Measuring the impact of the European Capital of Culture programme on overnight stays: Evidence for the last two decades

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Abstract

This study explores the effects of the European Capital of Culture (ECoC) on tourism demand, measured as overnight stays, for the years 1998 to 2014. The analysis includes 34 ECoC hosts and makes use of data on approximately 800 European cities. A difference-in-differences propensity score matching estimator shows that hosting the ECoC leads to an increase in overnight stays of eight per cent on average during the year of the event but does not stimulate tourism demand in subsequent years. To account for deviations in the distribution of tourism inflows between ECoC and other cities, the quantile difference-in-differences estimator is used. This leads to similar but somewhat stronger results, especially for the year of the event and for the year after. Separate estimations of ECoC host reveal that there is a certain degree of heterogeneity in the effect. Long-term impacts can only be observed for a small group of cities (Essen, Guimarães, Salamanca and Tallinn).

Keywords: European capital of culture, overnight stays, difference-in-differences approach, propensity score matching, quantile difference-in-differences estimator, city tourism.

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1 Introduction

The *European Capital of Culture* (ECoC) programme introduced in 1985 is regarded as one of the most successful cultural projects ever launched by the European Union (Palmer & Richards, 2007). So far, more than 50 European cities have hosted the ECoC. This mega cultural event attracts a large amount of domestic and international visitors, and leads to image enhancement and urban revitalization (Richards & Wilson, 2004; Palmer & Richards, 2007; García & Cox, 2013; Liu, 2014).

The aim of this study is to investigate quantitatively the impact of the ECoC designation on local tourism demand. Tourism demand is measured as overnight stays and the analysis takes into account the effect on the year of the event as well as the two subsequent years. Just like in the cases of Gomes and Librero-Cano (2017) and Srakar and Vecco (2017), the difference-in-differences estimator (DID) is used for the exercise. By use of a control group (cities non-treated) this estimator filters out the pure effect of hosting the event (city treated) by controlling for the average time trend and other factors that affect overnight stays. The control group includes either those cities with the highest degree of similar characteristics to the city treated, based on an index, or an average of all cities that have not been treated. In addition, to account for differences in the distribution of tourism flows across the two groups of cities, the quantile difference-in-differences (QDID) estimator is employed. Since the budgets of the event vary widely across cities and the application procedure as well as the political purpose has developed over time (Garcia & Cox, 2013), the effects are also estimated separately for each single host city.

Several studies have investigated the impact of hosting the ECoC on overnight stays. However, with the exception of Gomes and Librero-Cano (2017) and Srakar and Vecco (2017), these studies mainly rely on separate cases and face-to-face interviews, or are based on descriptive statistics where tourist numbers before and after the event are compared (Hughes, Allen &

Wasik, 2003; Herrero et al., 2006; García & Cox, 2013; Vareiro et al., 2016; see Liu, 2014 of an overview). Nevertheless, in the majority of cases the studies confirm a positive impact of the ECoC designation on tourism flows in the year of the event, although the long-term tourism effects of hosting the ECoC are less clear-cut. Descriptive evidence shows that there is a large heterogeneity in the effects, where overnight stays increase in some cities while there is no change or even a decline in others (García & Cox, 2013). Gomes and Librero-Cano (2017) investigate the ECoC effect on gross regional product (GRP) per capita (using regional data at the NUTS level), output, and employment for several tourism related industries (accommodation, food services, arts, entertainment, recreation and construction). Using the difference-in-differences approach the authors find significant long-term effects on GRP per capita but insignificant effects on output and employment of accommodation and food services and their related industries. Srakar and Vecco (2017) provide an ex-post evaluation of the 2012 Maribor ECoC event and find no impact on local employment, although there are positive tourism effects in the year of the event for the main ECoC city, while the co-hosts experienced no benefits.

Event planners often argue that hosting the ECoC leads to a long-term increase in tourism demand, and stimulates urban regeneration, city branding and economic development, coinciding with seminal suggestions made by Hall (1992) and Boland (2010). Thus, destination marketing organisations and local stakeholders increasingly use major cultural events as an important opportunity to market cities and attract tourists (Law, 1993; Boland, 2010). Cultural tourists are particularly regarded as desirable tourists because they are well educated and spend more money than other types of tourists (Richards, 2000). Ex-post evaluation of the ECoC is important because the national or local government, EU structural funds or a mix of these sources largely fund the event. In the last 20 years, on average the ECoC budget has been about EUR 40 million for each city (García & Cox, 2013).

This study contributes to the literature on the interrelations between tourism flows, cultural heritages and events. Broader studies show that tourism is intertwined with cultural participation and cultural events (Plaza, 2000; Borowiecki, and Castiglione, 2014; Zieba, 2016; Guccio et al., 2017). The more narrowly specified sub-field of concern here, for instance, the tourism effects of a specific cultural event, builds on Gomes and Librero-Cano (2017) who investigate the relationship between hosting the European Capital of Culture and GRP per capita. This study is the first quantitative investigation of the direct as well as lasting impact of the ECoC on local tourism demand, measured as the number of overnight stays, covering almost all ECoC events in the last two decades. The quantile estimations refine the analysis further, as does the separate treatment of each host city. The exclusion of the earliest years of the ECoC events relates to data deficits on overnight stays at the city level. In recent years, the data situation has improved considerably.

The structure of this paper is as follows: Section two outlines the conceptual background, while Section three introduces the empirical model and Section four the dataset used. Section five presents the empirical results and Section six concludes.

2 Conceptual background

Presently, the designation of the ECoC is awarded each year to two cities in different EU-countries. These cities create a cultural programme for the year (European Commission, 2017). The goals of the ECoC programme have developed over time, from the initial purpose of bringing people of the member states closer together, and highlighting and sharing the richness and diversity of European culture to more specific objectives such as contributing to the regeneration of cities, raising their international profiles, enhancing their local image and boosting tourism (Garcia & Cox, 2013; European Commission, 2017). These targets coincide with an increased awareness by local policy makers of the potential contribution that culture and art can make to several public goals such as economic development, job creation and social

inclusion (Griffiths, 2006). They may also raise expectations of what can be achieved by hosting the ECoC event.

Similar to the goals, both the application and the appointment procedures have been formalised over time, and experts are consulted to review applications. Initially, there was one appointment per year, however, during the Millennium nine cities hosted the event, and since 2005 onwards two cities have been appointed. In 2009 there was again an adjustment, implying that one of the two cities should be in a recent member state (European Commission, 2017). Just like the Millennium hosts, Essen, Marseille and Maribor are special cases, including areas in the event that were broader than the city itself. For instance, Essen encompassed the whole Ruhr area, where the surrounding cities each held a cultural week during the year of the event.

In general, ECoC host cities rely on public funds to create new cultural venues or extend transport infrastructure, for instance. The budget of hosting the ECoC event can be substantial with more than EUR 100 million being needed in some cases. In addition, some cities receive extra funding or loans for infrastructure development. Many EU cities in countries to the east or to the south of Europe have used structural funds (ERDF) or obtained ERDF projects linked to hosting of the ECoC for development of infrastructure. Success of the ECoC is often measured in terms of increases in overnight stays (Palmer & Richards, 2007). Sjøholt (1999) suggests that many cities hope that the ECoC designation will act as "a seedbed for multiplier effects within cultural industries". This indicates that the ECoC has wider effects on the local economy.

There are two main strands of literature. One relies on stakeholders, experts and visitors for information about the expected effects or comparisons of tourism flows before and after the event (Hughes et al., 2003; Balsas, 2004; Herrero et al., 2006; Gunay, 2010; Garcia & Cox, 2013; Vareiro et al., 2016). For instance, Vareiro et al. (2016) suggest that the 2012 ECOC in Guimarães attracted many new visitors with the majority coming for the first time. Gunay (2010)

finds that increased awareness of cultural heritage and higher emphasis on cultural tourism belongs to the most important short and long-term effects.

The other strand of literature is based on quantitative methods to investigate the impact of hosting the ECoC on local outcome (Gomes & Librero-Cano, 2017; Srakar & Vecco, 2017). The results of these studies are not homogeneous. While Gomes and Librero-Cano (2017) report that the ECoC stimulates regional GDP per capita, Srakar and Vecco (2017) do not find a positive impact on employment when looking at the 2012 Maribor event. Apart from Gomes and Librero-Cano (2017) and Srakar and Vecco (2017), the quantitative evidence is mainly based on descriptive statistics. While descriptive statistics point to significant increases in the year of the event, long-term effects are unclear (Garcia & Cox, 2013). There might be several reasons for why ECoC attracts a significant number of visitors in the year of event but not in subsequent years. An important reason is that most attractions and performances are temporary. Related research on tourism effects of cultural events finds that the establishment of re-occurring Jazz Festivals, for instance, has a long-term effect on tourism demand (Vecco & Srakar, 2017).

Based on the purpose of the ECoC and the available literature, this study tests the following hypotheses:

Hypothesis 1: Hosting the ECoC boosts the number of local overnight stays in the year of event, but has no long-term effect.

Hypothesis 2: Effects of hosting the ECoC are heterogeneous even when the specific characteristics of the cities are controlled for.

Literature provides no clear evidence of a single common factor that specifically attracts visitors to an ECoC. Instead, this could depend on a bundle of factors, partly including, but not limited to, general tourism flows. The latter include price level, cultural offerings, location factors and other city characteristics. Typical city characteristics are size, accessibility and natural environment (sea border, for instance). The factors mentioned above also coincide to a certain

degree with what needs to be in place to meet the goals of the ECoC event (European Commission, 2017), such as a functioning infrastructure, basic cultural supply that can be built upon as well as a certain level of intellectual, artistic and managerial capital that can put together and accomplish the event. Thus, analysis will include a set of characteristics that relates to tourism, extended by determinants that clearly distinguish the cities from each other.

3 Empirical model

The crucial question is how to estimate the effects of hosting the ECoC on the number of overnight stays in contrast to what would have happened had there not been an event. In the real world, this cannot be observed. A simple comparison of the pre-event level of overnight stays with those during or after is misleading because urban tourism generally grows independently of this event. Several quantitative methods have been proposed to evaluate the ex-post performance of cultural events. Scholars use input-output models (Bracalente et al., 2011) or CGE models (Dwyer, Forsyth, & Spurr, 2005) and recently also difference-in-differences estimators (Srakar & Vecco, 2017). In this study, a combination of the non-parametric propensity score matching (PSM) estimator and the difference-in-difference specification is used. The PSM constructs a statistical comparison between cities affected by the ECoC and those not affected.

A probit estimation is used to identify common denominators of the treated cities, including a group of variables reflecting city characteristics in a broader sense (population, presence of an airport, sea border, presence of a UNESCO world heritage site, Mediterranean climate zone, presence of a university listed in the Times higher Education [THE] ranking and being a capital city). The common characteristics then form the basis for the creation of an index or a propensity score for the treated as well as the non-treated city. With the propensity score calculated, a matching algorithm is required to estimate the missing counterfactual for each treated observation. Following Heckman, Ichimura and Todd (1997), kernel matching (KM) is used, which links each treated city to its most similar counterpart (Caliendo & Kopeinig, 2008). A

sample appropriate for the exercise needs to satisfy several conditions to allow for the use of the propensity score matching estimator (Caliendo & Kopeinig, 2008). These conditions include a rich set of information on individual characteristics, which is available for both the treatment and control group. Additional requirements are that the treated and non-treated observations should belong to the same type of heterogeneous individuals. This analysis focuses on cities with a population of 100,000 or more. Thus, the database is expected to satisfy the aforementioned conditions.

To account for a possibly skewed distribution of tourism flows across cities, the quantile difference-in-differences (QDID) estimator combined with the propensity score matching method is also used (see Angrist & Pischke, 2008). This eliminates the risk that the estimations are distorted by apparent differences in the tourism inflows between cities with and without ECoC assignments. Quantile regressions also allow for a more comprehensive understanding of how a cultural event affects overnight stays by differentiating the levels of tourism flows, conditional on the impact of the control variables (size and location). Another advantage of quantile regressions is that the possible impact of outliers in the dependent variable is reduced (Koenker, 2005).

A major drawback of the DID-PSM or the quantile estimator is that these techniques can only be applied when the number of treated cases as well as the control group is sufficiently large. Therefore, the standard difference-in-differences estimator is applied separately to each ECoC case, with the control group represented by an average of all non-treated cities. Beyond pure methodological issues, to verify the results by separate estimation of each treated case is particularly important because of the different ECoC budgets and the variations over time in the application and appointment processes.. An alternative approach to analyse treatment effects is to use the synthetic control function (Abadie, Diamond & Hainmueller, 2010). However, this

approach requires even longer data series than the difference-in-differences estimator and is thus not applicable here.

Based on the assumption that the time-varying effects (macroeconomic effects) are identical for all cities, Y^T reflects the number of overnight stays for the treated city, Y^C is the level that would have been realised without hosting the ECoC, and index 0 and 1 denote the pre- and post-treatment period. The specification for the average treatment effect may be expressed as follows:

$$\delta_{DID} = \left(\overline{Y}_1^T - \overline{Y}_0^T\right) - \left(\overline{Y}_1^C - \overline{Y}_0^C\right). \quad (1)$$

The average treatment effect can be estimated using a linear regression model, where the logarithm number of overnight stays (ln*Y*) is related to a dummy variable that indicates time-period (pre- or post-treatment) and a dummy variable that denotes if the city is in the treated group (hosting ECoC). The interaction term of these two dummy variables is the DID-parameter itself, leading to the following specification:

$$ln\,Y_{it} = \alpha_0 + \alpha_1 \cdot period_t + \alpha_2 \cdot treated_{it} + \alpha_3 period_t \cdot treated_{it} + \varepsilon_{it} \quad (2)$$

where *i* is a certain city at time *t. Period* is a dummy variable that is equal to 0 in the baseline period (three-year average prior to the event) and 1 thereafter, whereas *treated* is a dummy variable that is equal to 1 if the city is hosting the ECoC event and 0 otherwise. Parameter α_3 is the interaction term, measuring the average treatment (DID) effect and ε_i is the error term, which is assumed to be i.i.d. normal with zero mean and constant variance. In order to account for specific characteristics of each single hosting city, the difference-in-differences estimator is augmented by a set of control variables ***X***.

$$ln\,Y_{it} = \widetilde{\alpha}_0 + \widetilde{\alpha}_1 \cdot period_t + \widetilde{\alpha}_2 \cdot treated_{it} + \widetilde{\alpha}_3 period_t \cdot treated_{it} + X_i\beta + \varepsilon_{it} \quad (3)$$

The control variable includes population, presence of an airport, presence of a UNESCO world heritage, location (seashore, capital city) and climate zone. In case of more than one ECoC host

per year, the other treated cities are excluded from the control group, but former ECoC hosts are allowed to reappear in the dataset. The equation can be estimated by OLS, with the standard errors clustered at the country level. In addition, a quantile difference-in-differences analysis is used. For the given quantile (p) the estimation equation is given as follows:

$$Q_p\left(lnY_{it} \mid period, treated, X\right) = \tilde{\tilde{\alpha}}_0(p) + \tilde{\tilde{\alpha}}_1(p) \cdot period_t + \tilde{\tilde{\alpha}}_2(p) \cdot treated_{it} + \tilde{\tilde{\alpha}}_3(p) period_t \cdot treated_{it} + X_i \tilde{\beta}(p) + (p)\tilde{\varepsilon}_{it} \quad (4)$$

The standard DID method relies on the assumption of a common trend in the average outcomes of the treated and non-treated groups over time. This assumption does not hold if there are neighbourhood or spillover effects to other cities located a relatively short distance away from the ECoC hosting city. However, the definition of areas is wide enough to rule out such effects of any size.

4 Data sources and descriptive statistics

Data originate from several sources. Local tourism demand is approximated by number of overnight stays for accommodation units. This information originates from the national statistical offices, Eurostat or the TourMis database (www.tourmis.info/) and can be obtained for 34 out of 36 ECoC cities between 1998 and 2014. The main source is Eurostat's "Culture and tourism - cities and greater cities" database, containing information on total nights spent in tourist accommodation establishments. This database holds information on cities equal to or larger than 100,000 inhabitants (except Weimar with 65,000). An overview of overnight stays in the ECoC cities before, during and after the event is available in Table 7 in the Appendix. No information on overnight stays is available for Avignon or for Kraków. Data for the United Kingdom are based on the international passenger survey.

Information on specific city characteristics (the control variables) originates from publicly available sources. More refined or alternative data that characterise a city might be available in certain cases, but these variables are chosen because they are both harmonised and available

across most cities in the study. Climate zone is identified by use of the Köppen classification. Population data is found in the Eurostat databases and information on world heritage sites is available from UNESCO. Geographical data (seashore) is calculated using Google maps, and the presence of an airport is constructed by use of Wikipedia information. Facts on knowledge intensive cities (with superior universities) are derived from the Times Higher Education (THE) ranking and details about the ECoC originate from the European Commission.

Table 1: Characteristics of ECoC hosts (median or percentage)

	ECoC hosts	ECoC non-hosts
Overnight stays (median)	1,136,623	480,961
Population (number) (median)	165,086	175,529
Overnight stays per population (median)	4.3	2.5
Capital city (yes/no)	0.21	0.04
World heritage site (yes/no)	0.53	0.18
Seashore (yes/no)	0.42	0.29
University listed in the Times Higher Education (THE) ranking (yes/no)	0.39	0.14
Me**d**iterranean climate zone (yes/no)	0.08	0.19
Airport (yes/no)	0.84	0.32

Source: UNESCO, Eurostat, national statistical offices. THE ranking. Google maps, Lists of Airports: Wikipedia. Sample period is 1998-2014 with about 26,800 observations.

Characteristics of the cities appointed the ECoC relate to the criteria formulated by the European Commission. During the period of time studied here, the ECoC cities are not seldom capitals and have a higher than average supply of amenities (world heritage sites, seashores) (Table 1). These cities are also easy accessible and more knowledge intensive with a higher percentage of cities with a leading university. Given these characteristics, the ECoC hosts are cities with a higher than average flow of tourists.

5 Empirical results

The results indicate that hosting the ECoC gives a direct but not sustainable boost to local tourism demand, approximated by the number of overnight stays. The average treatment effect of hosting the ECoC event is eight per cent and significant at the one per cent level for the years 1998 to 2014 (Table 2).[1] However, the positive effect diminishes already the year after the event

[1] Since the dependent variable used for the analysis is the logarithm of overnight stays and the coefficient of interest is a dummy variable, we need to apply the Halvorsen and Palmquist (1980) formula to obtain the effect in percentage terms. For coefficients below 0.10 the difference is negligible.

(t+1), and estimates for the consecutive year (t+2) are not significant at conventional levels. This indicates that the ECoC event has no permanent effects on tourism demand, supporting the first hypothesis of a more temporary boost.

Table 2: Impact of hosting the ECoC on overnight stays (DID-PSM)

	DID estimates		t-stat	Country dummy	Controls	Number of treated	Number of observations	R^2
t	0.08	***	3.28	Yes	Yes	34	13406	0.09
t+1	-0.01		-0.40	Yes	Yes	34	13727	0.09
t+2	-0.02		-0.53	Yes	Yes	32	11512	0.06
t	0.09	***	3.50	No	Yes	34	14909	0.09
t+1	0.00		-0.12	No	Yes	34	14462	0.09
t+2	-0.01		-0.16	No	Yes	32	12970	0.08

Notes: Average treatment effects for the year of the event as well as for subsequent years (t+1 and t+2). Estimates are based on the difference-in-differences estimator combined with the propensity score matching estimator. Asterisks ***, ** and * denote significance at the 1, 5 and 10 per cent levels. The t-values (t-stat) are based on robust standard errors adjusted for clustering at the city level. Baseline period for overnight stays is measured as the average over the last three years prior to the event. T-tests on the mean differences for all covariates are not significant, indicating that matching was successful. Other control variables are included in the underlying probit model of being an ECoC to calculate the propensity scores.

Table 3: Impact of hosting the ECoC on overnight stays (QDID 0.75-PSM)

	DID estimates		t-stat	Country dummy	Controls	Number of treated	Number of observations	R^2
t	0.146	***	57.06	Yes	Yes	34	13406	0.02
t+1	0.106	***	10.19	Yes	Yes	34	13727	0.02
t+2	0.082		1.23	Yes	Yes	32	11512	0.02
t	0.141	***	3.08	No	Yes	34	14909	0.02
t+1	0.100	***	49.79	No	Yes	34	14462	0.02
t+2	0.069		0.97	No	Yes	32	12970	0.02

Notes: Average treatment effects for the year of the event as well as for subsequent years (t+1 and t+2). Estimates are based on the quantile difference-in-differences (QDID) estimator (0.75 quantile) combined with the propensity score matching estimator. Asterisk ***, ** and * denote significance at the 1, 5 and 10 per cent levels. The t-values (t-stat) are based on robust standard errors adjusted for clustering at the city level. Baseline period for overnight stays is measured as the average over the last three years prior to the event. T-tests on the mean differences for all covariates are not significant, indicating that matching was successful. Other control variables are included in the underlying probit model to calculate the propensity scores.

The increase by eight per cent in the year of the event is equal to 40,000 overnight stays on average, given the median of 500,000 in the estimation sample. The average treatment effect is not sensitive to the exclusion or inclusion of country dummy variables in the underlying probit equation (eight and nine per cent, respectively). Fourie and Santana-Gallego (2011) detect similar results for the tourism impact of more narrowly defined mega events in the field of sports. Using a tourism gravity model for 169 destination countries, the authors find an eight per cent increase in tourist arrivals during the year of such sport events.

Table 5 in the appendix shows the results of the probit estimation of being an ECoC that is used to calculate the propensity scores. The estimates reveal that the least common denominators among the treated cities are the presence of a world heritage site and an airport, both significant at the five per cent level. Capital city and population coincide to a certain degree while seashore, a Mediterranean climate zone and a highly-ranked local university are factors not significant at conventional levels.

For the QDID estimations, the 0.75 quantile is used. Narrowing down the control group in this way equalises the level of tourism flows between the appointed and non-appointed cities. The quantile results reveal that the number of overnight stays in the ECoC cities increase by 15 per cent in the year of the event, and by 11 per cent in the following year; however, thereafter no effects are found (Table 3). Thus, the quantile estimates are slightly stronger than those achieved by the DID-PSM estimator, but otherwise they coincide with the general pattern where long-term effects are absent, in line with Hypothesis 1.

Results from the standard difference-in-differences estimator for each of the 34 ECoC host cases (including the year 2000 when nine cities where appointed) show that total number of overnight stays in the year of the event are 12 per cent higher on average than they should have been without the treatment (Table 4). After this, the effect on overnight stays either declines or is no longer significant (majority of cases), thus supporting Hypothesis 1. The significant estimates reveal effects of three and two per cent on average in the years t+1 and t+2, respectively. All control variables in the overnight stays equation (population, capital city, world heritage site, seashore, Mediterranean climate zone, university listed in the THE ranking and presence of an airport) are significant and positive at the one per cent level (see Table 6 in Appendix for an example).

Table 4: Impact of hosting the ECoC on overnight stays by city

Year	City		t	t+1	t+2	Year	City		t	t+1	t+2
1998	Stockholm	DID	0.063	0.027	-0.007	2009	Vilnius	DID	-0.097	-0.042	0.070
		t-stat	0.77	0.32	-0.09			t-stat	-1.85	-0.74	1.24
		R^2	0.70	0.70	0.70			R^2	0.58	0.56	0.56
		# obs	158	158	171			# obs	490	559	633
1999	Weimar	DID	0.378	0.057	0.050	2009	Linz	DID	0.132	0.043	0.067
		t-stat	4.44	0.66	0.62			t-stat	2.27	0.77	1.28
		R^2	0.71	0.74	0.67			R^2	0.56	0.56	0.58
		# obs	163	177	207			# obs	581	559	633
2000	Millenium ECOC cities	DID	-0.053	-0.068	-0.081	2010	Istanbul	DID	0.081	0.213	0.349
		t-stat	-0.10	-0.14	-0.15			t-stat	1.26	3.88	7.58
		R^2	0.63	0.64	0.64			R^2	0.57	0.57	0.58
		# obs	263	251	231			# obs	574	642	608
2001	Rotterdam	DID	-0.002	-0.033	-0.245	2010	Essen	DID	0.272	0.181	0.227
		t-stat	-0.03	-0.47	-2.96			t-stat	5.03	3.88	4.27
		R^2	0.60	0.59	0.60			R^2	0.56	0.56	0.58
		# obs	270	272	275			# obs	574	642	608
2001	Porto	DID	0.064	0.131	0.064	2010	Pécs	DID	0.061	-0.187	-0.155
		t-stat	0.88	1.66	0.84			t-stat	1.26	-3.44	-2.70
		R^2	0.60	0.59	0.60			R^2	0.56	0.56	0.58
		# obs	270	272	275			# obs	574	642	608
2002	Bruges	DID	0.130	0.016	-0.057	2011	Turku	DID	-0.001	-0.070	-0.134
		t-stat	2.08	0.22	-0.78			t-stat	-0.04	-1.64	-2.67
		R^2	0.56	0.56	0.55			R^2	0.56	0.58	0.58
		# obs	525	325	420			# obs	702	663	664
2002	Salamanca	DID	0.213	0.149	0.241	2011	Tallinn	DID	0.230	0.220	0.200
		t-stat	2.82	1.96	3.55			t-stat	4.52	3.91	3.80
		R^2	0.56	0.56	0.55			R^2	0.56	0.58	0.58
		# obs	325	324	420			# obs	702	663	664
2003	Graz	DID	0.242	0.042	-0.004	2012	Guimarães	DID	0.284	0.110	0.233
		t-stat	3.53	0.61	-0.06			t-stat	5.82	2.37	4.42
		R^2	0.57	0.56	0.55			R^2	0.56	0.56	0.57
		# obs	350	431	419			# obs	799	785	732
2004	Genoa	DID	0.049	-0.097	-0.055	2012	Maribor	DID	0.220	0.056	0.048
		t-stat	0.83	-1.49	-0.90			t-stat	4.74	1.04	0.93
		R^2	0.57	0.56	0.56			R^2	0.56	0.56	0.57
		# obs	445	439	438			# obs	799	795	732
2006	Patras	DID	0.215	0.102	-0.097	2013	Marseille	DID	0.028	-0.042	-0.066
		t-stat	3.51	0.16	-1.82		Aix-en-	t-stat	0.07	-0.10	-0.15
		R^2	0.55	0.57	0.58		Provence	R^2	0.56	0.55	0.54
		# obs	490	537	536			# obs	799	736	477
2007	Sibiu	DID	0.227	0.031	-0.063	2013	Košice	DID	0.070	-0.106	-0.005
		t-stat	3.66	0.47	-1.03			t-stat	1.42	-2.17	-0.08
		R^2	0.56	0.58	0.58			R^2	0.56	0.56	0.54
		# obs	490	537	477			# obs	735	735	476
2007	Luxembourg	DID	-0.008	-0.108	-0.092	2014	Riga	DID	0.109	0.101	
		t-stat	-0.14	-1.82	-1.96			t-stat	2.41	0.16	
		R^2	0.56	0.57	0.58			R^2	0.57	0.54	
		# obs	490	537	477			# obs	738	478	
2008	Liverpool	DID	-0.190	-0.410	-0.480	2014	Umeå	DID	0.176		
		t-stat	-2.80	-6.18	-6.77			t-stat	3.34		
		R^2	0.58	0.57	0.58			R^2	0.57		
		# obs	491	463	427			# obs	738		
2008	Stavanger	DID	0.008	0.034	0.057		**Mean**	DID	0.119	0.030	0.023
		t-stat	0.15	0.56	0.09		**# sig. 5%**	13/27	6/26	5/25	5/24
		R^2	0.58	0.57	0.58						
		# obs	490	462	426						

Notes: This table reports standard DID estimates with additional covariates to control for the heterogeneity of the cities and with the average no-treated firm as control group. The dependent variable is the logarithm of overnight stays. The percentage effects can be obtained by using the Halvorsen and Palmquist (1980) transformation. Significance levels are not reported due to space limitations. The control variables are significant at the five per cent level and are displayed in Table 6 in the Appendix for Umeå, as an example. Baseline period of overnight stays refers to the mean of the last three years prior to the event. Millennium cities include Avignon, Bergen, Bologna, Brussels, Helsinki, Kraków, Prague, Reykjavík and Santiago de Compostela.

There is a large degree of heterogeneity in the average treatment effect, which means that also the second hypothesis cannot be rejected. Significant increases in overnight stays in the year of the event are found for 13 ECoC hosts (Table 4). Particularly strong increases in the year of the event are found for Weimar (>30 per cent) as well as for Salamanca, Graz, Patras, Sibiu, Essen, Guimarães, Tallinn, and Maribor (between 20 and 30 per cent). Higher than average effects are also observed for Riga, Umeå and Linz (between 10 and 20 per cent). The significant tourism effects for the 2012 ECoC in Maribor are consistent with Srakar and Vecco (2017). In the remaining cities, hosting the ECoC does not lead to an increase in the number of overnight stays even in the year of the event. Included in this group are the nine Millennium hosts: Genoa, Istanbul, Košice, Liverpool, Luxembourg, Marseille-Aix, Pécs, Porto, Rotterdam, Stavanger, Stockholm, Turku and Vilnius. In the years surrounding the financial crisis, Liverpool and Vilnius appear with negative effects associated to the event. However, by relating the treated city to the control group, the general trend should be controlled for, implying that these results are independent of the crisis or that the crisis hit these two cities more severely than the average city in the control group. Generally, gains are larger for second tier cultural cities (Weimar, Tallinn, Guimarães, Salamanca and Graz) than for typical industrial cities.

Overall, the cultural capital event does not lead to a long-term increase in tourism demand measured as the number of overnight stays in the majority of cases. The insignificance of the long run effects of hosting the ECoC confirms previous studies for two separate ECoC hosts in Austria (Firgo & Fritz, 2017). Further, the results are in line with Gomes and Librero-Cano (2017) who find insignificant effects for output and employment of the accommodation and restaurant sector.

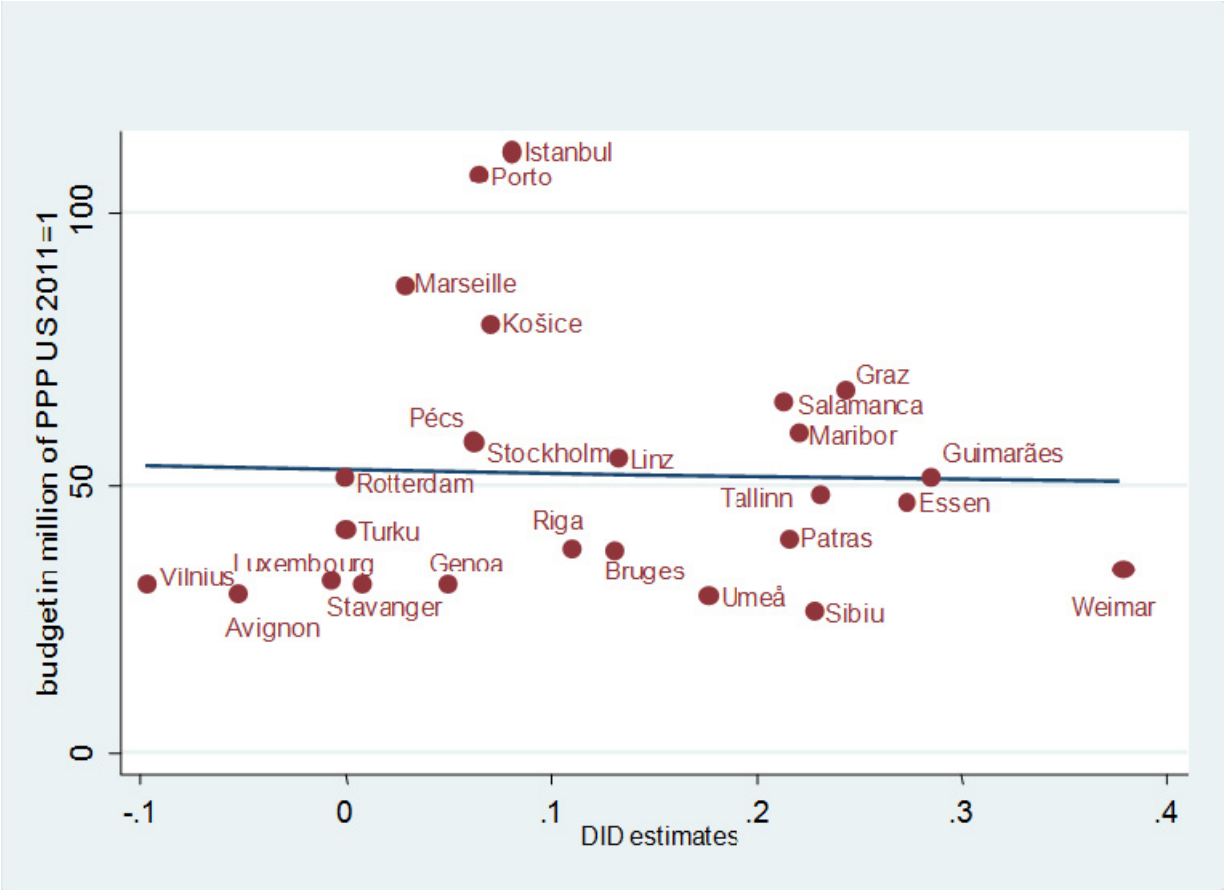
For a few cities (Essen, Guimarães, Salamanca and Tallinn) long term tourism increases can be found but the reasons for such increases are difficult to explain – maybe these cities were hidden jewels not yet acknowledged before the event. Alternatively, the explanation lies in the fact that,

for instance, arts festivals are more successful when the following are in place: public and private goodwill, excellent management in the implementation phase and during the event, significant marketing efforts, and a critical mass of artists and art activities, as proposed by Du Cros and Jolliffe (2014).[2] The size of the budget may also play a role in the magnitude of long run tourism effects. Contrasting the DID estimates with the ECoC budget gives some additional insights. When the budget is adjusted for differences in the purchasing power parities (PPP), Liverpool, Istanbul, Porto, Marseille and Košice receive the highest ECoC budgets. However, findings reveal that large ECoC budgets are not necessarily associated with higher than average tourism effects. In the group of ECoC hosts with the lowest budgets (Sibiu and Umeå), there are large short-term effects. The correlation between the short-term DID effects and the budget is not significantly different from zero (see Graph 1). Unreported results show that the results also hold true for DID estimates for t+1 and t+2.

An alternative to using the large group of cities or those in the 0.75 quantile as the control group would be to narrow the field down to those who bid for – but do not receive – the nomination of ECoC. However, such a robustness check is difficult to perform because the small number of candidates breaks the underlying assumptions of the model used. An additional step in the estimation procedure could have been considered if all countries were to use similar procedures for the bidding process, which they do not. In some countries, there is fierce competition regarding the formal bid and in others the bidder is nominated without rivalling candidates: Austria, Greece, Norway, Portugal and Lithuania (Gomes & Librero-Cano, 2017).

[2] In case of Ruhr 2010, the wide international media response (for instance, during the closing down of a 60 km long motorway), cultural networks and partnership during and after the event, and investment in tourism and transport infrastructure may have stimulated tourism flows in the subsequent years (Centre for Cultural Research, 2011).

Graph 1: Budget status of the European Capital of Culture and average treatment effect on overnight stays



Notes: Liverpool is excluded because of non-comparable data on overnight stays. Information on ECoC budgets are based on Garcia and Cox (2013) and the European Commission (2017). The ECoC budget is adjusted for differences in the standard of living using purchasing power parities from the Penn world tables (Feenstra et al. 2015 and http://www.rug.nl/ggdc/productivity/pwt/.)

6 Conclusions

This study provides new empirical insights into the effects of the European Capital of Culture programme on tourism demand over the last 20 years. The main results from the quantitative analysis reveal that a boost in tourism demand, approximated by the number of overnight stays, is common in the year of the event, but rapidly declines. Three alternative estimators are used with similar results: difference-in-differences combined with propensity score matching, quantile difference-in-differences combined with propensity score matching and standard difference-in-differences.

Detailed evidence for the 34 ECoC cities during the years 1998 to 2014 shows that the tourism effects are sizable and significant in the year of the event and insignificant in subsequent years. On average, hosting the ECoC lead to an increase by eight per cent in the year of event, which is equal to a rise in overnight stays by 40,000 for a representative city with about 500,000 overnight stays. Regressions for the 0.75 quantile confirm that tourism effects are large and significant in the year of event and the following year but not significant in the second year after the event. Standard difference-in-differences estimates for each city separately show that long-term effects could only be observed in a few cases (Essen, Guimarães, Salamanca, and Tallinn). Another new finding is that there is large heterogeneity across the ECoC host cities, even in the year of event. Second tier cities with major heritage and cultural attractions benefit most (Weimar, Graz, Guimarães, Tallinn and Salamanca) while industrial cities gain the least or even suffer (negative effects are observed for Rotterdam, Liverpool, Genoa, Stavanger and Marseilles).

Several policy implications can be drawn from these empirical results. In general, knowledge about the causal effects of hosting large events such as the ECoC is relevant for policy makers, city planners and banks for a number of reasons. The findings reveal that long-term effects can only be observed for a subset of cities that are not necessarily large and are characterised by a wealth of historical and cultural attractions. Typically, the reason behind this is a subject for further analysis, but speculation could be that these cities held a hidden potential for increased tourism that was unlocked in connection with the ECoC event. Traditional historical and cultural sites and capitals do not have large amounts of hidden secrets. Given that an increase in the number of overnight stays is indeed considered an important success factor of the event, the shift in purpose by the European Commission towards cities in need of regeneration might imply that positive and sustainable effects become even more difficult s to reach. However, the success of the ECoC event could be defined in alternative ways, with less emphasis on the in-flow of

persons in need of accommodation. Possibly, other establishments than accommodations could receive support, which is primarily beneficial for the local population.

Some limitations should be noted in the present study. The dependent variable number of overnight stays is a narrow approximation of tourism demand. Alternatives to this could have been number of arrivals or expenditures, for instance, although such information is not widely available at the city level. In addition, the local spillover effects to neighbouring cities are not investigated. It might well be the case that close-by second tier cities benefit, too. Therefore, for future work it would be interesting to investigate the impact of the ECoC event on overnight stays of the neighbouring cities. In the analysis, day-visitors cannot be taken into account, implying that another route for future work would be to investigate whether there is indeed a long-term effect, although this effect would be shifted from those travelling to the city to those living nearby. This would mean an exploration of how the domestic demand for cultural attractions is affected.

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Appendix

Table 5: Probit estimates of being an ECoC

	(i)			(ii)		
	Coeff		z-stat	Coeff		z-stat
Capital city	-0.07		-0.31	0.29	*	1.82
Unesco world heritage site	0.47	***	2.72	0.30	**	2.34
Seashore	0.09		0.49	0.14		1.09
Mediterranean Climate zone	-0.11		-0.47	-0.27		-1.42
THE university	0.16		0.91	0.13		0.99
Airport	0.39	**	2.28	0.49	***	3.34
Log population	-0.03		-0.41	-0.08	*	-1.67
Country dummy variables	yes			no		
Constant	-2.40	**	-2.01	-2.32	***	-3.97
Pseudo R^2	0.15			0.09		
Number of observations	13494			14909		
Log likelihood	-201.52			-218.76		

Notes: Asterisks ***, ** and * denote significance at the 1, 5 and 10 per cent levels. Column (i) relates to the whole control group while the estimations presented in Column (ii) are based on the quantile estimations.

Table 6: Control variables in the difference-in-differences equation

	Dep. var. Ln overnight stays		
	Coeff.		t-stat
ln population	0.44	***	9.07
<u>Dummy variables:</u>			
Capital city	0.73	***	7.13
UNESCO World heritage site	0.69	***	10.61
Seashore	0.46	***	7.12
Med. climate zones	0.53	***	7.45
University listed in the THE ranking	0.77	***	10.72
Airport	0.79	***	12.89
R^2	0.58		
Number of observations	738		

Notes: Asterisks ***, ** and * denote significance at the 1, 5 and 10 per cent levels. The estimation sample refers to the most recent estimation sample (Umeå) as an example.

Table 7: Evolution of overnight stays before, during and after the ECoC event

City	Mean t-3 to t-1	T	t+1	t+2
Stockholm	5269336	5912743	5948084	6174242
Weimar	368340	573767	448295	440075
Bruxelles/Brussel	4146105	4496895	4418679	4686350
Praha	7766678	7333182	8323494	7024756
Santiago de Compostela	1250401	978845	847215	874221
Helsinki	2309660	2604647	2563101	2504411
Reykjavik	657120	702123	690397	716639
Bologna	1308499	1467939	1617845	1562843
Bergen	1693114	1732414	1706118	1695834
Kraków	2052865	n.a.	1528579	n.a.
Rotterdam	833900	840500	834300	685900
Porto	889914	958581	1048462	996615
Salamanca	651360	818351	780905	892802
Brugge	1247180	1441725	1309096	1269358
Graz	641449	832385	717963	729029
Genova	1194551	1337820	1230123	1355614
Pátra	189400	259660	238469	205290
Sibiu	390596	530100	459342	381672
Luxemburg	1096850	1176396	1122940	1041134
Merseyside (Liverpool region)	4100000	3600000	2700000	2578387
Stavanger	1183959	1264007	1214257	1277595
Vilnius	1244100	1077818	1166955	1365011
Linz	678392	738555	693011	741886
Essen	1051261	1357737	1302511	1376165
Istanbul	9425750	10058536	12063087	13929713
Pécs	226638	237119	194269	202452
Turku	771482	805752	759160	733224
Tallinn	2105836	2770488	2757697	2802111
Guimarães	150356	208331	178429	208987
Maribor	207256	269474	232806	239446
Aix-en-Provence	2454879	2545334	2521008	2524792
Marseille	3669157	4042165	3789690	3782536
Kosice	279401	311602	269731	305534
Riga	2116646	2473854	2516474	n.a.
Umeå	400113	500017	n.a.	n.a.

Note: Data for the UK refers to international overnight stays and are based on the international passenger survey. Source: Eurostat, National statistical offices.