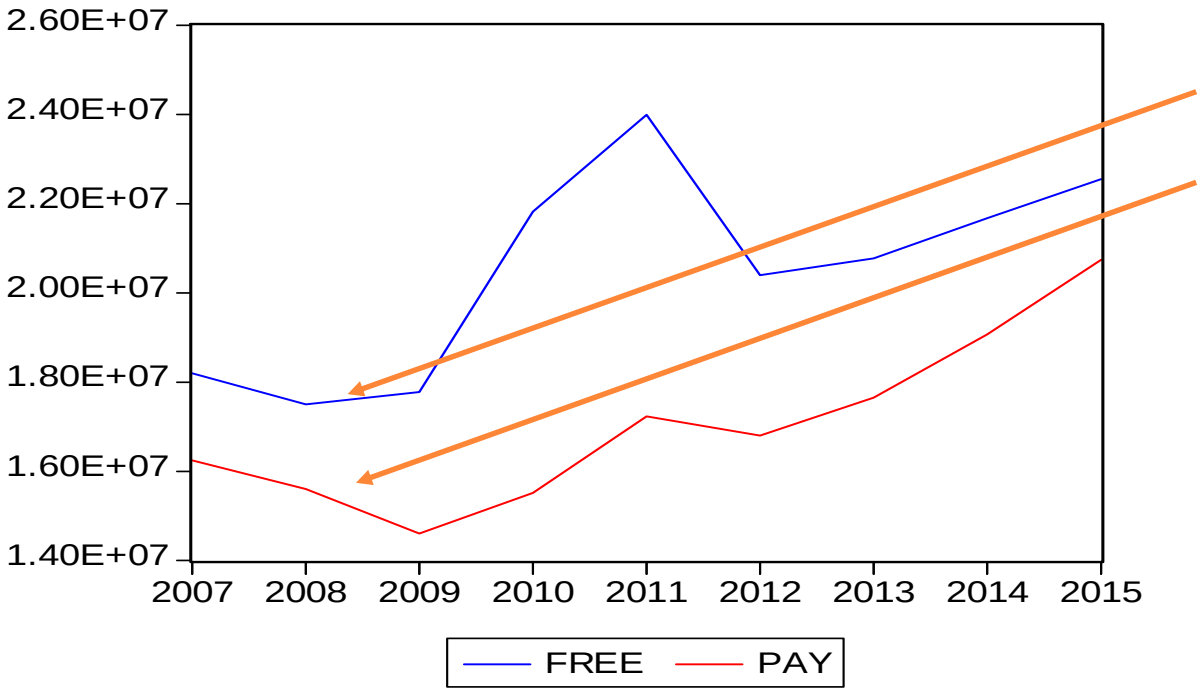

-3.8%

-3.9%

Data

Statistics

	FREE VISITS	CHARGED VISITS
Mean	1,468,755	1,300,212
Median	1,344,276	1,360,045
Maximum	3,981,811	2,511,003
Minimum	371,681	398,435
Std. Dev.	709043.4	519583.9
Month with min average	JAUNARY (640,482)	JANUARY (620,815)
Month with Max average	APRIL (2,816,942)	AUGUST (2,0200,039)
F test on seasonality	$F_{11,228}$=213.95**	$F_{11,228}$=371.24***
K test on seasonality	K=222.55**	K=214.83**
F test on moving seasonality	$F_{19,209}$=2.47**	$F_{19,209}$=1.25$^{n.s.}$
SF (min-Max,1996) SF (min-Max,2015)	0.96-1.01 0.96-1.02	0.95-1.04 0.95-1.03
Observations	240	240

Data

Statistics on seasonality:

- the presence of significant seasonal components cannot be rejected;
- seasonality appears to be more limited and more stable over the years for the charged attendance, as compared to free attendance:
- the appropriate *F*-test on moving seasonality detects moving seasonal factors for free visits (with a tendency to reduction, as shown by the change of seasonal factors), while rejects the presence of moving seasonality for charged visits.

Data

The nature of seasonality:

- Seasonality may have a stochastic or a deterministic nature;
- i.e., it can be driven by the presence of seasonal unit roots, or by the presence of deterministic seasonal components.
- Test to detect the presence of seasonal unit roots: **Dickey, Hasza and Fuller** (1984), (extension of DF test) .
  - Hylleberg et al. (1990) and Beaulieu & Miron (1993) proposed other test procedures, still following a regression-based approach.
  - These tests have been largely employed to analyse monthly time series in the field of tourism (see, e.g., Cellini & Cuccia, 2013, referring to Italy).
- However, Smith & Taylor (1998) and Taylor (1998):
  - the DHF procedure does not allow for different time trends across the seasons, and ...
  - the null of the presence of seasonal unit root is easily rejected, if one allows for different trends across seasons.

Data

The nature of seasonality:

- Let Y_t denote a monthly time series,
- With representation $Y_t = a + \rho Y_{t-12} + v_t$
- The series possesses a seasonal unit root if the null hypothesis $\rho = 1$ cannot be rejected
- Operationally : Subtract $Y_{t\text{-}12}$ from both sides ; consider regression $\Delta_{12} Y_t = a + \alpha Y_{t-12} + v_t$, and evaluate the null hypothesis $\alpha = \rho - 1 = 0$
- Moreover, more complex deterministic components of the data generation process of Y_t can be considered. Specifically:
- (a) $a = \{a_i\}_{i=1}^{12}$,
- (b) a number of AR terms of to have w.n. residuals (in most cases, the 1st, 2nd and 12th)
- (c) a deterministic trend (T) can be appropriately considered as well.

Data

The nature of seasonality:

- Hence, the following specification is considered

$$\Delta_{12} Y_t = \sum_{i=1}^{12} a_i + \tau T + \alpha Y_{t-12} + \sum_j \beta_j \Delta_{12} Y_{t-j} + \varepsilon_t$$

- **Taylor (1998)** makes a relevant point concerning the inclusion of deterministic trend: the inclusion of 12 different trend terms (one for each season) can be appropriate, and in such a case the null of seasonal unit root may be rejected, whereas is cannot be rejected in the presence of one trend, common to all seasons.
- Thus, he suggests to consider:

$$\Delta_{12} Y_t = \sum_{i=1}^{12} a_i + \sum_{i=1}^{12} c_i T_i + \sum_{i=1}^{12} b_i Y_{t-i} + \varepsilon_t$$

and proves that the null of no-seasonal-unit-root corresponds to $\sum_{i=1}^{12} b_i = 0$

Data

Statistics on seasonality:

- Application of the Taylor method to our data:

Table 2 – Test on seasonal unit roots

	FREE VISITS	CHARGED VISITS
Hasza-Dickey-Fueller test (critical value Student-t 5%: -6.13)	-0.665 (-8.19)***	-0.55 (-8.68)***
Taylor $F_{1,2,...12}$ test (critical value 5%: 7.240)	10.321 (p=.000)***	7.534 (p=.000)***

Note: Hasza-Dickey-Fuller test report the estimate of the alpha coefficient (and its Student t) in [1]; only significant lag terms of $\Delta_{12}Y_t$ are considered. Taylor $F_{1,2,...12}$ test considers eq. [2] and provides the result of the F test on the null b1=b2=...b12=0. In both cases, the null is the presence of a seasonal unit root.

- **Tests on seasonal unit root, in the presence of different seasonal deterministic trends, reject the null**

Data

Statistics on seasonality:

- ... but deterministic seasonal trends differ across seasons (in some months they are insignificant)

QUESTION:

- What is the meaning of the fact that we model time-series as “endowed with different deterministic seasonal trends”, rather than “seasonally integrated”?
- (➔ the effects of shocks are “less permanent”)

The relations between charged- and free- visits

Here, the core analysis:

- Our specification

  (on the basis of the considerations concerning the nature of seasonality):

$$Y_t = \sum_{i=1}^{12} a_i + \sum_{i=1}^{12} c_i T_i + \beta X_t + \gamma Z_t + \sum_{i=1}^{12} \lambda_i Y_{t-i} + \sum_{i=1}^{12} \varphi_i X_{t-i} + \varepsilon_t ;$$

where

Y = the charged visits to museum and monuments

X = the free visits

Z = a control variable (tourist arrivals).

The relations between charged- and free- visits

- We proceed from the general to the particular, and we maintain only the significant terms in the regression specification.
- Only a sub-set of the 12 seasonal dummy variables, and only a subset of seasonal trends are statistically significant, and hence are kept in the final specification, beyond a constant term and a time trend.
- Similarly, only the significant lags of variables *X* and *Y* are kept in specification (usually, the lags of 1st, 2nd and 12th order).

The relations between charged- and free- visits

- Results (Basic Specification) (Dept Variable: CHARGED_ VISITS

Constant (×1,000)		110.3 (1.66)*
Seasonal constant dummy (×1,000) [month number in brackets]	[1]	-224.8 (-4.78)***
	[6]	19201 (1.75)*
	[7]	42356 (3.49)***
	[8]	53320 (4.29)***
	[11]	-242.2 (-4.49)***
Seasonal deterministic trends [month number in brackets]	[2]	-111.8 (-4.93)***
	[6]	-9772.7 (-1.78)*
	[7]	-21304.5 (-3.50)***
	[8]	-26756.6 (-4.30)***
	[9]	-155.3 (-5.52)***
	[12]	-84.1 (-3.61)***
TOURIST ARRIVALS		0.115 (6.39)***
FREE_VISITS		-0.203 (-5.87)***
FREE_VISITS (-1)		-0.084 (-3.10)***
FREE_VISITS (-2)		-0.084 (-2.50)***
FREE_VISITS (-12)		0.136 (3.74)**
CHARGED_VISITS(-1)		0.269 (5.81)***
CHARGED_VISITS(-12)		0.216 (3.70)***

R2	0.96
F	248.4***
DW	1.73
AIC	26.21

The relations between charged- and free- visits

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Tourist arrivals significant

(the same, if tourist overstays are considered)

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Contemporary free entrants negative

(Crowding out)

R2	0.96
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The relations between charged- and free- visits

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Positive and significant effect of 12th lag of free entrants

The relations between charged- and free- visits

- Results

Effect of CUMULATED LAGGED FREE_VISITS

$$CUMUL\_FREE\_VISITS_t = \sum_{i=1}^{12} FREE\_VISITS(t-i)/12$$

R2	0.94
F	231.3***
DW	2.11
AIC	26.50

Constant (×1,000)	162.2 (2.50)***	
Seasonal constant dummy (×1,000) [month number in brackets]	[1]	-257.2 (-4.59)***
	[4]	152.5 (3.21)***
	[7]	-105.9 (-1.99)***
	[8]	23065 (1.88)*
	[11]	-317.9 (-5.10)***
Seasonal deterministic trends [month number in brackets]	[2]	-122.3 (-4.60)
	[8]	-11486 (-1.88)*
	[9]	-59.0 (-2.93)***
	[12]	-117.3 (-4.50)***
TOURIST_ARRIVALS	0.043 (4.11)***	
FREE_VISITS	-0.03 (-0.98)	
CUMUL_FREE_VISITS	0.112 (2.29)**	
CHARGED_VISITS(-1)	0.249 (5.54)***	
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The relations between charged- and free- visits

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Positive, significant !!

The relations between charged- and free- visits

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Contemporary free visits: NO LONGER SIGNIFICANT!

(the crowding-out effect disappears)

The relations between charged- and free- visits

- Results

Effect of CUMULATED LAGGED FREE_VISITS

$$CUMUL\_FREE\_VISITS_t = \sum_{i=1}^{12} FREE\_VISITS(t-i)/12$$

Question:
Are TOURIST ARRIVALS Endogeneous??

Hasuman exogeneity test:
Chì-sq = 33.17 *** (p = 0.000)

However, IV estimates (with 1,2,12 lags as the instruments) provide very similar coefficients

R2	0.94
F	231.3***
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TOURIST_ARRIVALS	0.043 (4.11)***
FREE_VISITS	-0.03 (-0.98)
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The relations between charged- and free- visits

Elasticity coefficients:

based on estimates from baseline regression (OLS, Col. 2):

- $E_{charged\_visits,\, cum\_free\_visits(-1,-12)}$

  = 0.13 (s.d. 0.06)

- A small (but statistically significant) contribution of free visits to the increase of charged entrants!

The July 2014 break

Question:

Is there a significant structural break in July 2014?

- Taking July 2014 as the break-point,

  the Chow breakpoint test provides the statistics:

  F=2.09 (p=0.01)**, LR=33.57 (p=0.003)***,

➔ the absence of structural break has to be rejected.

- Which specific coefficients do show structural instability?

(We investigate possible breaks involving the constant term and the slope coefficients of contemporary and past free visits, as well as the tourism variable.)

The July 2014 break

The only significant regressor (in the sub-period after July 2014) is the contemporary free visitors

(positive and significant!)

Constant (×1,000)	260.0 (3.85)***	181.2 (1.97)*
Trend (year)		-9042.3 (-1-93)*
Significant Seasonal constant dummy	*[4,7,8,11]*	*[1,4,7,8,11]*
Significant Seasonal deterministic trends	*[2,8,9,12]*	*[2,8,9,12]*
TOURIST ARRIVALS	0.045 (4.36)***	0.048 (4.74)***
FREE_VISITS	-0.029 (-1.09)	-0.027 (-1.02)
CUMULATED_FREE_VISITS	0.081 (1.63)	0.226 (2.42)**
CHARGED_VISITS(-1)	0.238 (5.42)***	0.209 (4.75)***
CHARGED_VISITS (-12)	0.324 (5.34)***	0.377 (6.02)***
DU(Since07-2014)	-898498 (-0.41)	
DU(Since07-2014) * TOURIST_ARRIVALS	-0.003 (-0.24)	
DU(Since07-2014) * FREE_VISITS	0.200 (2.39)**	0.086 (4.48)***
DU(Since07-2014)*CUMUL_FREE_VISITS	0.376 (032)	

The July 2014 break

- Caution is necessary, in front of the limited number of observations available after July 2014
- The decision of promoting free visits to state museums and monuments emerges to have a structural effect,
- ... that strengthens the positive relation between free and charged visits.
- Contemporary relation between free and charged visits: they start to behave as complementary goods.
- (but also lagged relation is influenced: a higher sensitivity emerges, as measured by the elasticity coefficients)

The July 2014 break

In other words,

- The positive externality from free to charged visits to museum emerges even without time lag (after the July 2014 governmental decision of promoting free visits has come in place).
- At the same time, the effect of past free visit remains positive and significant;
- taking the last specification as the final one,

  the elasticity coefficients (after July 2014):

$$E_{\text{charged\_visits, contemp\_free\_v}} = 0.07^{***}$$

$$E_{\text{charged\_visits, previous12\_free\_v}} = 0.25^{**}$$

Theoretical considerations

- The fact that **opportunity cost** of cultural consumption is decreasing in the stock of consumed cultural services and commodities;
- The fact that and cultural consumption is characterized by **addiction** ...
- ... are milestones in cultural economics!

  Becker and Murphy (1988)
  Stigler and Becker (1977)
  Ch. 3 of Book 3 in Marshall's *Principles* (Marshall,1890).

These arguments provide support for the point that enhancing free visit to museums today may increase demand for museum tomorrow.

Theoretical considerations

- The evidence is also fully consistent with ***framing theory*** of consumption (Tversky & Kahneman, 1981; Thaler, 1985).
- Consumers make their choice on the basis of a mental accounting system: they firstly allocate income to specific expenditure categories (e.g., food; clothes; culture...), and in a second stage they make the choice within each expenditure category.
- If the museum entrance is free instead of charged (in a given day, or in a given place), consumers who use this opportunity remain with a higher disposable income to spend for other goods and services within the expenditure category to which museum visits belong.

Theoretical considerations

- Possibly, this expenditure category includes not only museum visits, but also other cultural (and perhaps recreational and tourist) goods and services.
- This may explain why the elasticity is lower than 1: The possibility of free visit to a museums entails a saved sum of money, which will be devoted by consumers to other museum visits or to other goods within the same expenditure category.
- From a policy-making perspective, free admission policy to public museums has beneficial effects not only on subsequent charged visits to public (and private) museums, but also on the whole cultural and entertainment industry, as well as on tourism and hospitality markets.

Concluding remarks

The Italian case provides support to the points that

Enhancing free visit to museums today does increase demand for museum tomorrow.

The elasticity of charged visits to museums to past free visit is about 0.2-0.3.

The elasticity has increased, and the response has became more immediate, after the new policy (enhancing free visits to museums) has come in place in Italy, in July 2014.

Thanks!

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