CULTURAL PARTECIPATION, PAST CONSUMPTION AND WEATHER CONDITION

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ABSTRACT

Cultural participation is the result of interactions between supply and demand. The maximum possible consumption is the number of performance offered multiplied by venues capacity. In the short run supply can adapt modifying the number of performance while in the long run can adapt also the capacity building or dismissing theatres.

We analyze cultural participation using a rich dataset which span monthly in the years 2006-2016 for 110 Italian provinces.

Cultural participation can be influenced by economic and social condition such as income, literacy or unemployment, and we test the possibility that weather conditions can play a role. Our empirical specification includes the possibility for rational addiction already tested in recent literature.

We focus on three main kind of performances: movies, theatres and concert and estimate both price elasticities and cross elasticities.

We find that weather condition play a small but significant role in determining demand for cultural goods but more for movies than in theatre and concert where prior reservation is typical.

Keyword: Cultural participation, live performances, theatre, demand, movie exhibition, cross elasticities, weather conditions

Jel codes: L82, D12, Z11

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1 INTRODUCTION

While income and price elasticities are the usual end products of empirical demand analysis only few paper devoted to the demand for performing arts derives such elasticities and a broad part of literature is devoted instead to more broadly examining the competing determinants of audience attendance or participation patterns (Seaman 2006).

Gapinski (1986) explore the substitution between different form of live performance, or within a specific art expression using firm data of 13 London companies along twelve years and finds the cross elasticities to be all positive showing that different individual demands are rather interdependent. He finds own price elasticity all below unity and argues that theatres can rise revenues through a price increase also if there would be a spillover on other companies because of observed substitutability.

Muniz, Rodriguez, Suarez (2017) in a participation analysis hat use survey data confirm the importance of income and education in determining participation in cultural activity and its frequency using Spanish Time Use Survey with a sample of individual between 18 and 65 years old. Running separate estimates by gender they find that female frequency of attendance increases with wage and decrease when they are working. Moreover female cultural participation is more sensitive to earning and non labour income than male participation. While their methodology does not allow to estimate proper elasticities, they suggest that cultural promotion policies should be focused on the most disadvantaged population in term of education and earnings.

Cultural activities can be considered a preferential platform to produce relational goods that influence positively individual well-being as emerge from a study based on a survey of Italian population (Blessi G., E.Grossi, P.L.Sacco, G.Pieretti, G.Ferilli, 2014). Cultural experiences may then be much more than a pleasant way to spend leisure time. They may be important platforms for the development of individual dispositions and capabilities that may substantially expand the potential of self-determination, the strategies for the pursuit of life satisfaction, the articulation and adoption of lifestyle choices. While relational goods cannot be directly produced by the state, public action can promote personal interaction in many ways, for istance supporting arts and sport that are not only linked with entertainment but to the more central issue of social development.

While many studies find figures of income elasticities inferior to the unity for many cultural product, expecially the ones that use aggregate data (Seaman 2006?), a recent paper using microdata from income and expenditure in seven Latin American countries, estimate Engel equation and efind that culture behave as a luxury good, with income elasticity around 2 (Acerenza Gandelman 2019).

Cultural spending is larger in urban area, in household where the head is a female but lower as the number of children increases. Most educated people spend more in cultural both in absolute level but also as a percentage of total household consumption also after controlling for the total household total expenditure. For the authors this means that educated people appreciate more cultural spending.

Buzanakova and Ozhegnov (2016) use the data of different seat area of a single theatre to estimate a centile regression and find that demand is weekly elastic to price and the price elasticity change for different performance with the more popular performances exhibit the less elastic demand .

Hallmann et al. (2017) show a small but significant correlation between sport and cultural participation that can be described as complementary and competing activities. Leisure times, gender, education and subjective well-being are significant predictor of both sport and cultural participation.

In a paper close to our Castiglione and Infante (2016) show than theatre consumption is consistent with the theory of rational addiction with past consumption influencing current consumption. The utility is influenced by learning by doing. The study is based on a panel of 20 italian regions over the period 1980-2013.

There are not many analysis on the impact of meteorological conditions on cultural consumptions. As many of the recent work on the impact of weather conditions, the few analysis concerning cultural good rely mainly on single institution data but with daily observation that can better isolate the role of such factors as rain.

Cellini and Cuccia(2019) using daily data of Museo della Ceramica in Sicily, document a significant effect of weather conditions, specifically temperature and rainfall, which work in an asymmetric way across the different seasons. Temperature has a significant non-monotonic effect on museum attendance, with an increase having a positive impact in low-temperature (non-summer) months and a negative impact in high-temperature (summer) season; rainfalls encourage museum visits but only during summer months. They consider only paid entrances leaving away school visits and older people free entry.

In another study focused on a single museum in New Zeland, Cuffe(2018) use subdaily data and find that the magnitudes and signs of the effects of rainfall vary significantly throughout the day.

In some hours, the predicted increase in visitors is nearly three times larger than would be expected from estimates using daily measures. Many individuals appear to actively adjust their plans throughout the day in response to rain, while others' attendance depends upon prior weather forecasts of rain.

In a more general work Connolly (2008) considers the effects of weather conditions on daily labor-leisure decisions of individuals. Using diary data from the American Time Use Survey (ATUS), Connolly finds that men respond to daily precipitation by working more and engaging in less total leisure. At the same time, women report greater time spent in leisure on days with rain, as well as more minutes in indoor activities.

A little broader literature explores the weather impact os sport practice (Provencher,2002; …) or on outdoor activities like visiting zoo (Zivin and Neidell, 2009).

Weather condition can have different effect on cultural consumption. Rain can crowd out other outdoor activities therefore increasing demand for indoor performances, but at the same time can make an evening out of home more disagreeable and then decrease demand. The intensity, predictability or the part of the day can have an important role that cannot be captured with monthly data. Temperature act differently depending on the average condition of the area and the possible extreme values. A temperature of 4 degree in winter can reduce demand for out of home activity in the south of Italy but increase it in many northen provinces.

To capture these different possible effect we use a non linear relation with deman (quadratic term) and an interaction with a month dummy to show possible different effect in different seasons.

2 DATA DESCRIPTION

Our data come from different sources. From Siae (Società Italiana Autori Editori, the public italian collecting society) we obtained montly data on admittance for different cultural consumption, for the 110 italian provinces from January 2006 to December 2016 with a total in theory of 13200 observation. But the panel is not balanced since in different provinces not always there is supply and demand for each specific cultural good.

For each sector we obtained total revenues that divided by monthly admittance produce an average price, than the number of performances that is the first proxy for supply.

From the yearly data on the number of venues for different cultural goods and the number of total seats available we built the average number of seat per sector (an yearly date) that multiplied by the monthly number of performance give us the effective total supply. Probably there are some overlapping between the number of venues since not every venue has on an exclusive sector.

Especially in minor town a single venue can work as a theatre, hosts ballet performances and work as a cinema in some days of the week.

There are some inconsistencies in these data, that are probably due to error in data collection, and the problems emerge when there are ratio like price (revenue/attendance) or occupancy rate (tickets/total seats avalilable).

From Istat (Italian Institute for Statistic) we took the province data on economic and social conditions, namely population, unemployment, participation to the labour market, value adde per province, disposable income and age group. Many variable are not available on a monthly basis but at quarterly or yearly observations. The level of instruction is proxied by the average number of years of school attendance.

From Aeronautica Militare we obtained the data average temperature and total rain on a monthly basis from January 2007 to December 2016 for the single meteo stations. Areonautica Militare list almost 200 station but due to budget reduction some of them, not relevant for the airports, were not maintained and others were transferred to regional administration to be integrated in regional meteo systems. In total we have data form 96 stations for rain and from 105 stations for temperature. Some of these station are installed on top of the mountains and are unrepresentive of their province for average data and we need to exclude them. In the end we could match meteo data for 56 provinces representing 73% of Italian population that are the sample we use in first draft.

Summary Statistics

VarName	Obs	Mean	SD	Min	Max
ticketsballet	4448	2466.103	4150.830	1.000	63060.000
priceballet	4448	15.386	145.581	0.100	6836.140
supplyballet	4448	5138.371	7777.148	8.000	98805.547
ticketsconcert	5443	3059.927	6138.147	1.000	76922.000
priceconcert	5443	17.329	102.072	0.009	4892.222
supplyconcert	5443	5593.633	8668.291	40.000	79313.758
ticketsmovie	6450	95829.711	1.47e+05	104.000	2.30e+06
pricemovie	6450	5.915	0.701	1.266	11.242
supplymovie	6450	5.95e+05	7.26e+05	5017.500	1.00e+07
ticketsopera	3381	3983.936	13958.493	1.000	2.29e+05
priceopera	3381	365.078	13186.237	0.121	7.54e+05
supplyopera	3381	4461.989	6603.648	39.000	95886.664
ticketspop_concert	5520	7432.727	17303.982	1.000	3.35e+05
pricepop_concert	5520	18.069	24.339	0.116	1029.033
supplypop_concert	5520	22611.428	70385.922	180.000	1.54e+06
ticketstheatre	6279	14059.324	28055.881	1.000	4.00e+05
pricetheatre	6279	37.607	1145.548	0.196	90232.500
supplytheatre	6279	34144.480	80588.272	123.286	1.26e+06
occupancytheatre	6279	0.468	0.334	0.001	4.041

temperature	6452	15.353	6.840	-0.890	30.220
rain	6332	69.507	174.427	0.000	11374.800
education	6428	9.648	0.584	8.138	11.393
lowage	6452	2.37e+05	2.31e+05	41125.000	1.41e+06
midage	6452	3.14e+05	2.82e+05	70606.000	2.00e+06

3 MODEL

We set up the model as follow:

$$Q_{it} = \beta_0 + \beta_1 P_{it} + \beta_2 X_{it} + \eta_i + \phi_t + \nu_{it} \qquad (1)$$

The dependent variable Qit is the quantity of tickets sold, and the independent variable Pit is the price per-ticket. Xit is a vector of control variables including demographic conditions, macroeconomic variables and meteoric variables. ηi is the province fixed effect and ϕt is a vector of season dummy variables, and νit is the sector-province and time variant unobservables. To take into account the fact that the provinces with higher population are more likely to have more tickets sold, we control for population in each province. Meanwhile, we also put people into three groups based on age: low age group (below 35 years old), middle age group (36 to 70 years old) and high age group (71 above) and control the percent of each group in each province.

We run the regression for different sectors separately. Each observation is a sector in a province in a month of a year. The result is displayed in Table 1 and 2. Column 1 to 6 are ballet, concert, theatre, pop concert, movie and opera, respectively. The control variables include the average value added for the province, annual average population, disposable income, average education level, average labor participation rate, unemployment rate, population in different age groups. For the meteoric variables, we have rain and temperature, and we also interact these variables with season dummy variables.

We find that for every sector, ticket price has a negative and significant effect on the quantity of tickets sold, which is consistent to the law of demand.

We find that people's age range does not have significant effect on tickets sold, but the percent of lower age people has negative effect on the tickets sold and middle age people has positive effect. This fact is not counter-intuitive.

Table 1: *Panel data regression with province fixed effect for different sectors*

	(1)	(2)	(3)	(4)	(5)	(6)
logprice	-0.377	-0.378***	-0.204***	-0.614***	-0.762***	-0.594***
	(-1.86)	(-3.45)	(-12.07)	(-6.91)	(-5.90)	(-17.62)
VA	0.000114	0.000191*	0.0000583*	0.0000722	0.0000764*	0.000125
	(1.00)	(2.03)	(2.14)	(1.26)	(2.32)	(1.72)
annua	0.0000141*	-0.00000565	-0.00000439**	0.00000881*	-0.00000561	0.00000689
	(1.98)	(-1.11)	(-2.67)	(2.43)	(-1.43)	(0.71)
disposable-income	-0.000320	0.0000631	-0.0000353	-0.000223	-0.000149*	-0.000228
	(-1.36)	(0.37)	(-0.65)	(-1.94)	(-2.33)	(-1.63)
education	-0.276	-0.354	0.137*	-0.187	0.0645	-0.131
	(-0.67)	(-1.22)	(2.04)	(-1.08)	(0.97)	(-0.57)
labor-participation	-0.0121	-0.0239	0.00144	0.00279	0.00570	-0.00295
	(-0.24)	(-0.68)	(0.16)	(0.12)	(0.62)	(-0.09)
unemployment	0.0298	0.0411	-0.00826	-0.00961	-0.0150*	-0.0398
	(0.61)	(1.41)	(-1.11)	(-0.47)	(-2.10)	(-1.29)
logpopulation	-18.62*	-0.963	0.961	-7.429		
	(-2.13)	(-0.15)	(0.63)	(-1.86)		
perc-lowage	-1.401	-10.23	-0.0420	7.203	0.334	8.994
	(-0.07)	(-0.79)	(-0.01)	(0.85)	(0.10)	(0.79)
perc-midage	18.26	-6.479	5.216	16.97	6.865	33.42*
	(0.68)	(-0.40)	(1.10)	(1.50)	(1.56)	(2.07)
temperature	-0.148*	-0.0707	0.00247	0.0291	0.115***	0.0561
	(-2.15)	(-1.84)	(0.21)	(0.89)	(9.11)	(1.23)
rain	-0.000802	0.000482	-0.0000525	-0.000772	0.000240	0.00145
	(-0.72)	(0.51)	(-0.30)	(-1.12)	(1.00)	(1.82)

* Significant at 10% ; ** Significant at 5% ; *** Significant at 1%

We find that for ballet, concert, pop concert and opera, the effect of education on the quantity of tickets sold is negative.

Also, labour force participation also has negative effect on the tickets sold for sectors of ballet, concert, and opera. These facts may indicate that higher education people have less cultural consumption because they are too busy with their jobs.

But one counter-intuitive result is that unemployment has a positive effect on the number of tickets sold, but disposable income has a negative effect. One explanation could be the following: people with higher income and employed have less time. Even for one who is unemployed, since the tickets are not expensive (especially considering the high welfare of Italy) and people have more time for cultural consumption, it is more likely that unemployed people are more likely to have cultural consumption.

Or, there is some possibility that in Italy, the art education is very fundamental so that even low education people like arts, so the key factor that determines consumption is not money (since the tickets are not expensive), not education, but time.

Table 2: *Panel data regression with province fixed effect for different sectors*

	(1)	(2)	(3)	(4)	(5)	(6)
spring	2.576**	1.303*	0.574***	0.316	-0.806***	0.253
	(3.01)	(2.23)	(4.40)	(0.97)	(-6.27)	(0.49)
summer	3.242	0.524	-3.431***	-0.941	-4.652***	-2.972
	(1.02)	(0.63)	(-10.29)	(-0.82)	(-20.26)	(-1.66)
fall	1.535	1.147*	0.916***	0.443	-1.063***	0.477
	(1.80)	(2.29)	(6.24)	(1.27)	(-7.33)	(0.82)
temp*spring	-0.230**	-0.0628	-0.0317**	-0.0376	0.0464***	-0.0276
	(-2.89)	(-1.28)	(-2.62)	(-1.23)	(3.72)	(-0.57)
temp*summer	-0.265	-0.0240	0.138***	0.0493	0.215***	0.112
	(-1.53)	(-0.43)	(6.80)	(0.78)	(13.59)	(1.06)
temp*fall	-0.174*	-0.0588	-0.0824***	-0.0335	0.0811***	-0.0424
	(-2.08)	(-1.27)	(-6.20)	(-1.02)	(6.10)	(-0.78)
rain*spring	0.000180	-0.000264	-0.000498*	0.00145	-0.0000676	-0.00280**
	(0.17)	(-0.24)	(-1.97)	(1.87)	(-0.30)	(-3.03)
rain*summer	0.00429	-0.000575	-0.00112*	-0.000476	0.000842	-0.000100
	(1.27)	(-0.55)	(-2.54)	(-0.32)	(1.70)	(-0.09)
rain*fall	0.000840	-0.000664	0.000694*	0.000102	-0.000192	-0.00191
	(0.54)	(-0.77)	(2.29)	(0.12)	(-0.68)	(-1.70)
rainsq	0.000000136	-2.78e-08	4.35e-08	-0.000000478	-0.000000103	0.000000724
	(0.53)	(-0.05)	(1.74)	(-1.33)	(-0.70)	(1.34)
tempsq	0.0105*	0.00311	-0.00265***	0.000635	-0.00670***	-0.00100
	(2.47)	(1.78)	(-4.43)	(0.39)	(-14.73)	(-0.37)
total-population					0.00000421	-0.00000412
					(1.06)	(-0.43)
Cons	245.1*	33.10	-3.986	95.59	9.360*	-10.14
	(2.12)	(0.39)	(-0.21)	(1.87)	(2.46)	(-0.77)

* Significant at 10% ; ** Significant at 5% ; *** Significant at 1%

We show in appendix panel estimation with lagged variable using Arellano Bond procedure that confirm the finding of Cuccia and Castiglione with more granular data.

4 CONCLUSION

To be written

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APPENDIX

CONCERT

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Arellano-Bond dynamic panel-data estimation     Number of obs      =       456
Group variable: sec_pro                         Number of groups   =        45
Time variable: date
                                                Obs per group:
                                                             min =           1
                                                             avg =    10.13333
                                                             max =          71

Number of instruments =    456                  Wald chi2(26)      =   1420.43
                                                Prob > chi2        =    0.0000
One-step results
                                 (Std. Err. adjusted for clustering on sec_pro)
------------------------------------------------------------------------------
             |               Robust
  logtickets |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  logtickets |
         L1. |  -.3097112    .063247    -4.90   0.000    -.4336731   -.1857494
             |
    logprice |
         --. |   .0438388   .0542327     0.81   0.419    -.0624554     .150133
         L1. |   .0541051   .0901993     0.60   0.549    -.1226822    .2308925
         L2. |  -.1367622   .0984663    -1.39   0.165    -.3297526    .0562281
             |
          VA |   .0007022   .0003823     1.84   0.066    -.0000471    .0014516
       annua |   .0001485   .0000667     2.23   0.026     .0000177    .0002793
      dispos |  -.0003718   .0007171    -0.52   0.604    -.0017773    .0010338
   education |  -1.243279   1.508916    -0.82   0.410      -4.2007    1.714142
        part |  -.0261911   .0937528    -0.28   0.780    -.2099432    .1575611
        unem |   .1981422   .1262468     1.57   0.117    -.0492969    .4455813
      logpop |  -56.54886   50.05317    -1.13   0.259    -154.6513    41.55356
     plowage |    27.4279   68.38678     0.40   0.688    -106.6077    161.4635
     pmidage |   26.29337   59.57642     0.44   0.659    -90.47426     143.061
 temperature |   .0640514   .0519971     1.23   0.218    -.0378611     .165964
        rain |   .0000563   .0007379     0.08   0.939      -.00139    .0015026
      spring |   .3650996   .7309921     0.50   0.617    -1.067619    1.797818
      summer |  -4.477371   1.937718    -2.31   0.021    -8.275228   -.6795148
        fall |   .9557281   .5918609     1.61   0.106    -.2042979    2.115754
  tempspring |  -.0372042   .0589572    -0.63   0.528    -.1527582    .0783497
  tempsummer |   .1629172   .1029243     1.58   0.113    -.0388107    .3646451
    tempfall |  -.0597299   .0566643    -1.05   0.292    -.1707899      .05133
  rainspring |  -.0004836   .0010478    -0.46   0.644    -.0025372      .00157
  rainsummer |   .0006253   .0007822     0.80   0.424    -.0009079    .0021584
    rainfall |   .0003744    .000887     0.42   0.673    -.0013641    .0021128
      rainsq |   3.18e-07   4.31e-07     0.74   0.460    -5.26e-07    1.16e-06
      tempsq |  -.0020499   .0028085    -0.73   0.465    -.0075544    .0034546
------------------------------------------------------------------------------
Instruments for differenced equation
        GMM-type: L(2/.).logtickets
        Standard: D.logprice LD.logprice L2D.logprice D.VA D.annua D.dispos
                  D.education D.part D.unem D.logpop D.plowage D.pmidage
                  D.temperature D.rain D.spring D.summer D.fall D.tempspring
                  D.tempsummer D.tempfall D.rainspring D.rainsummer
                  D.rainfall D.rainsq D.tempsq
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THEATRE

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Arellano-Bond dynamic panel-data estimation     Number of obs     =      4,762
Group variable: sec_pro                         Number of groups  =         54
Time variable: date
                                                Obs per group:
                                                              min =         23
                                                              avg =   88.18519
                                                              max =        117

Number of instruments =   4.0e+03               Wald chi2(25)     =    3418.41
                                                Prob > chi2       =     0.0000
One-step results
                              (Std. Err. adjusted for clustering on sec_pro)
```

logtickets	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
logtickets						
L1.	.0893803	.0392455	2.28	0.023	.0124606	.1663
logprice						
--.	-.0369643	.0539727	-0.68	0.493	-.1427489	.0688203
L1.	.0722139	.0254139	2.84	0.004	.0224035	.1220243
L2.	.0159804	.0279361	0.57	0.567	-.0387733	.0707342
VA	.000018	.0000322	0.56	0.576	-.0000452	.0000812
annua	-2.93e-06	2.28e-06	-1.28	0.200	-7.40e-06	1.55e-06
dispos	.0000559	.0000649	0.86	0.389	-.0000713	.000183
education	.0110505	.0998314	0.11	0.912	-.1846154	.2067164
part	-.0097301	.0104004	-0.94	0.350	-.0301145	.0106542
unem	.0150503	.013327	1.13	0.259	-.0110702	.0411708
logpop	1.069948	2.510404	0.43	0.670	-3.850354	5.99025
plowage	-20.55315	8.021663	-2.56	0.010	-36.27532	-4.830983
pmidage	-21.17076	11.20751	-1.89	0.059	-43.13706	.7955511
temperature	-.0375004	.0149026	-2.52	0.012	-.0667089	-.0082919
rain	-.0001705	.0001003	-1.70	0.089	-.0003672	.0000261
spring	.8876644	.2102724	4.22	0.000	.4755381	1.299791
summer	-2.820531	.5557489	-5.08	0.000	-3.909779	-1.731283
fall	1.399164	.191955	7.29	0.000	1.022939	1.775389
tempspring	-.0579431	.0233088	-2.49	0.013	-.1036274	-.0122587
tempsummer	.0926415	.0255873	3.62	0.000	.0424913	.1427916
tempfall	-.1217638	.0187332	-6.50	0.000	-.1584802	-.0850473
rainspring	-.0003511	.0001352	-2.60	0.009	-.0006162	-.0000861
rainsummer	-.0006781	.0006107	-1.11	0.267	-.001875	.0005187
rainfall	.0007752	.0002404	3.22	0.001	.0003041	.0012463
rainsq	4.23e-08	1.58e-08	2.68	0.007	1.14e-08	7.31e-08
tempsq	-.0005487	.0007253	-0.76	0.449	-.0019702	.0008729

```
Instruments for differenced equation
        GMM-type: L(2/.).logtickets
        Standard: D.logprice LD.logprice L2D.logprice D.VA D.annua D.dispos
                  D.education D.part D.unem D.logpop D.plowage D.pmidage
                  D.temperature D.rain D.spring D.summer D.fall D.tempspring
                  D.tempsummer D.tempfall D.rainspring D.rainsummer
                  D.rainfall D.rainsq D.tempsq
```

POP CONCERT

```
Arellano-Bond dynamic panel-data estimation     Number of obs      =       929
Group variable: sec_pro                         Number of groups   =        50
Time variable: date
                                                Obs per group:
                                                              min =          1
                                                              avg =      18.58
                                                              max =         55

Number of instruments =    928                  Wald chi2(26)      =   1312.59
                                                Prob > chi2        =    0.0000
One-step results
                               (Std. Err. adjusted for clustering on sec_pro)
------------------------------------------------------------------------------
             |               Robust
  logtickets |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  logtickets |
         L1. |  -.2697303    .040687    -6.63   0.000    -.3494753   -.1899853
             |
    logprice |
         --. |   1.000288   .1305416     7.66   0.000      .744431    1.256145
         L1. |   .3434617   .0992769     3.46   0.001     .1488825    .5380409
         L2. |   .0337834   .0718405     0.47   0.638    -.1070213    .1745881
             |
          VA |  -.0000545   .0002508    -0.22   0.828    -.0005461    .0004371
       annua |   .0000211   .0000197     1.07   0.286    -.0000176    .0000598
      dispos |   .0001988   .0006109     0.33   0.745    -.0009985    .0013961
   education |  -1.038412   .9747079    -1.07   0.287    -2.948805    .8719801
        part |  -.0748459   .0956287    -0.78   0.434    -.2622746    .1125828
        unem |  -.0491509   .1381991    -0.36   0.722    -.3200161    .2217143
      logpop |  -30.81133    28.3551    -1.09   0.277    -86.38631    24.76365
     plowage |   157.1422   71.80817     2.19   0.029     16.40081    297.8837
     pmidage |  -14.95074   84.37363    -0.18   0.859      -180.32    150.4185
 temperature |   .0140079   .0320483     0.44   0.662    -.0488055    .0768213
        rain |  -.0005946   .0007096    -0.84   0.402    -.0019854    .0007962
      spring |   .4774354   .3937969     1.21   0.225    -.2943924    1.249263
      summer |  -3.826648   1.576175    -2.43   0.015    -6.915894   -.7374029
        fall |   .8172769   .4130756     1.98   0.048     .0076636     1.62689
  tempspring |  -.0582329   .0317894    -1.83   0.067     -.120539    .0040732
  tempsummer |    .139719   .0822068     1.70   0.089    -.0214035    .3008414
    tempfall |  -.0725271   .0354977    -2.04   0.041    -.1421012   -.0029529
  rainspring |   .0011267   .0004045     2.79   0.005     .0003338    .0019196
  rainsummer |   .0016513   .0017441     0.95   0.344     -.001767    .0050697
    rainfall |   .0009568    .000562     1.70   0.089    -.0001447    .0020582
      rainsq |  -3.17e-07   3.06e-07    -1.04   0.300    -9.16e-07    2.82e-07
      tempsq |   .0009935   .0017261     0.58   0.565    -.0023896    .0043766
------------------------------------------------------------------------------
Instruments for differenced equation
        GMM-type: L(2/.).logtickets
        Standard: D.logprice LD.logprice L2D.logprice D.VA D.annua D.dispos
                  D.education D.part D.unem D.logpop D.plowage D.pmidage
                  D.temperature D.rain D.spring D.summer D.fall D.tempspring
                  D.tempsummer D.tempfall D.rainspring D.rainsummer
                  D.rainfall D.rainsq D.tempsq
```

MOVIE

```
Arellano-Bond dynamic panel-data estimation     Number of obs      =      1,559
Group variable: sec_pro                         Number of groups   =         50
Time variable: date
                                                Obs per group:
                                                              min =          1
                                                              avg =      31.18
                                                              max =        104

Number of instruments =   1.3e+03               Wald chi2(25)      =   18734.91
                                                Prob > chi2        =     0.0000
One-step results
                               (Std. Err. adjusted for clustering on sec_pro)
------------------------------------------------------------------------------
             |               Robust
  logtickets |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  logtickets |
         L1. |   .0023484   .0574084     0.04   0.967    -.1101701    .1148669
             |
    logprice |
         --. |  -.3779793   .2161495    -1.75   0.080    -.8016245    .0456659
         L1. |   -.389524   .1263237    -3.08   0.002    -.6371139   -.1419341
         L2. |  -.0640105    .171522    -0.37   0.709    -.4001873    .2721664
             |
          VA |  -.0000715   .0000869    -0.82   0.411    -.0002419    .0000989
       annua |  -.0000122   .0000262    -0.46   0.643    -.0000636    .0000393
      dispos |   .0000361   .0001639     0.22   0.826    -.0002852    .0003573
   education |    .180372   .1492625     1.21   0.227     -.112177    .4729211
        part |  -.0222811    .046497    -0.48   0.632    -.1134137    .0688514
        unem |  -.0219497   .0150768    -1.46   0.145    -.0514997    .0076003
      g1tpop |  -4.56e-06   .0000116    -0.39   0.694    -.0000273    .0000181
     plowage |   9.785429   19.90008     0.49   0.623      -29.218    48.78886
     pmidage |  -19.64586    29.8336    -0.66   0.510    -78.11864    38.82692
 temperature |  -.0039093   .0193936    -0.20   0.840      -.04192    .0341015
        rain |    .000266   .0001268     2.10   0.036     .0000175    .0005145
      spring |   .0100352   .0921642     0.11   0.913    -.1706033    .1906737
      summer |  -1.571934   .5168513    -3.04   0.002    -2.584944   -.5589245
        fall |  -.1945643   .2437636    -0.80   0.425    -.6723322    .2832036
  tempspring |  -.0197975   .0098973    -2.00   0.045    -.0391958   -.0003992
  tempsummer |   .0417491   .0292787     1.43   0.154    -.0156362    .0991343
    tempfall |   .0032461   .0167981     0.19   0.847    -.0296776    .0361698
  rainspring |  -.0003006   .0001145    -2.63   0.009     -.000525   -.0000762
  rainsummer |   .0002337   .0002402     0.97   0.331    -.0002371    .0007046
    rainfall |  -.0001112   .0000613    -1.82   0.069    -.0002313    8.87e-06
      rainsq |  -5.05e-08   3.00e-08    -1.68   0.093    -1.09e-07    8.36e-09
      tempsq |  -.0010414   .0009584    -1.09   0.277    -.0029198    .0008371
------------------------------------------------------------------------------
Instruments for differenced equation
        GMM-type: L(2/.).logtickets
        Standard: D.logprice LD.logprice L2D.logprice D.VA D.annua D.dispos
                  D.education D.part D.unem D.g1tpop D.plowage D.pmidage
                  D.temperature D.rain D.spring D.summer D.fall D.tempspring
                  D.tempsummer D.tempfall D.rainspring D.rainsummer
                  D.rainfall D.rainsq D.tempsq
```

OPERA

```
Arellano-Bond dynamic panel-data estimation     Number of obs      =       688
Group variable: sec_pro                         Number of groups   =        35
Time variable: date
                                                Obs per group:
                                                             min =           1
                                                             avg =    19.65714
                                                             max =          95

Number of instruments =    686                  Wald chi2(26)      =  16575.80
                                                Prob > chi2        =    0.0000
One-step results
                                 (Std. Err. adjusted for clustering on sec_pro)
```

logtickets	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
logtickets						
L1.	-.0457526	.1070473	-0.43	0.669	-.2555615	.1640563
logprice						
--.	-.2530059	.1032815	-2.45	0.014	-.455434	-.0505779
L1.	.0260968	.0726559	0.36	0.719	-.1163061	.1684996
L2.	-.0125711	.0650675	-0.19	0.847	-.1401012	.1149589
VA	.0003327	.0001951	1.71	0.088	-.0000497	.000715
annua	-.0000238	.0000304	-0.78	0.433	-.0000834	.0000358
dispos	-.0003178	.0005629	-0.56	0.572	-.001421	.0007854
education	.6800712	1.363331	0.50	0.618	-1.992008	3.352151
part	-.0696401	.0843931	-0.83	0.409	-.2350475	.0957674
unem	.105293	.1373585	0.77	0.443	-.1639247	.3745107
g1tpop	.0000199	.0000178	1.12	0.264	-.000015	.0000549
plowage	-92.95555	53.5722	-1.74	0.083	-197.9551	12.04403
pmidage	30.10444	69.41281	0.43	0.665	-105.9422	166.151
temperature	-.0021807	.0766278	-0.03	0.977	-.1523684	.1480069
rain	.003359	.0012709	2.64	0.008	.000868	.00585
spring	.6457376	.6836066	0.94	0.345	-.6941068	1.985582
summer	-1.669135	3.421505	-0.49	0.626	-8.37516	5.036891
fall	-.2311862	1.244791	-0.19	0.853	-2.670931	2.208559
tempspring	-.0175838	.0662044	-0.27	0.791	-.1473419	.1121744
tempsummer	.0998011	.1945616	0.51	0.608	-.2815327	.4811348
tempfall	.0215991	.1003582	0.22	0.830	-.1750993	.2182974
rainspring	-.0052036	.0019808	-2.63	0.009	-.0090858	-.0013214
rainsummer	-.002955	.0015239	-1.94	0.052	-.0059418	.0000318
rainfall	-.001877	.0021395	-0.88	0.380	-.0060704	.0023163
rainsq	9.30e-07	5.47e-07	1.70	0.089	-1.42e-07	2.00e-06
tempsq	-.0007064	.0043882	-0.16	0.872	-.0093071	.0078944

```
Instruments for differenced equation
        GMM-type: L(2/.).logtickets
        Standard: D.logprice LD.logprice L2D.logprice D.VA D.annua D.dispos
                  D.education D.part D.unem D.g1tpop D.plowage D.pmidage
                  D.temperature D.rain D.spring D.summer D.fall D.tempspring
                  D.tempsummer D.tempfall D.rainspring D.rainsummer
                  D.rainfall D.rainsq D.tempsq
```