Just Dance? The Economic Effects of the Ultra Europe Music Festival in Split

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Abstract: *This paper identifies the economic impacts of the Ultra Europe Music Festival, a popular electronic music festival taking place in the city of Split. Using publicly available daily tax data on fiscalised amounts and the number of receipts, we examine the festival's effects on taxable consumption of accommodation, food and drink services, retail, and taxi services. To isolate the causal effects, we employ two-way difference-in-difference and two-way event study on a daily frequency and county level, with other Dalmatian Adriatic counties as controls. Results reveal temporary positive effects on the consumption of food and drink services, taxi services, and, to a lesser extent, retail. However, no significant impact on accommodation is recorded, arguably due to the prevalence of non-fiscalised accommodation in private households. The positive effects on taxable dimensions of consumption are concentrated on festival days, with spillover effects present on the day following the event.*

Keywords: Ultra Europe Music Festival; economic effects; public policy evaluation; fiscalisation

JEL classification: D04, L8, Z30

Introduction

Mass music festivals and sporting events, sometimes labelled mega-events, attract thousands of people to the host destinations, generating a wide battery of economic and social impacts. Mega-events produce demand-side effects as attendees consume goods and services, generating income for the local economy, but also supply-side effects as the host destination prepares, plans, organises, and transforms to absorb thousands of attendees. Therefore, mega-events are seen as strategic opportunities to enhance local economies, spread out tourist season, and brand host destinations

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(Getz, 2016). However, mega-events, especially if a destination with already strong tourism hosts them, can produce negative ramifications related to over-tourism, as they burden local infrastructure and crowd out domicile populations (Baldin et al., 2024). Consequently, mega-events are sometimes perceived as controversial, prompting the need for careful consideration of the costs and benefits of such mass events.

In this paper, we assess the impact of the Ultra Europe Music Festival on the local economy of Split-Dalmatia County, where the festival takes place. From 2013, at the beginning of July, the city of Split, a popular tourist destination on the Adriatic coast and the second biggest city in Croatia hosts the Ultra Europe Music Festival. This large electronic three-day music festival, followed by afterparties on nearby islands, attracts over a hundred thousand attendees from numerous countries. According to media outlets and information provided by the organizers in 2013, the festival attracted 103,000 attendees (Croatiaweek, 2013). By 2023, this number had increased to approximately 150,000 attendees, demonstrating significant growth in its popularity and influence (Ultra Music Festival, 2023).

We focus our analysis on the direct economic demand effects that originate from the consumption of festival attendees, especially from the tax-collection perspective. We use publicly available data on fiscalisation in Croatia from 2018, disseminated by the Ministry of Finance's Tax Administration. The data originated from a need to monitor cash and card transactions to improve value-added tax collection, containing daily fiscalised amounts and receipts disaggregated by detailed NACE sectors and Croatian counties. This data enables pinpointing the daily effects of the festival across the consumption categories, namely consumption of accommodation, services related to food and drinks, retail, and taxi services, all while being able to construct control groups using other Dalmatian Adriatic counties.

We apply the identification strategies in the causal inference tradition (Angrist and Pischke, 2010) to identify the causal effect of Ultra Europe Music Festival editions from 2018 to 2023 on fiscalised amounts and the number of receipts. In particular, we estimate two-way difference-in-difference and two-way event study using daily data, thus accounting for potential confounders by using control, non-treated, groups.

Results from difference-in-difference estimation show that Ultra Europe Music Festival has a significant positive effect on the fiscalised amount and the number of receipts in Split-Dalmatia County in services related to food and drinks, and taxi services, borderline significant and smaller-in-magnitude effect on retail, and no effect on accommodation. In particular, the festival increases the fiscalised amount of services related to food and drinks by 22.5%, taxi services by 33.2%, and by 4.2% in retail. These baseline estimations are robust to in-time placebo randomization of festival dates. Results from the event study also corroborate these baseline results. Given their daily frequency, the data also show that the festival effects are temporary, concentrating on festival days and producing spillover effects on a day after the main part of the festival. The absence of an effect on accommodation is likely due to the fact that private household

accommodation, which operates under a lump sum system widely used in Croatia, is exempt from VAT and, consequently, from fiscalization (Slovinac, 2022).

While this analysis alone cannot assess the totality of net effects of the Ultra Europe Music Festival in Split, as there are effects beyond measurable taxable consumption, such as job creation, consumption multiplier effects, and promotional and branding benefits, it does carefully identify the causal effect of the festival on consumption, which is a starting point for more comprehensive cost-benefit analysis.

The rest of the paper is structured as follows. The next section provides related literature, the third section presents data, and the fourth section exposes the empirical strategy, followed by the sections on the results and discussion. The last section concludes and provides avenues for future research.

Related literature

According to the review paper by Getz and Page (2016), the research on event tourism gained traction in the 1980s and has been growing since then. The same authors classify events into business, festival and culture, entertainment, and sports-related, each of them sparking a fruitful academic literature that evaluates not only the economic but also the broader social impact of such events. For example, Falk and Hagsten (2017) estimate the impact of the European Culture Capital programme on tourist overnight stays, while Tramonte and Willms (2010) explore the effects of the same programme on educational attainment. More examples of the broader social impact of event-based tourism can be found in review papers by Getz (2010), Getz and Page (2016), and Mair and Weber (2019).

Getz and Page (2016) also argue that, from an economic standpoint, event-related tourism can be evaluated from two perspectives: demand – who travels and attends events, what does their behaviour induce in terms of income and consumption – and supply – how do destinations plan, develop and change to host the events. Our analysis addresses the economic impact of the Ultra Europe Music Festival from the demand perspective. While there is no, to the best of our knowledge, assessment of the economic effect of the Ultra Europe Music Festival, there are numerous studies that explore the effects of event-based tourism and can be related to our research. In particular, Scandizzo and Pierleoni (2018) review the research on the economic effect of the Olympic games, while Domínguez-Azcue et al. (2021) synthesise the existing research on the nexus of the movie industry and tourism.

Focusing on the research on the interplay of festivals and economic effects, the existing literature aims to assess the total supply and demand effects using an input-output approach. Baldi et al. (2022), while identifying the effects of Summer Jamboree, an international music festival taking place in the Italian city of Senigallia, find that for every 1 euro of public money invested, 6.3 euros are generated. Bracalente et al. (2011), analysing the effects of the Umbria Jazz Festival, separately estimate the

effect on event production expenditures (supply side) and visitors' expenditures (demand side). A recent paper by Baldin et al. (2024) takes a more critical perspective on the effect of large cultural events. Using the structural equation model, they find that cultural events in Venice, a city with already massive tourism, temporarily crowd out domicile populations, especially if the festivals are not related to local traditions.

Our analysis, while building on the aforementioned research, departs from existing literature in a few dimensions. Firstly, we focus only on the demand side of festival effects, exploring the consumption patterns of festival attendees. Secondly, the nature of the dataset we use pinpoints direct economic effects from a tax perspective; and lastly, we identify the effect of Ultra Europe Music Festival within the methodological tradition of causal inference and applied microeconometrics (see, for, example, Angrist and Pischke, 2010).

Data

The main data source is a publicly available data set on fiscalisation in Croatia, available on the Ministry of Finance Tax Administration's website: https://porezna.gov.hr/fiskalizacija/izvjestaji/. The fiscalisation in Croatia was introduced on 1 January 2013 to improve the process of monitoring cash and card transactions for tax purposes, especially collecting value-added tax (VAT). The subjects of fiscalisation are individuals and business entities performing business activities, which are required to pay income and profit tax (Tax Administration, 2016). Therefore, the fiscalisation data covers business-to-consumer transactions that are subjected to VAT. It does not cover the data on business-to-business transactions, as well as businesses exempt from VAT, notably businesses in a lump sum system.

The publicly available dataset contains data on two levels of aggregation of Statistical Classification of Economic Activities in the European Community (NACE) (Eurostat, 2008): (i) data on Level 1 categories, from A to T; (ii) data on selected detailed sectors, from two to four NACE digits. In the analysis, we use the detailed versions of the fiscalisation data, focusing on four NACE sectors: (i) NACE I56 – Food and beverage service activities, henceforth "Services related to food and drinks", which includes restaurants, bars, and caffes; (ii) NACE I55 – Accommodation; (iii) NACE G4711 – Retail sale in non-specialised stores with food, beverages or tobacco predominating, henceforth "Retail", which correspond grocery stores, markets and supermarkets with food, beverages, and household products; and (iv) NACE H4932 – Taxi operation, henceforth "Taxi services". The publicly accessible fiscalisation data begins on 1 January 2018 and includes information on the number of receipts (transactions) as well as the total fiscalised amount.

Three important fiscalisation data features enable the estimation of the causal effect of Ultra Europe Music Festival in Split on the local economy: frequency, geographical

disaggregation, and inclusion of relevant NACE sectors. First, the data available is of a daily frequency. Specifically, with the festival days identified, it is possible to designate these as "treatment" days and subsequently infer their effects. Note that the Ultra Europe Music Festival began in 2013 and held its most recent edition in 2024, with a two-year pause in 2020 and 2021 due to the COVID-19 pandemic. The fiscalisation data spans from 2018, thus focusing our analysis on the festival editions from 2018 to 2023. The second important feature is geographical disaggregation, as the daily data is available separately for 21 Croatian counties. This enables estimation of the Ultra Europe Music Festival in Split-Dalmatia County and the construction of a control group, i.e., other counties without the festival. Given the geographical key of the data, the effect is estimated on the county, not on the city, level, which is a convenient feature as there are potential economic spillovers of the festival from the city of Split to the surrounding area. The third characteristic of the data is the inclusion of relevant NACE sectors in the detailed version of the publicly available fiscalisation dataset. In particular, estimating the effect of Ultra Europe Music Festival on fiscalisation in services related to food and drinks, accommodation, retail, and taxi services, arguably captures important facets of economic behaviour and spending patterns of festival attendees, thus enabling the estimation of direct effects of the festival on the local economy.

Figure 1: Fiscalised amount in Split-Dalmatia County
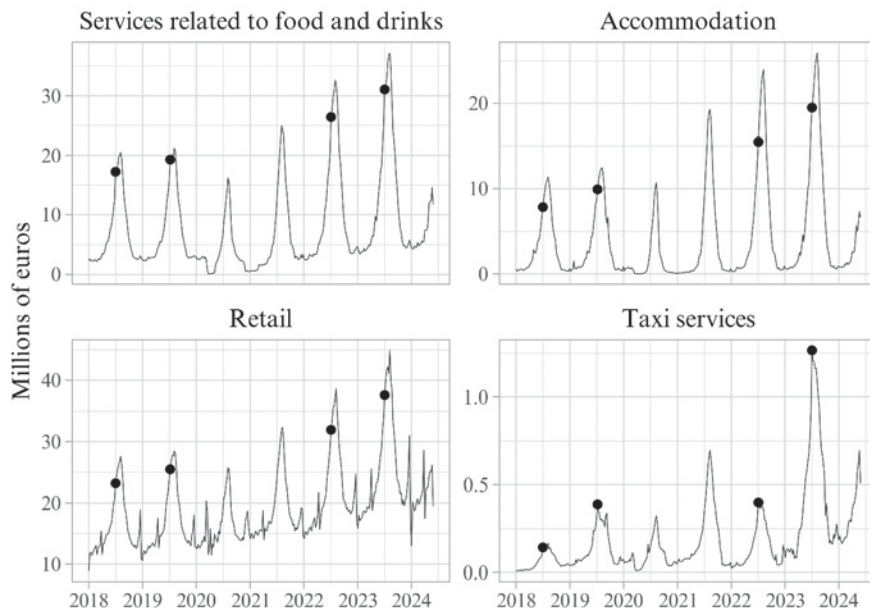
Notes: Black points represent the week of the Ultra Europe Music Festival. In 2020 and 2021, the festival did not take place.

Source: Ministry of Finance Tax Administration and authors' own calculations.

Figure 1, which displays the fiscalised amount on a weekly level for Split-Dalmatia County, disaggregated on a selected detailed NACE sector, encapsulates the data and its important features for the empirical strategy. Black points on the graph denote the week in which the Ultra Europe Music Festival takes place. Knowing that the festival takes place at the beginning of July, the seasonal variation of fiscalised amount blurs the visual identification of the effect and grants a more nuanced empirical strategy. However, for taxi services, even with the seasonal pattern, the year peaks are achieved in a week when the Ultra Europe Music Festival takes place.

Empirical strategy

Figure 1 alone does not allow inference of the economic effects of the Ultra Europe Music Festival as both observable and unobservable confounding factors that may coincide with the festival, which complicates the identification of causal effects. In particular, the tourist season is a strong confounding factor in our identification. As the festival usually takes place in the first part of July, it is concurrent with the beginning of the apex tourist season in Croatia. Building on the Roy-Rubin potential outcome framework (Rubin, 2005), a fundamental question of the causal inference in this context is how the consumption patterns in Split-Dalmatia County would look like if there was no Ultra Europe Music Festival.

We start with a simple two-way fixed-effect estimation of the difference-in-difference approach. In a nutshell, the difference-in-difference identification strategy compares the evolution of the outcome of interest of the treated unit (Split-Dalmatia County) and controls (other counties) before and after the treatment (festival), see, for example, Angrist and Pischke (2009) and Huntington-Klein (2021). Figure 2 displays the other Croatian counties used as a control group for Split-Dalmatia County: Zadar County, Šibenik-Knin County, and Dubrovnik-Neretva County. We chose these counties for several reasons; firstly, they are geographically close to Split, they also have strong seasonal patterns of tourism, and a pre-trend empirical exercise, which tests the identification assumptions of parallel trends, indicates that these Dalmatian Adriatic counties constitute a valid control group for the Split-Dalmatia County, which enables causal inference (Figure 3 and 4).

Figure 2: Display of the control and treated counties

Treated county
Control counties
Not used counties
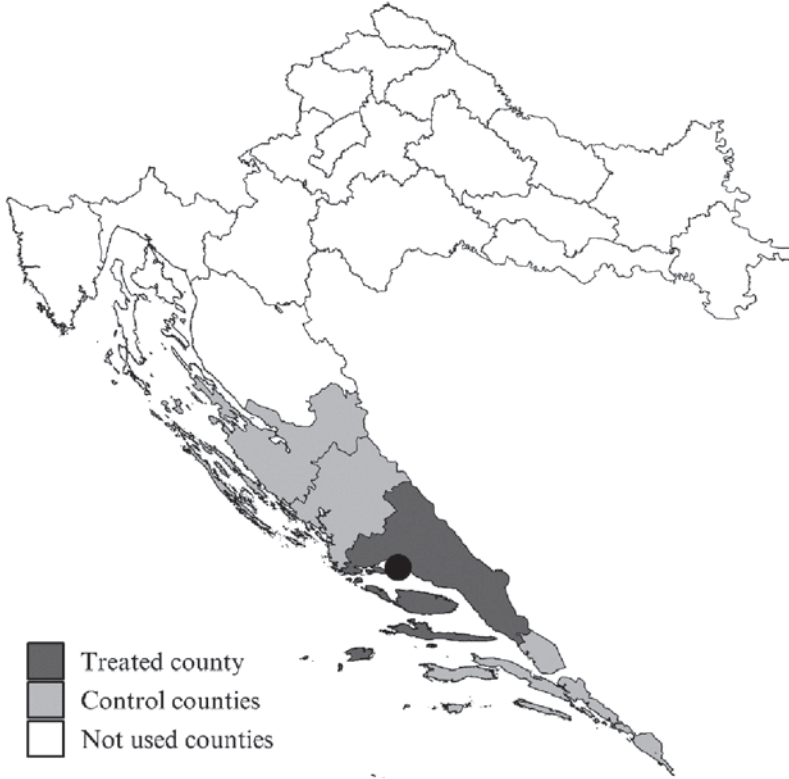
Notes: In the treated county (Split-Dalmatia County), the city of Split is denoted by a black point.

Source: Authors' own calculations.

The basic two-way difference-in-difference is estimated using the following equation with daily observations, separately for each detailed NACE sector presented in Figure 1:

$$y_{it} = \alpha + \beta \times treat_i + \gamma \times UEMF_t + \delta \times (treat_i \times UEMF_t) + \epsilon_{it} \tag{1}$$

where:
- y_{it} is the outcome of interest, i.e., log of the number of euros spent on day t in county i, as well as the log of the number of receipts on day t in county i;
- $treat_i$ serves as an indicator for Split-Dalmatia County, the location of the Ultra Europe Music Festival; it takes the value of 1 if the county in question is Split-Dalmatia and 0 if the county is Zadar, Šibenik-Knin, or Dubrovnik-Neretva;
- $UEMF_t$ is an indicator variable that assumes a value of 1 on days when the Ultra Europe Music Festival takes place and 0 on all other days;

- (*treat$_i$* × *UEMF$_t$*) is an interaction term that identifies the treatment – Ultra Europe Music Festival in Split-Dalmatia County, so the parameter δ represents the causal object of interest.

To estimate Equation (1), we use the fiscalisation data from 2018, 2019, 2022, and 2023, pooling four Ultra Europe Music Festival editions. We also subset the data using less than 30 days before and after the Ultra Europe Music Festival starts to compare fiscalised amounts and receipts during the tourist season. In addition, standard errors are clustered on a county level, allowing for in-group correlation of errors, which aligns with the literature standards (see Bertrand et al., 2004).

Recently, there has been ample new research in the difference-in-difference literature indicating that two-way fixed-effects rendition of difference-in-difference estimation might produce biased estimates (see, for example, De Chaisemartin and d'Haultfoeuille, 2023, and Roth et al., 2023), most notably in a setting where the treatment profile is staggered. However, in our empirical setting, the treatment does not have characteristics of a rollout design, so we are not making "forbidden comparisons"; hence, the estimation of Equation (1) should yield causal parameters of interest, given that the parallel trend assumption holds.

To assess the parallel trends assumption and show the dynamics of effects, in addition to Equation (1), we estimate a two-way event study (see Miller, 2023). Fundamentally, event study relies on comparing the evolution of the outcome of interest relative to an event, using leads and lags, while using control groups that account for unobserved heterogeneity.

Using the daily data and pooled four editions of Ultra Europe Music Festival for each of the detailed NACE sectors we estimate the equation:

$$y_{it} = \alpha + \sum_{k=T_0}^{-2} \beta_k \times treat_{ik} + \sum_{k=0}^{T_1} \beta_k \times treat_{ik} + \phi_i + y_t + \epsilon_{it} \tag{2}$$

where:
- y_{it} is the outcome of interest, i.e., log of the number of euros spent on day t in county i, as well as the log of the number of receipts on day t in county i;
- $treat_{ik}$ is the indicator variable denoting the treated county, Split-Dalmatia County, in the period k relative to the start of the festival. Corresponding β_k-s are, therefore, key coefficients in the model as they represent the evolution of the outcome of interest in a treated geographical unit (Split-Dalmatia County). We restrict the time frame from -29 (T_0) to 29 (T_1) days from the start of the Ultra Europe Music Festival. The reference period is $t = -1$ (a day before the start of the festival) therefore, the summation parts are split in the equation;
- ϕ_i is a vector of county fixed-effects. Similar to Equation (1), we include Split-Dalmatia County as well as Zadar, Šibenik-Knin, and Dubrovnik-Neretva County in the estimation. These county fixed-effects capture fixed county idiosyncrasies,

such as size, broader population demographics, geographical position, tourist capacities, and their composition, as well as time-invariant amenities.

- y_t is a vector of time fixed-effects on a daily frequency. This set of time dummies captures geographically common temporal idiosyncrasies, most notably seasonal patterns and calendar effects.

Estimates from Equation (2) can provide a more granulated outlook of the estimated effects. Firstly, from lead and lags to the relative start of the Ultra Europe Music Festival, we can also inspect if the parallel trends assumption hols, which is a central identifying assumption in difference-in-difference estimation. It also gives insights into the dynamics of the effects, as the estimates are disaggregated on a relative daily period from the festival start.

Results

Tables 1 and 2 show results from Equation (1), two-way difference-in-difference, separately for each NACE sector. Table 1 shows the results of the fiscalised amount, while Table 2 presents the estimates for the number of receipts; all results are pooled using four editions of Ultra Europe Music Festival (2018, 2019, 2022, and 2023).

Each column of Table 1 displays the results for NACE sectors presented in Figure 1. Ultra Europe Music Festival causes an increase in the total fiscalised amount in "Services related to food and drinks" of 22.5%, an increase in "Retail" of 4.2%, and an increase in "Taxi services" of 33.2%. These effects are statistically significant at the 1% level for the first and last NACE sector and significant at the 5% level for "Retail". Surprisingly, the Ultra Europe Music Festival does not cause an increase in the total fiscalised amount in "Accommodation", as the estimated effect is statistically indistinguishable from zero, which we account to the prevalence of private accommodation, which is not subject to fiscalisation. Table 2, which shows the results on the number of receipts, corroborates the conclusions mentioned above. The Ultra Europe Music Festival increases the number of receipts in "Services related to food and drinks" by 16.5%, in "Retail" by 3.2%, and in "Taxi services" by 35.2%, with all the estimates being statistically significant on at least a 5% level. Again, the coefficient on "Accommodation" is not statistically significant.

Table 1: Difference-in-difference results of the effect of Ultra festival on fiscalised amount in Split-Dalmatia County

	Dependent variable: Fiscalised amount			
	Services related to food and drinks	Accommodation	Retail	Taxi services
Ultra Europe Music Festival	0.225***	0.027	0.042**	0.332***
Standard errors (clustered at the county level)	(0.014)	(0.038)	(0.008)	(0.053)
Observations	944	944	944	944
Adjusted R^2	0.966	0.901	0.986	0.929
Residual Std. Error (df = 704)	0.111	0.206	0.067	0.315

Notes: Each column represents the result of the estimation of Equation 1 using $\log(1 + \text{fiscalised amount})$ as a dependent variable, using daily data, separately for each detailed NACE sector. Coefficient next to the interaction term, δ, is the causal parameter of interest. Standard errors in the parentheses are clustered at the county level.

Source: Ministry of Finance Tax Administration and authors' own calculations.

*p<0.1; **p<0.05; ***p<0.01.

Table 2: Difference-in-difference results of the effect of Ultra festival on number of receipts in Split-Dalmatia County

	Dependent variable: Number of receipts			
	Services related to food and drinks	Accommodation	Retail	Taxi services
Ultra Europe Music Festival	0.165***	-0.003	0.032**	0.352***
Standard errors (clustered at the county level)	(0.013)	(0.017)	(0.008)	(0.026)
Observations	944	944	944	944
Adjusted R^2	0.973	0.887	0.993	0.911
Residual Std. Error (df = 704)	0.083	0.165	0.050	0.384

Notes: Each column represents the result of the estimation of Equation 1 using $\log(1 + \text{number of receipts})$ as a dependent variable, using daily data, separately for each detailed NACE sector. Coefficient next to interaction term, δ, is the causal parameter of interest. Standard errors in the parentheses are clustered at the county level.

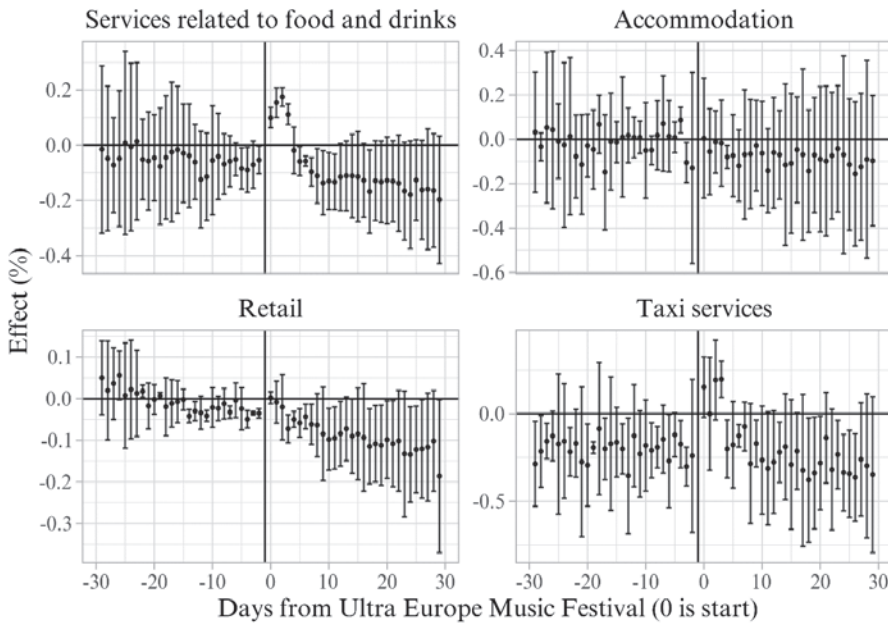Source: Ministry of Finance Tax Administration and authors' own calculations.

*p<0.1; **p<0.05; ***p<0.01.

Figures 3 and 4 display the results of the event-study exercise, separately for each detailed NACE sector, and two outcomes, total fiscalised amount (Figure 3) and number of receipts (Figure 4). As mentioned in the methodology section, event study results can provide three different sets of insights: (i) whether the parallel trends assumption is plausible, (ii) the magnitude of the estimated effects, and (iii) the dynamics of the effect. From both figures, we can infer that the parallel trends assumption is plausible, as the time effects before the relative start of the Ultra Europe Music Festival fluctuate around zero, being statistically indistinguishable from zero at the 1% level. However, even if the parallel trends are arguably plausible, not all detailed NACE sectors in-

cluded in the analysis have the same quality of pre-treatment fit: while for "Services related to food and drinks" and "Accommodation", parallel trends appear to be very plausible, the pre-trend fit for "Retail" indicates a glimpse of a systematic trend (which suggests that Split-Dalmatia County may exhibit slightly different dynamics in retail fiscalization compared to the control counties), while for the "Taxi services", the time coefficients before the festival start are systematically negative.

From both Figures 3 and 4, we can infer a statistically significant effect of Ultra Europe Music Festival's total fiscalised amount and number of receipts in "Services related to food and drinks" and "Taxi services". In addition, while for the "Retail", there is a small visual upward kink in the time effects, the coefficients next to "Accommodation" show no sign of change, all in accord with the results obtained with the two-way difference-in-difference estimation. The magnitude of the effects in the event study is somewhat smaller, spanning from 10 to 20% for "Services related to food and drinks" and 10 to 25% for the "Taxi services", which is related to the fact that the difference-in-difference estimates from Table 1 and 2 are, by construction, for the whole festival, while the event study from Figures 3 and 4 separates the effect on each single day.

Figure 3: Event-study results of the effect of Ultra festival on fiscalised amount in Split-Dalmatia County
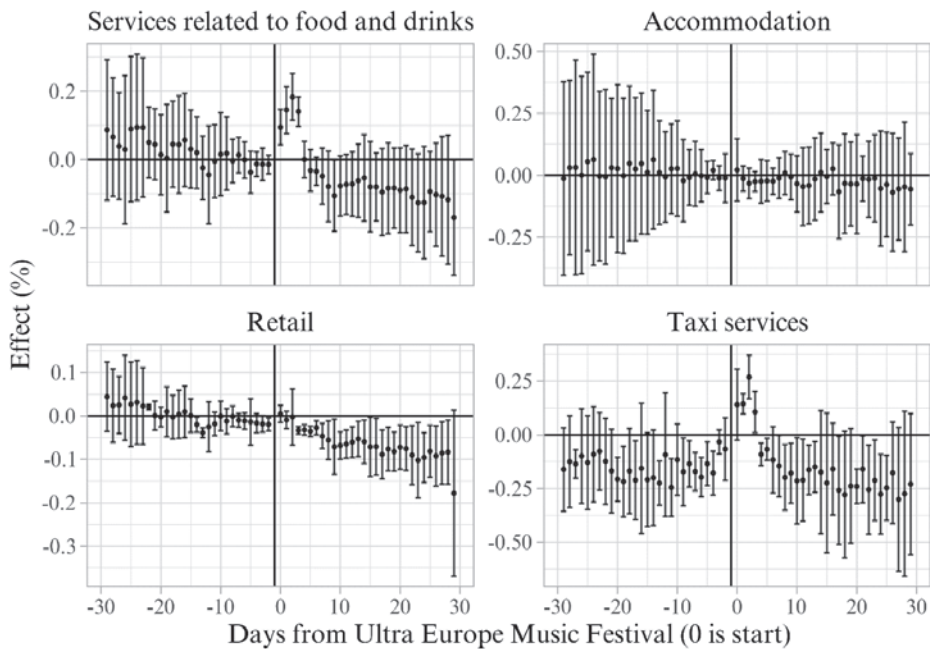

Notes: Each panel represents the results of the pooled event study analysis from Equation 2, using log(1 + fiscalised amount) as a dependent variable, using daily data, separately for each detailed NACE. The points on the Y-axis show

β coefficients, while the bars indicate a 99-% confidence interval using standard errors clustered at the county level. Each panel has a different y-axis domain.

Source: Ministry of Finance Tax Administration and authors' own calculations.

The dynamics of the effects show that the impact of the Ultra Europe Music Festival is temporary, concentrated on festival days, with spillovers occurring only on the day following the festival's conclusion. Specifically, being a three-day event, Ultra Europe demonstrates a significant positive effect on the total fiscalised amount and the number of receipts for "Services related to food and drinks" and "Taxi services" one day after the festival ends. This phenomenon may be partially attributed to after-midnight spending on the final day of the festival, which is recorded on the subsequent day, as well as to the day-after effect, when festival attendees, on their way home or other destinations, eat outside and use taxis.

Figure 4: Event-study results of the effect of Ultra festival on the number of receipts in Split-Dalmatia County
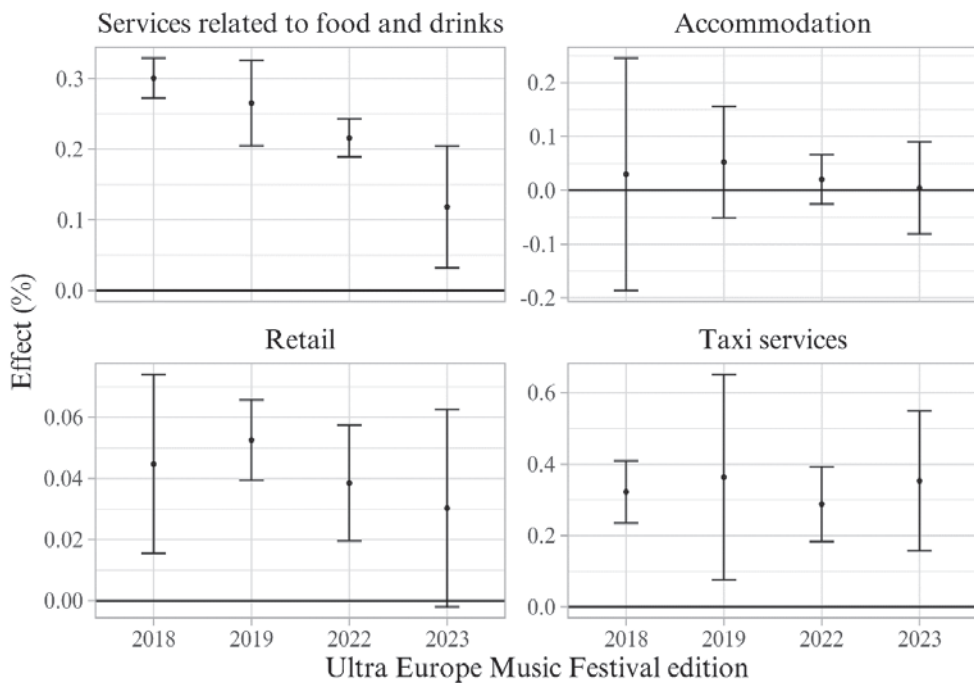

Notes: Each panel represents the results of the pooled event study analysis from Equation 2, using log(1 + number of receipts) as a dependent variable, using daily data, separately for each detailed NACE. The points on the Y-axis show β coefficients, while the bars indicate a 99-% confidence interval using standard errors clustered at the county level. Each panel has a different y-axis domain.

Source: Ministry of Finance Tax Administration and authors' own calculations.

In addition, given that the fiscalisation data covers multiple editions of the Ultra Europe Music Festival, we run the difference-in-difference estimation from Equation 1 separately for each festival rendition to provide a heterogenous description of festival effects throughout the years (Figure 5). Results on the total fiscalised amount show that the effects of the festival are homogenous over the years, except the "Services related to food and drinks", whose effects are shrinking from 30% in 2018 to 11.8% in 2023.

Figure 5: Heterogenous time-specific effects of Ultra festival on fiscalised amount in Split-Dalmatia County


Notes: Each panel represents the results of the difference-in-difference analysis from Equation 1, using log(1 + fiscalised amount) as a dependent variable, using daily data, separately for each detailed NACE. The points on the Y-axis show γ coefficients, estimated separately for each Ultra festival edition, while the bars indicate a 99-% confidence interval using standard errors clustered at the county level. Each panel has a different y-axis domain.

Source: Ministry of Finance Tax Administration and authors' own calculations.

Finally, we also perform a placebo exercise with the difference-in-difference estimation to corroborate these results and determine whether some other confounders drive the effects. For each date between 1 June and 1 September, we falsely assign the Ultra Europe Music Festival days, excluding the true festival dates. Then, we estimate the difference-in-difference from Equation (1) for each false festival days.

The results, presented in Figure 6 for the fiscalised amount and Figure 7 for the number of receipts, indicate that our baseline results hold, as the estimated effects from Equation (1) for "Services related to food and drinks" and "Taxi services" are much greater in magnitude compared to placebo effects.
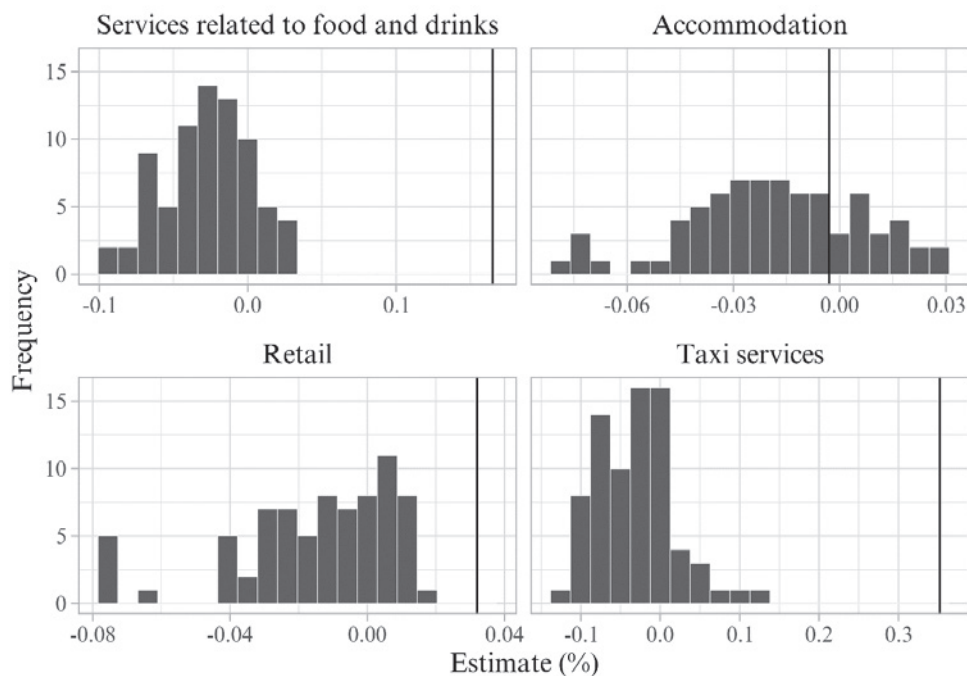
Figure 6: Placebo estimates of the effect of Ultra festival on fiscalised amount in Split-Dalmatia County
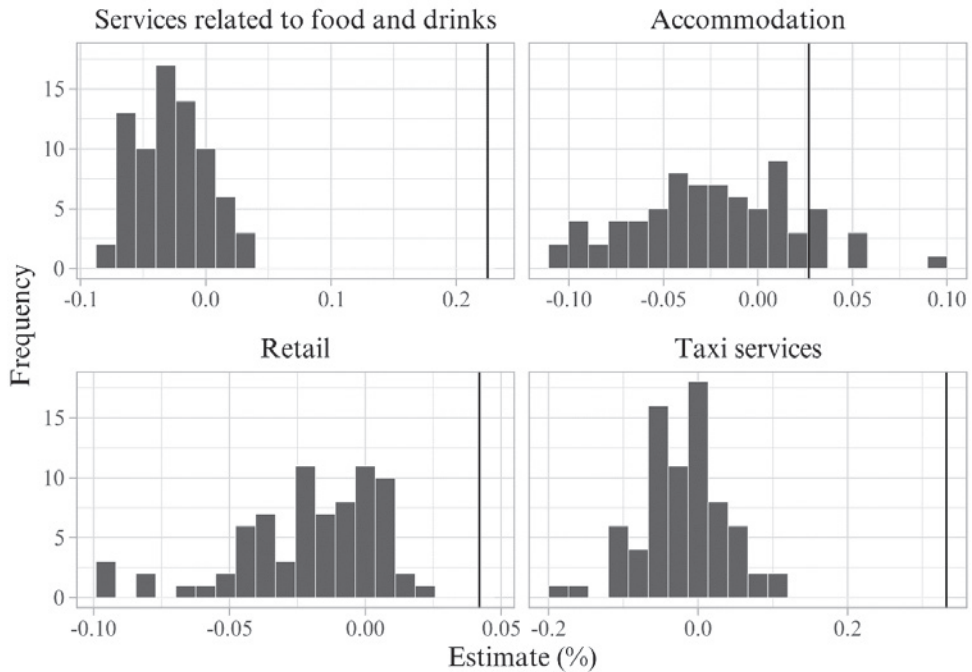
Notes: The black line represents the baseline difference-in-difference estimation of the δ coefficient from Equation 1 and Table 1. Grey bars represent the histogram of placebo estimates using the same estimation but falsely assigning festival days across the 1st of June to the 1st of September, excluding the actual festival days.

Source: Ministry of Finance Tax Administration and authors' own calculations.

Figure 7: Placebo estimates of results of the effect of Ultra festival on fiscalised amount in Split-Dalmatia County

Notes: The black line represents the baseline difference-in-difference estimation of the δ coefficient from Equation 1 and Table 1. Grey bars represent the histogram of placebo estimates using the same estimation but falsely assigning festival days across the 1st of June to the 1st of September, excluding the actual festival days.

Source: Ministry of Finance Tax Administration and authors' own calculations.

Discussion

Summing up the results presented in the previous section, we find that Ultra Europe Music Festival has a strong temporary positive effect on the fiscalised amount and number of receipts in "Services related to food and drinks" and "Taxi services", borderline significant positive effect on expenditures in "Retail", and no effect of "Accommodation". There are two potential reasons for the absence of an observable effect on accommodation. Firstly, unlike other NACE sectors in the analysis, there is a time delay in receiving and paying for an accommodation service. Stays could be spread out through the days before and after the festival. For example, festival attendees could come a few days before the festival, stay a few days after, and pay the bill at the beginning or the end of the stay. This pattern of behaviour could not be observed in difference-in-difference estimation but could be recorded through

an event study framework. The second reason for this surprising result is that accommodation in private households, prevalent in Croatia, is not subject to fiscalisation. In particular, in 2023, around 40% of overnight stays in Croatia occurred in private household accommodation (HNB, 2024), subject to lump sum taxation and, therefore, not fiscalised (Slovinac, 2022). The fact that event study analysis does not capture time leads and lags in effect on accommodation arguably points towards the second explanation: as the considerable portion of accommodation capacities are not fiscalised – more than 105 thousand units in 2023 (Tax Administration, 2024) – there is no observable effect of the festival on accommodation services.

The estimation of the presented results is predicated on the appropriate choice of control groups for Split-Dalmatia County. As explained in the methodological section, we choose three other Dalmatian counties on the Adriatic Sea as control geographies – Zadar, Šibenik-Knin, and Dubrovnik-Neretva County – and the results in event study analysis validate parallel trends assumption, thus corroborating our choice. However, these control groups could also be treated by the Ultra Europe Music Festival. Festival attendees could, for example, arrive at Zadar airport and go to Dubrovnik after the festival. This hypothetical scenario would imply that the fiscalised amounts in control groups are also affected, potentially inducing bias in our estimates. However, given that control counties are positively affected, our estimates are lower bound of the true effect, i.e., the effect of Ultra Europe Music Festival on Split-Dalmatia County is at least the one presented above.

The estimates we present capture the direct demand economic effects of the festival. While other economic outcomes could also be explored (Bracalente et al., 2011 and Baldi et al., 2022), such as tourist arrivals and stays or the prices of short-term lent, we argue that fiscalisation data enables the analysis of important dimensions of festival effects. Firstly, it captures the behaviour of festival attendees, consumption of food and drinks, accommodation, and travel, precisely measuring realised outcomes. Therefore, unlike tourist arrivals, fiscalisation data provides nuanced information on the consumption patterns of festival attendees. Secondly, fiscalisation data, by definition, explores the effects of the festival from a tax perspective – how much additional taxes can be collected due to the festival, which is, arguably, an important dimension for constructing a cost-benefit analysis of the whole event.

This analysis alone cannot assess the net effect of the Ultra Europe Music Festival in Split. In addition to taxable consumption, which we measure, there are other indirect economic effects of the festival. For example, additional jobs might be created due to the festival hosting, and there are certainly multiplicative effects of income generated by the festival on the local economy (Bracalente et al., 2011 and Baldi et al., 2022). Furthermore, there are other positive facets of festival hosting, such as promotion, habit formation of tourists, and destination branding, see, for example, Getz (2010), Getz and Page (2016), and Mair and Weber (2019). Ultimately, for a complete cost-benefit of Ultra Europe Music Festival, a whole battery of direct and indirect

economic and social effects would have to be known, as well as the set of preferences that value and weigh them.

Conclusions

This paper assesses the economic impact of the Ultra Europe Music Festival on Split-Dalmatia County from 2018 to 2023, focusing on direct economic demand effects through the lens of fiscalisation data. The findings reveal significant temporary positive effects on fiscalised amounts and receipts in services related to food and drinks, taxi services, and retail but no significant effect on accommodation. The lack of observable impact on accommodation can be attributed to the prevalence of non-fiscalised private accommodations, which account for a substantial portion of overnight stays in Croatia. The analysis highlights that the economic benefits of the Ultra Europe Music Festival are concentrated around the festival days, with noticeable spillover effects immediately following the event.

These papers' limitations also serve as directions for future research. To comprehensively evaluate the economic effects of the Ultra Europe Music Festival, one needs to undertake a more detailed examination of indirect economic and social effects, such as job creation, consumption multiplier effects, branding, and promotional benefits, all of which contribute significantly to the broader economic landscape influenced by the festival. These potential benefits should be juxtaposed to potential drawbacks of festivals, mostly associated with over-tourism. For example, increased pressure on local infrastructure can lead to the deterioration of public amenities and higher maintenance costs, straining municipal budgets and resources. Over-tourism can also result in crowding out the domicile population, as residents may be displaced or discouraged from using local services due to congestion and higher prices. Additionally, disturbances in the real estate market are another critical issue, as the demand for short-term rentals during the festival can inflate property prices and rents, making housing less affordable for locals. By addressing these potential drawbacks in future research, a more balanced and comprehensive understanding of the festival's impact can be achieved, leading to more effective policy recommendations and management strategies to mitigate the negative effects of over-tourism. Another potential avenue of research, beyond assessing the festival's direct and indirect economic effects, involves exploring the optimal time and venue of the festival. Investigating the potential benefits of moving the festival away from the peak of the tourist season and rotating its venue might smooth-out high seasonality of tourism and disperse economic benefits more evenly across the region, reducing the stress on any single location. While these strategies appear promising for enhancing the festival's positive impact on the local economy and promoting sustainable tourism practices, further research, and careful planning are necessary to evaluate their feasibility and effectiveness.

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Conflicts of interest/Competing interests

There is no conflict of interest/Competing interests

Availability of data and material

The data that support the findings of this study are openly available in the website of Ministry of Finance Tax Administration's website (https://porezna.gov.hr/fiskalizaci-ja/izvjestaji/).

Code Availability

The computer codes are available upon request.

Authors' Contributions

Not applicable.

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