



# Who scores from hosting sports events? Local spending evidence from the EURO 2024

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## ABSTRACT

Hosting mega-sports events generates optimistic projections of economic benefits, yet empirical evidence on actual local returns remains mixed. Focusing on the UEFA EURO 2024 in Germany, we provide causal evidence on short-term local consumption effects using anonymized daily card-spending data. Using a difference-in-differences and local-projection framework, we document a 3% increase in consumer spending in host cities during the tournament, driven almost entirely by international visitors. Effects are concentrated in the group stage, on match days, in city centers, and in tourist-facing sectors. Domestic spending exhibits spatial displacement but no aggregate crowding out.

## 1. Introduction

Governments and cities around the world regularly compete to host mega-sports events, such as the Olympic Games or international soccer tournaments. Hosting these events, however, entails considerable public expenditures, as governments must fund infrastructure, security measures, and organizational costs. These costs are often justified by optimistic projections of economic benefits such as increased economic activity, more tourism, and higher consumer spending. Empirical evidence on the actual economic returns to hosting is, however, mixed, and often fails to detect significant and economically meaningful effects (Baade and Matheson, 2016). Most empirical studies are constrained by the limited availability of disaggregated data at the temporal, spatial, or sectoral level, which hampers the identification of economic effects. Prior evidence predominantly relies on aggregate economic indicators

such as GDP, sales, or employment at the national or regional level, typically measured at quarterly or monthly frequencies. These data, hence, lack the temporal and spatial granularity to capture localized and immediate economic effects.

This paper provides causal evidence on the short-term local consumption effects of hosting a major sports event, using granular transaction data. Focusing on the 2024 UEFA European Championship (EURO 2024) in Germany, our empirical analysis leverages highly granular daily card spending data at the postcode level from the Mastercard network. Our empirical strategy integrates a difference-in-differences (DiD) design with a local projections DiD approach to estimate the impact on consumer spending during the tournament and around match days. The EURO 2024 provides a particularly well-suited setting for studying short-term local consumption effects: the tournament is short in duration, features a high density of matches across multiple large

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cities, and has largely predetermined schedules during the group stage, facilitating identification of localized and time-bound demand shocks. Using this setting, we document a statistically and economically significant increase in consumer spending both over the entire tournament period and on individual match days.

We first estimate a DiD model comparing host cities to appropriate control groups of non-host cities in Germany, accounting for day and postcode fixed effects. Contrary to much of the existing literature, which relies primarily on aggregate data, we document a statistically significant and economically meaningful increase in consumer spending in host cities of roughly 3% relative to non-host cities over the tournament period. This increase is attributable mainly to spending by international visitors during the group stage of the championship. Local spending by international visitors increases by more than 11% in host cities during the group stage, a pattern likely attributable to higher match density and to the fact that group stage match schedules are announced well in advance, facilitating international travel planning. In contrast, we find no evidence of either crowding out or an increase in domestic spending in host cities at the aggregate level. The estimated effects are robust to alternative choices of the control group.

Second, to capture consumption dynamics around match days, we employ a local projections difference-in-differences (LP-DiD) design. Using a clean control group that excludes observations affected by other EURO matches mitigates concerns about regional and temporal spillovers and allows for flexible, horizon-specific treatment effects. On match days, we observe an average 5% increase in spending, driven by additional spending by international visitors.

Beyond the average effects, we uncover pronounced spatial and sector-level heterogeneity. Economic gains are largest in city centers and in tourist-facing retail and service sectors, and are almost entirely driven by international visitors. In contrast, domestic consumption remains unaffected at the aggregate level, but appears to be spatially displaced over the course of the tournament.

Finally, our findings provide policymakers with unique evidence on localized economic effects of mega-sports events and contribute to the evaluation of benefits and costs of hosting such events. We conduct a back-of-the-envelope calculation to approximate the impact on consumer spending in Euros, focusing on brick-and-mortar retail, hospitality, and entertainment. This exercise suggests that increases in local consumer spending in tourism-related services and retail sectors during the tournament are of a similar order of magnitude to expenses borne by the EURO 2024 host cities. As only a fraction of this additional spending translates into tax revenue, municipal receipts fall well short of these costs. This implies that the EURO effectively functioned as a targeted transfer to tourist-facing urban sectors, rather than as a self-financing investment for host city budgets.

The paper relates to several strands of literature. First, it contributes to the large body of work assessing the economic impact of mega-events. Most studies rely on aggregate indicators such as GDP, employment, or population growth and tend to find zero significance or even negative economic effects of hosting major sports events such as the Olympics or the FIFA World Cup (e.g., Baade and Matheson, 2004, 2016; Billings and Holladay, 2012; Hagn and Maennig, 2008, 2009; Nitsch and Wendland, 2017; Scandizzo and Pierleoni, 2018). Fewer studies using aggregate data report positive but weak effects of mega-sports events on regional GDP (Firgo, 2021), wages (Jasmand and Maennig, 2008), or tourism (Allmers and Maennig, 2009). Some studies examine economic effects at the sectoral level and find no significant overall effect, or only positive short-term employment effects in sectors such as retail, accommodation, and food services (Feddersen and Maennig, 2012, 2013). A much smaller literature examines more granular outcomes, documenting positive effects on nighttime emissions (Pfeifer et al., 2018) and hotel records (Du Plessis and Maennig, 2012), but a decline in sales (Lamla et al., 2014). Overall, the evidence remains mixed and often faces limitations related to data availability or identification. We contribute to this literature by documenting positive

short-run effects of hosting on consumer spending, and by analyzing temporal, spatial, and sectoral-level heterogeneity.

Second, our paper relates to the urban and regional economics literature on sports stadiums, amenities, and place-based investments. Earlier studies examine whether professional sports franchises and stadiums stimulate local economic development, suggesting that stadiums rarely generate substantial city-wide employment or income gains (Coates and Humphreys, 2003; Matheson, 2018; Bradbury et al., 2023, 2024). However, a growing body of research shows that stadiums can generate spatially concentrated effects. Studies document positive spillovers to nearby businesses (Abbasov and Sedov, 2023), increases in land and property values (Ahlfeldt and Kavetsos, 2014; Dehring et al., 2007; Tu, 2005; Feng and Humphreys, 2018; Chikish et al., 2019; Propheter, 2023; Funahashi and Cardazzi, 2026), and improvements in neighborhood attractiveness and urban image (Ahlfeldt and Maennig, 2009, 2010). Related studies on mega-events and housing markets examine whether hosting affects rents and property values around event facilities, but find effects that are context-specific and often limited or spatially uneven (Hur and Watanabe, 2025; Hur et al., 2026a,b). Other studies emphasize that stadiums may also generate localized costs, including congestion, crime, pollution, and residential disamenities (Humphreys and Nowak, 2017; Pyun, 2019; Locke, 2019; Hyun, 2022; Joshi et al., 2020). This literature suggests that sports-related investments primarily affect economic activity at fine spatial scales, even when aggregate city-wide effects remain limited. Consistent with this evidence, studies of other place-based entertainment investments, such as casinos, document localized gains in employment, income, wages, house prices, and tourism-related sectors (Anisfeld and Rosenthal-Kay, 2025; Scavette, 2023). We extend this literature from permanent investments to a temporary event, and, unlike work relying on slow-moving outcomes such as property values, we observe the resulting localized demand shock directly through daily spending data.

Third, we contribute to the growing body of literature that leverages high-frequency consumer spending data to analyze localized consumption patterns. Due to its fine-grained geographic resolution, transaction data have been used to study consumer mobility and the spatial concentration of economic activity (e.g., Agarwal et al., 2017; Bounie et al., 2023), to nowcast consumption (Aastveit et al., 2024), and to study spending responses to shocks such as natural disasters (Yuan et al., 2022) or the COVID-19 pandemic (Dunn et al., 2021; Chetty et al., 2024; Parker et al., 2022; Alcedo et al., 2025; Alipour et al., 2025). We extend this literature by examining how a large-scale public sports event induces localized shifts in consumption, providing novel insights into the spatial dynamics of short-term demand shocks driven by non-policy events.

Overall, our findings shed light on the economic mechanisms underlying major sports events by disentangling the roles of international tourism, domestic consumer substitution, and spatial displacement. More broadly, our results help reconcile the mixed evidence in the mega-event literature by showing that event-related economic activity is concentrated at spatial and sectoral scales that aggregate analyses often fail to capture. The results illustrate how consumption patterns shift across sectors and urban space, offering insights that may help local policymakers allocate resources more efficiently and design targeted strategies to maximize local economic benefits.

The remainder of the paper is organized as follows. The next Section 2 describes the institutional background of the EURO 2024 in Germany. Section 3 presents our data sample, followed by a description of our empirical approach in Section 4. Section 5 presents our main results, while Section 6 examines temporal, spatial, and industry-specific heterogeneities. This is followed by a discussion in Section 7 before Section 8 concludes.

## 2. Institutional background: The UEFA EURO 2024

The UEFA EURO 2024 took place in Germany from June 14 to July 14, 2024, marking the 17th edition of the UEFA European Soccer Championship for national men's soccer teams. Germany was selected as the host nation on September 27, 2018 after prevailing over Turkey in the bidding process. The tournament featured 24 teams, with matches played across ten host cities: Berlin, Dortmund, Düsseldorf, Frankfurt am Main, Gelsenkirchen, Hamburg, Cologne, Leipzig, Munich, and Stuttgart. It was the third time Germany hosted the tournament.

*Locations and matches.* A total of 51 matches were played, with 36 group stage matches taking place across all ten host cities. Berlin, Dortmund, and Munich hosted 6 matches; Düsseldorf, Hamburg, Cologne, Frankfurt, and Stuttgart hosted 5; and Gelsenkirchen and Leipzig hosted 4. The round of 16 took place in all cities except Hamburg and Stuttgart, while the quarterfinals were held in Munich, Hamburg, Berlin, and Dortmund. The semifinals were held in Dortmund and Munich, with the final at the Olympiastadion in Berlin on 14 July 2024. Table A.1 in the Appendix provides an overview of the respective matches at each location.

*Selection of host cities.* The ten host cities were selected based on criteria such as stadium capacity, safety standards, and overall infrastructure quality (Fußball-Bund, 2018). Each stadium was required to accommodate at least 30,000 spectators and to offer modern amenities, including VIP areas, media facilities, accessibility features for individuals with disabilities, and up-to-date broadcasting capabilities to support media coverage and fan engagement. In addition, candidate cities needed to demonstrate adequate public infrastructure, parking and hotel availability, and a comprehensive security concept. Accessibility via public transportation and proximity to airports and train stations also played a central role in the selection process.

Initially, 18 German cities expressed interest in hosting matches. Nuremberg, Bremen, Mönchengladbach, and Hanover were not selected by the German Football Association due to assessments related to infrastructure, security, and stadium capacity. Dresden, Freiburg, Karlsruhe, and Kaiserslautern withdrew their applications for financial reasons. Several of these cities hosted matches during the 2006 World Cup. Fig. A.1 in the Appendix illustrates both host and applicant cities along with their respective stadium capacities.

*Costs and revenues.* Hosting the UEFA EURO 2024 entailed significant financial considerations, many of which were borne by national and regional governments, private stakeholders, and local municipalities. The federal government reports public sector expenditures totaling 333 million Euros (Wicker et al., 2024), of which 292 million were covered by the host cities themselves (see Table A.2 in the Appendix for a breakdown of costs). These costs include public investments and infrastructure upgrades, security measures, logistical coordination, the provision of at least one fan zone per city, and advertising expenditures. Renovation and maintenance costs for stadiums are added to these expenditures. The UEFA's budget report for the 2023/24 season allocated 645.5 million Euros to event expenses for the tournament borne by the UEFA itself (UEFA, 2023). These expenditures contrast with revenues of up to 2.4 billion Euros from broadcasting and media rights, commercial activities, ticket sales, hospitality packages, and other sources (UEFA, 2023). While hosting the event yields substantial financial benefits for the UEFA, a significant share of the costs is borne by the public sector. Therefore, this paper focuses on the effects of local consumer spending to assess how hosting the event influences actual spending in host cities and, in turn, short-term economic inflows.<sup>2</sup>

<sup>2</sup> Despite tax privileges granted to UEFA, The Nielsen Company (US), LLC (2024) estimates total economic benefits of 7.4 billion Euros for Germany. However, these figures are based on survey and media data from ticket holders only and do not account for spillovers or crowding-out effects, potentially overstating the true economic impact.

## 3. Data and descriptive statistics

*Sample.* Our sample comprises daily postcode-level observations on card transactions and spending in German metropolitan regions between January 2023 and July 2024. We focus on the ten host cities, the eight additional cities that have expressed interest in hosting the championship or applied to do so, and all cities with a professional league (first- and second-division Bundesliga) soccer stadium. While we mainly focus on spending in the cities themselves, our data also includes surrounding postcodes within 30 kilometers of the main stadium.

*Card spending data.* Our analysis uses anonymized, aggregated daily card transaction data from Mastercard Location Insights to measure local offline consumer spending. The dataset encompasses postcode-level indices of spending at physical point-of-sale (POS) locations, such as retail stores and restaurants, that are cleared through the Mastercard network. This includes payments with Mastercard credit, debit, or Maestro cards, as well as with virtual payment systems such as Apple Pay, with a Mastercard card in the background. Cash transactions and prepaid bookings are not observed in the data. We use daily spending data at the postcode and industry level from January 2023 to August 2024, and we can distinguish payments made with local German cards from those made with international cards.<sup>3</sup>

*Further microgeographic data.* We supplement our analysis with further microgeographic data. As spending varies systematically with weather conditions and across days, we enrich the dataset with information on public holidays, school holidays at the federal state level, temperature, and precipitation data that we collected via web scraping. We further add data on match days of the UEFA European Championship, as well as other soccer events that take place in the same stadium, such as the UEFA Champions League, the UEFA Europa League, the DFB club games, and the German Bundesliga, to account for other soccer match days. We also supplement our analysis with administrative data on overnight stays of tourists from the German Statistical Office.

## 4. Empirical strategy

We examine the short-term effects of hosting a major sports event on local consumer spending. Specifically, we estimate the impact of the UEFA EURO 2024 on microgeographic daily spending using a difference-in-differences (DiD) and Local Projection DiD framework. The analysis compares domestic and international cardholder spending in host cities to a control group of non-hosting cities. We estimate both the aggregate effect over the entire event period and the match day specific effects, including the days immediately before and after the match.

*Overall consumption effects during the EURO 2024.* Our baseline specification estimates differential spending effects between host cities and their control group for the full duration of the tournament:

$$Spend_{it} = \beta \cdot DiD_{it} + \gamma \cdot \mathbf{Z}_{it} + \alpha_i + \mu_t + \varepsilon_{it} \quad (1)$$

The dependent variable,  $Spend_{it}$ , captures the logarithm of the total or industry-specific spending volume for postcodes  $i$  on day  $t$ , estimated separately for total, international, and domestic spending.  $DiD_{it}$  is an interaction of the indicator for host cities with the time period of the EURO 2024. We account for postcode fixed effects  $\alpha_i$ , capturing heterogeneous spending across locations, and for date fixed effects  $\mu_t$ , which

<sup>3</sup> Due to confidentiality restrictions, the dataset includes only postcodes meeting a minimum transaction threshold. These conditions are usually fulfilled for overall spending in cities. However, this might introduce sample selection bias when analyzing spending by industry separately, which we discuss further in Section 6.3.

absorb seasonal and day-specific variation. In particular, the day fixed effects absorb potential nationwide consumption effects of the EURO that are independent of hosting.<sup>4</sup>  $\mathbf{Z}_{it}$  includes indicators for school and public holidays, as well as weather variables such as temperature and precipitation that may influence daily spending. Additionally, we control for non-EURO 2024 soccer match days, covering games from the German Bundesliga, UEFA Champions League, and DFB Pokal, to account for other soccer-related spending shocks in the same stadium.<sup>5</sup> Standard errors are clustered at the postcode level.

We include postcode-level and industry-specific weights in our regression model to account for spatial heterogeneity in consumption patterns and initial differences in consumer spending levels between postcodes. The weights are derived from the average transaction amount observed in 2023 for each postcode-industry sector combination. The calculated mean is applied uniformly to all observations within each postcode, ensuring that regional spending and consumption behavior are captured using a consistent baseline across geographical units for each sector.

**Control group selection.** The credibility of the empirical design hinges on the choice of an appropriate control group. In the context of mega-sports events, identifying an appropriate control group is challenging because cities self-select into the bidding process: those expecting the largest gain may be more likely to host the championship. We follow Firgo (2021), Nitsch and Wendland (2017), Billings and Holladay (2012), and Contreras and Corvalan (2014) in using runner-up cities as our main control group. Our main specification includes all cities that had expressed an interest in hosting the EURO, including cities that had applied to host the EURO, but were not selected (Nuremberg, Bremen, Hanover, and Mönchengladbach) and cities that had initially expressed interest in hosting but subsequently withdrew their applications (Dresden, Kaiserslautern, Karlsruhe, and Freiburg, see Fig. A.1). These cities have the infrastructure and hosting capacity (both in sports and tourism) required to host the EURO. As shown in Fig. C.1 in the Appendix, raw spending trends in host and control cities move roughly in parallel leading up to the EURO but then diverge in June.

As Firgo (2021) cautions that cities withdrawing their applications may constitute a suboptimal control group, we also conduct a robustness check with only the smaller first group. In addition, we conduct an estimation with a broad control group of all cities that host a first or second-division Bundesliga club, i.e., all cities with a major soccer stadium (see Fig. A.2). Note that we estimate percentage changes in consumer expenditure, controlling for postcode fixed effects. Hence, we account for initial differences in consumer spending and estimate differential short-term changes in consumer spending across cities. While we cannot fully rule out spillovers to our control group, we conduct several robustness checks to limit potential biases.

**Match day-specific effects.** We next examine the impact of the EURO 2024 on consumer spending surrounding individual match days. Specifically, we estimate the spending effects on match days and on the days immediately preceding and following each match. Conceptually, this approach allows us to trace the dynamic response of local spending to the “shock” of a match being held in a city, analogous to estimating cumulative abnormal returns around an event in financial

markets. Because this setting involves multiple, staggered treatment events with potentially heterogeneous treatment effects, applying a standard difference-in-differences estimator may yield negative weighting and, consequently, biased estimates. To address this concern, we adopt a local projection difference-in-differences approach, following Dube et al. (2025), and estimate the following equation:

$$Spend_{i,t+h} - \frac{1}{k} \sum_{\tau=k} Spend_{i,\tau} = \beta_h^{LP-DiD} \cdot D_{i,t} + \gamma \cdot \mathbf{Z}_{it} + \mu_t^h + \varepsilon_{it}^h \quad (2)$$

for  $h = -1, 0, 1$  and where  $D_{i,t} = 1$  indicates match days and  $D_{i,t} = 0$  non-match days. The sample is restricted to match days (or the leads and lags thereof) and a clean control group, which is never treated at all, as follows:

$$\begin{cases} \text{treatment} & D_{i,t} = 1 \text{ (match days)} \\ \text{clean control} & \Delta D_{i,j} = 0 \text{ for all } j \end{cases} \quad (3)$$

Since several matches occur in the same city, the immediate first lag, which is often used as a pre-treatment period, may be biased by intertemporal spillover effects. To address this, we adopt the pre-mean differenced specification of the LP-DiD estimator (PMD-LP-DiD), incorporating multiple pre-treatment periods. That is, we estimate separate equations for the day preceding the match (lead), the match day itself, and the day following the match (lag), using first differences relative to a pre-EURO period. This ensures that first differences are calculated relative to a period unaffected by the EURO 2024. More precisely, we compare spending on match days and their adjacent days (leads and lags) to the average spending on the same weekday across  $k$  days in May.<sup>6</sup> Our LP-DiD estimator then identifies whether changes in spending on match days (or their leads and lags) in host cities differ from those in the control group on corresponding days. We employ postcode-level and industry-specific weights as specified in Eq. (1).

## 5. Results

### 5.1. Overall effects: Increase in spending during the EURO 2024, driven by international visitors

**Table 1**  
Overall Spending Increase during the EURO 2024.

|                           | Overall               | International         | Domestic           |
|---------------------------|-----------------------|-----------------------|--------------------|
| Host City $\times$ Period | 0.0311***<br>(0.0102) | 0.0637***<br>(0.0184) | 0.0051<br>(0.0101) |
| Control Group             | Interested            | Interested            | Interested         |
| N                         | 428,820               | 412,825               | 428,172            |
| Adjusted R <sup>2</sup>   | 0.95                  | 0.93                  | 0.94               |
| Within R <sup>2</sup>     | 0.03                  | 0.01                  | 0.03               |
| Controls                  | Yes                   | Yes                   | Yes                |

**Notes:** The table reports difference-in-differences estimates of the effect of hosting the UEFA EURO 2024 on local spending. Estimates are presented separately for total spending and for spending using cards issued to international visitors and German residents. The treatment indicator equals one for host cities during the event period. The control group comprises cities that either formally applied but were not selected or initially expressed interest in hosting (*Interested*). All regressions include postcode and date fixed effects, as well as controls for public and school holidays, temperature, precipitation, and other soccer-related events. Due to confidentiality restrictions, the dataset includes only postcodes meeting a minimum transaction threshold, resulting in differing sample sizes across groups despite the broad coverage of the underlying transaction data. Regressions are weighted by postcode-level transaction volume in the preceding year. Standard errors are clustered at the postcode level. \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$ .

Table 1 presents the results for our baseline specification, capturing spending differences over the entire duration of the EURO 2024 for overall, international, and domestic spending between host

<sup>4</sup> For example, televised matches of the German national team reached a market share of 76.3%, while the market share across all matches amounted to 47.6% (Media Perspektiven, 2024). Such events may influence consumer behavior nationwide, regardless of whether the tournament is hosted in Germany or in a specific city. Including daily fixed effects accounts for these nationwide temporal patterns.

<sup>5</sup> We do not account for any other major events, as this might lead to an arbitrary selection of events. Thereby, we take a conservative stance in our estimations, presuming that any changes in event schedules due to the EURO are endogenous to the EURO and should hence not be netted out. Results are robust to the exclusion of other soccer-related match days.

<sup>6</sup> Comparable results arise when using a different pre-period, such as June/July 2023. As Dube et al. (2025) caution, incorporating covariates in an LP-DiD setting can bias estimates if treatment effects vary with those covariates. We therefore also estimate without controls.

**Table 2**  
Overall Spending Increase during the EURO 2024: Alternative Control Groups.

|                           | Overall              |                       | International         |                       | Domestic            |                     |
|---------------------------|----------------------|-----------------------|-----------------------|-----------------------|---------------------|---------------------|
| Host City $\times$ Period | 0.0236**<br>(0.0112) | 0.0237***<br>(0.0088) | 0.0762***<br>(0.0226) | 0.0563***<br>(0.0168) | -0.0087<br>(0.0109) | -0.0029<br>(0.0084) |
| Control Group             | Applied              | BL                    | Applied               | BL                    | Applied             | BL                  |
| N                         | 395,854              | 484,106               | 382,513               | 464,109               | 395,325             | 483,422             |
| Adjusted R <sup>2</sup>   | 0.95                 | 0.95                  | 0.93                  | 0.93                  | 0.94                | 0.94                |
| Within R <sup>2</sup>     | 0.02                 | 0.03                  | 0.01                  | 0.01                  | 0.02                | 0.03                |
| Controls                  | Yes                  | Yes                   | Yes                   | Yes                   | Yes                 | Yes                 |

Notes: The table reports difference-in-differences estimates based on Eq. (1), following the same specification as Table 1. The control group *Applied* comprises runner-up cities, i.e., cities that formally applied but were not selected. The control group *BL* includes cities with a first- or second-division Bundesliga stadium. The treatment indicator equals one for host cities during the event period. All regressions include postcode and date fixed effects, as well as controls for public and school holidays, temperature, precipitation, and other soccer-related events. Due to confidentiality restrictions, the dataset includes only postcodes meeting a minimum transaction threshold, resulting in differing sample sizes across groups despite the broad coverage of the underlying transaction data. Regressions are weighted by postcode-level transaction volume in the preceding year. Standard errors are clustered at the postcode level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

cities and their control groups. We find an overall increase in consumer expenditure during the EURO, driven entirely by international guests' expenditure. We find no significant change in domestic consumer expenditure, providing no evidence of aggregate crowding out of domestic spending by additional visitors. Comparable results arise when either employing the narrow sample of cities that had applied to host the EURO or the broad sample of all cities with major first and second league soccer stadiums (Table 2). Our findings are also robust to clustering at the city rather than the postcode level (Appendix Table D.1).

We validate our estimation strategy using a placebo test based on a hypothetical earlier EURO Championship. Table C.1 in the Appendix presents the results for a simulated tournament. Specifically, we exclude all data from June onward to eliminate any potential effects associated with the actual EURO - such as those from early-arriving visitors - and re-estimate the model for the hypothetical event in May. In addition, plotting the raw spending data across treatment and control groups reveals approximately parallel trends leading up to the EURO, but a marked divergence from June onward (see Appendix C).

## 5.2. Addressing potential biases

**Spillover effects.** The EURO may have generated broad shifts in consumer spending across Germany, independent of hosting activities. National matches attracted substantial viewership, with German matches drawing more than 25 million viewers (Media Perspektiven, 2024). Although this likely influences the overall composition of domestic spending, our empirical strategy compares host cities with a control group on the same calendar days. This design nets out nationwide consumption changes that would have occurred irrespective of hosting status. More precisely, our estimates capture net local spending effects, rather than nationwide effects, relative to control cities on the same days.

Nevertheless, comparing spending in host cities with that in other German cities that had expressed interest in hosting the EURO may be subject to spillover-induced bias. Such spillovers could operate in two directions: visitors attending the tournament may also travel to nearby non-host cities, biasing estimates downward, while visitors may forego trips to other German cities during the event, potentially biasing estimates upward. Although we cannot fully rule out these forms of interference, we probe the sensitivity of our estimates to potential spatial spillovers by restricting the control group to cities located at least 100 kilometers from any host city.<sup>7</sup> Because this restriction substantially reduces the sample size, it can only be properly implemented for the broader control group consisting of all cities with a Bundesliga

stadium. Columns (1), (3), and (5) of Table D.3 in the Appendix show only negligible differences between overall, international, and domestic spending effects estimated for this restricted control group relative to the main specification. While even restricting to cities beyond 100 km cannot fully rule out tourism displacement, the highly similar effects suggest that spillovers into control cities play at most a minor role in our estimates. We extend this exercise in a second step by additionally removing the host cities Cologne, Düsseldorf, Dortmund, and Gelsenkirchen, all located in the state of North Rhine-Westphalia and forming part of, or bordering, the Ruhr Area. Given that the Ruhr Area constitutes a dense urban corridor with highly integrated accommodation markets and mobility networks, these cities are more susceptible to cross-municipal spillovers: nearby non-host cities may absorb part of the treatment exposure, while host cities may share demand shocks with their neighbors. However, the estimated coefficients (columns (2), (4), and (6) of Table D.3) remain similar to those in the baseline specification, underscoring the robustness of our main results.

**Heterogeneous credit card use.** As our data only differentiates between overall, international, and domestic card spending, one potential concern is heterogeneity in card spending and Mastercard adoption across countries. According to ECB payment statistics, 36% of payments and 49% of transaction volumes in Germany are conducted via card or cashless payments (see Fig. E.1 in the Appendix). Although Germany has caught up from its low card-payment share prior to COVID, card usage remains slightly below that of many other European countries.<sup>8</sup> This raises the possibility of bias: if international visitors rely more on Mastercard than domestic consumers, recorded spending may rise simply because a larger share of transactions is recorded on the Mastercard network, rather than reflecting a genuine increase in consumption. However, we do not observe notable changes in domestic card spending, indicating that the overall effect cannot be driven solely by a substitution towards international consumers with higher card-payment propensities. Instead, our estimates suggest a genuine positive effect.

We also validate our findings using administrative accommodation statistics Appendix F, which show a pronounced increase in international visitors in June, particularly to host regions and from countries that participate in the EURO. That said, we may still overestimate the effect on total spending if international tourists' share in card spending exceeds their share in total spending. Moreover, Mastercard usage

<sup>7</sup> Note also that the raw spending data in Fig. C.1 in the Appendix does not indicate strong fluctuations in control group spending during the event period.

<sup>8</sup> Mastercard and its main competitor Visa have approximately similar market shares in Germany. Payments routed through the Mastercard network also include, for example, Maestro transactions and Apple Pay payments linked to a Mastercard, and therefore account for a substantial fraction of payments. Note also that given the relatively short estimation window, our results should not be biased by time-varying heterogeneity in Mastercard adoption across points of sale.

varies across countries, which could bias international spending figures if certain nationalities are disproportionately represented among EURO visitors.

## 6. Heterogeneity

We next analyze how the consumption effects documented above vary over time, across locations within host cities, and across industry categories, shedding light on the mechanisms underlying the aggregate results.

### 6.1. Timing of effects

Our daily microdata permits us to differentiate the timing of effects. We differentiate the group stage from the later knockout stage and subsequently address the daily effects around match days.

*Group stage vs. Knockout stage.* The difference between the group stage and the later knockout stage shows significant increases in consumption only in the group stage (Table 3). In particular, spending by international visitors increases by more than 11% during the group stage. The descriptive analysis of monthly accommodation statistics from the Federal Statistical Office in Appendix F confirms this pattern: While overall international tourist stays have increased during the group stage month of June, there are no notable changes in nights spent in July. The large effects in the group stage could be attributable to two factors. First, the much higher density of matches in the group stage directly results in more visitors. Second, because group stage matches are scheduled far in advance, it may be easier for international visitors to plan their trips.

*Effects around match days.* We subsequently employ the LP-DiD estimator (2) to quantify consumer spending effects around match days, using the same sample of cities that had expressed interest in hosting the EURO as a clean control group. Fig. 1 first reports average effects for match days during the overall EURO period, for the group stage, and for the knockout phase. Spending increases sharply on and around match days, driven by international visitors. As before, aggregate domestic consumer activity appears largely unaffected by matches held within the same city.

Moreover, Fig. 1 shows that consumption rises only slightly less on knockout stage match days than on match days during the group stage. The insignificant knockout stage effects reported in Table 3, therefore, do not reflect a lack of visitors on match days. Rather, they are mainly attributable to the substantially smaller number of matches per city and, potentially, to a modest crowding-out of visitors on other days.

Our estimation focuses only on consumer spending immediately surrounding match days.<sup>9</sup> However, some visitors may stay longer than three days and thereby affect spending on earlier or later dates. Unlike standard event-study designs, extended stays beyond three days do not contaminate the control group in an LP-DiD framework. Nonetheless, spillovers may affect estimates on other match days if matches occur in close temporal proximity. Consequently, our match day coefficients may partially capture positive spillovers from adjacent matches.

Including control variables requires stronger assumptions in LP-DiD estimation (Dube et al., 2025). In particular, difficulties may arise in characterizing estimation weights when treatment effects vary with covariate values. As a robustness check, we therefore re-estimate specification (2) without controls (see Appendix D.1). The resulting coefficients are slightly larger than those in Fig. 1, suggesting that any potential bias introduced by covariates likely results in, at most, more conservative estimates.

**Table 3**  
Group Stage vs. Knockout Stage.

|                            | Overall               | International         | Domestic            |
|----------------------------|-----------------------|-----------------------|---------------------|
| Host City × Group Stage    | 0.0475***<br>(0.0106) | 0.1128***<br>(0.0219) | −0.0028<br>(0.0098) |
| Host City × Knockout Stage | 0.0147<br>(0.0113)    | 0.0163<br>(0.0182)    | 0.0106<br>(0.0112)  |
| Control Group              | Interested            | Interested            | Interested          |
| N                          | 428,820               | 412,825               | 428,172             |
| Adjusted R <sup>2</sup>    | 0.95                  | 0.93                  | 0.94                |
| Within R <sup>2</sup>      | 0.02                  | 0.01                  | 0.03                |
| Controls                   | Yes                   | Yes                   | Yes                 |

*Notes:* The table reports difference-in-differences estimates of the effects of hosting the UEFA EURO 2024 separately for the group stage and the knockout stage. The reported coefficients correspond to interaction terms between host-city status and indicators for the respective tournament stage. Estimates are based on Eq. (1). The control group comprises cities that formally applied but were not selected or withdrew their application. The treatment indicator equals one for host cities during the respective event stage. All regressions include postcode and date fixed effects, as well as controls for public and school holidays, temperature, precipitation, and other soccer-related events. Due to confidentiality restrictions, the dataset includes only postcodes meeting a minimum transaction threshold, resulting in differing sample sizes across groups despite the broad coverage of the underlying transaction data. Regressions are weighted by postcode-level transaction volume in the preceding year. Standard errors are clustered at the postcode level. \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$ .

**Table 4**  
Location-Specific Effects: Overall EURO Period.

|                                    | Overall               | International         | Domestic              |
|------------------------------------|-----------------------|-----------------------|-----------------------|
| City Center × Host City × Period   | 0.0427***<br>(0.0134) | 0.1730***<br>(0.0262) | −0.0245**<br>(0.0122) |
| Stadium × Host City × Period       | −0.0094<br>(0.0428)   | 0.0593<br>(0.0518)    | −0.0436<br>(0.0436)   |
| Transport Hub × Host City × Period | 0.0333<br>(0.0208)    | 0.0949***<br>(0.0319) | −0.0096<br>(0.0192)   |
| Remainder of Host City × Period    | 0.0209**<br>(0.0105)  | 0.0355**<br>(0.0180)  | 0.0074<br>(0.0104)    |
| Control Group                      | Interested            | Interested            | Interested            |
| N                                  | 428,820               | 412,825               | 428,172               |
| Adjusted R <sup>2</sup>            | 0.95                  | 0.93                  | 0.93                  |
| Within R <sup>2</sup>              | 0.02                  | 0.01                  | 0.03                  |
| Controls                           | Yes                   | Yes                   | Yes                   |

*Notes:* The table reports difference-in-differences estimates of the effect of hosting the UEFA EURO 2024 during the overall event period, allowing for location-specific treatment effects within host cities. The reported coefficients correspond to interactions between location indicators and the event-period indicator. City center refers to the postcode area that contains the town hall. Transport hub denotes the postcode of the main railway station. Stadium refers to the postcode containing the host stadium. The remainder of the host city captures all other postcodes within the host city. The treatment indicator equals one for host-city postcodes during the event period. The control group comprises cities that either formally applied but were not selected or initially expressed interest in hosting (Interested). All regressions include postcode and date fixed effects, as well as controls for public and school holidays, temperature, precipitation, and other soccer-related events. Due to confidentiality restrictions, the dataset includes only postcodes meeting a minimum transaction threshold, resulting in differing sample sizes across groups despite the broad coverage of the underlying transaction data. Regressions are weighted by postcode-level transaction volume in the preceding year. Standard errors are clustered at the postcode level. \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$ .

### 6.2. Heterogeneity across locations

We next decompose the estimated effects by location within the city.<sup>10</sup> Table 4 reveals particularly strong effects in city centers, largely driven by increases in international spending, even as domestic spending is crowded out in these areas. Overall effects remain positive across the city, with sizable gains in international spending also observed

<sup>9</sup> As indicated by a survey of EURO visitors (The Nielsen Company (US), LLC, 2024), ticket holders stayed in Germany for on average two days, with 87% staying up to three days.

<sup>10</sup> We do not report city-specific estimates, as results at the individual city level may be disproportionately influenced by cross-country differences in Mastercard usage among visitors.

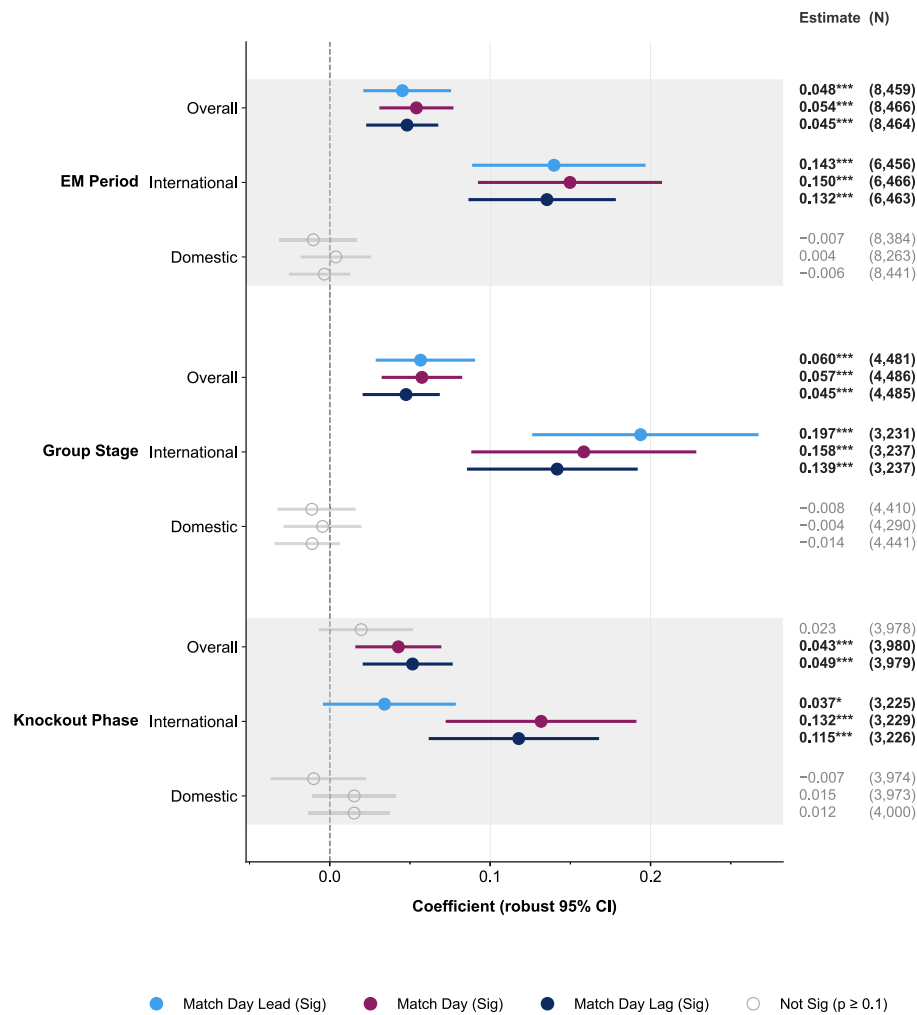


**Fig. 1.** Dynamic Spending Effects Around Match Days.

**Notes:** The figure displays dynamic difference-in-differences estimates of the effect of hosting the UEFA EURO 2024 around match days, based on a local projections approach. The reported coefficients correspond to leads and lags relative to match days for host cities. The treatment indicator equals one for host cities on match days and on the corresponding lead and lag days (i.e., the day before and the day after a match). All regressions include postcode fixed effects. The specifications control for school holidays, temperature, precipitation, and other soccer-related events. Due to confidentiality restrictions, the dataset includes only postcodes meeting a minimum transaction threshold, resulting in differing sample sizes across groups despite the broad coverage of the underlying transaction data. Regressions are weighted by postcode-level transaction volume in the preceding year. Point estimates are shown with 95% confidence intervals. The colors represent estimated coefficients that are statistically significant at conventional levels (up to the 10% significance level). Standard errors are clustered at the postcode level.

around transportation hubs. Match day-specific LP-DiD estimates provide further insight (see Table D.4 in the Appendix). On match days, effects are concentrated in city centers, whereas crowding out of domestic customers appears to occur on non-match days. Stadium surroundings benefit mainly on match days, while transportation hubs experience an increase in international spending mainly on the day before and the day after matches, consistent with visitor travel patterns.

While our primary estimation focuses on the host cities themselves, visitors may also choose to stay in adjacent municipalities rather than within the host-city boundaries, which may mean we do not capture all potential positive effects. Because the direct effects on host cities are most relevant to policy, our main analysis centers on these locations. Nonetheless, we also conduct a robustness check that expands the treatment area to include the surrounding municipalities within 30 km of each stadium. However, Table D.5 in the Appendix shows that the consumption effects of the EURO are highly localized, with only an insignificant increase in international spending outside of the host cities.

### 6.3. Heterogeneity by industry

We next decompose effects across industry categories, following the same empirical strategy as in the baseline analysis.<sup>11</sup> As before, spending observations are censored when the number of merchants or transactions within a given category and postcode falls below confidentiality thresholds on a given day. These requirements are typically met for aggregate spending in large cities, and therefore do not affect our main results. However, censoring becomes more consequential when disaggregating spending by industry, particularly for international transactions. As a result, category-level spending is observable only in postcodes with a sufficiently dense merchant presence in each category. We therefore restrict the analysis to a subset of industry categories, with the caveat that standard errors may be large due to limited coverage and that censoring may introduce bias in the estimates.<sup>12</sup>

<sup>11</sup> Industry categories are assigned by Mastercard based on the main category of a store.

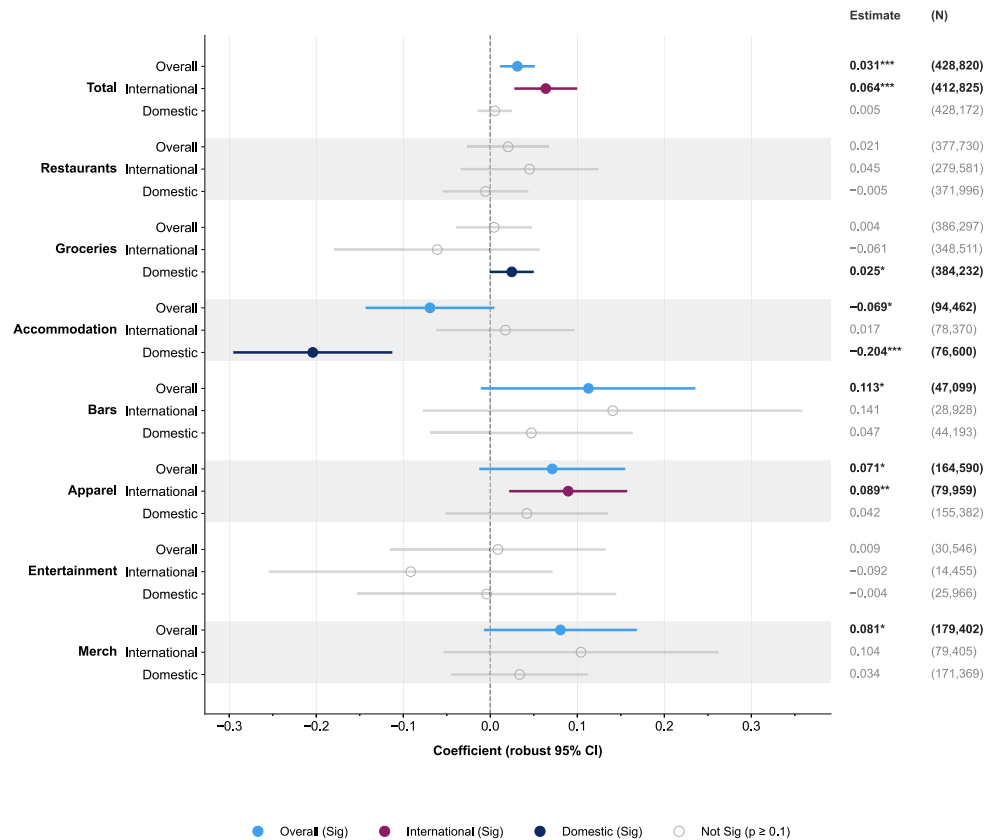


**Fig. 2.** Overall Spending Effects During the EURO by Industry.

*Notes:* The figure displays difference-in-differences estimates of the effect of hosting the UEFA EURO 2024 on spending by industry during the overall event period. Effects are shown separately for total spending and for the international and domestic demand components. The treatment indicator equals one for host cities during the event period. Regressions are estimated separately for each industry. All specifications include postcode and date fixed effects, as well as controls for public and school holidays, temperature, precipitation, and other soccer-related events. Due to confidentiality restrictions, the dataset includes only postcodes meeting a minimum transaction threshold, resulting in differing sample sizes across groups despite the broad coverage of the underlying transaction data. Regressions are weighted by postcode-level transaction volume in the preceding year. Point estimates are shown with 95% confidence intervals. The colors represent estimated coefficients that are statistically significant at conventional levels (up to the 10% significance level). Standard errors are clustered at the postcode level.

Fig. 2 presents the results for aggregate spending by industry category. Expenditures in restaurants, grocery stores, and arts and entertainment exhibit only modest variation over the sample period. By contrast, we observe a clear increase in apparel spending, along with a positive but only marginally significant effect for bars. The limited statistical precision for bars is likely attributable to the smaller effective sample size in this category.

The decline in hotel-related spending may appear counterintuitive, particularly in light of administrative tourism statistics indicating an increase in overnight stays during the tournament (see Appendix F). This discrepancy can be explained by the nature of our data, which captures payments made at the point of sale. Hotel expenditures are therefore recorded only when payment is made upon arrival or departure. If a larger share of bookings is prepaid during periods of heightened demand, these transactions would not be reflected in our data. Given the documented rise in tourist stays, the negative estimated effect is consistent with an increase in advance payments rather than a reduction in hotel demand.

On match days, we observe notable heterogeneity in consumption patterns across industry categories. As illustrated in Fig. 3, spending in restaurants, bars, and apparel rises in close temporal proximity to matches. These sectors are particularly exposed to tourist demand, and, as in the aggregate analysis, the effects are stronger for international spending (Fig. 4). In contrast, domestic spending exhibits little response across most industries, with no statistically significant changes or, at most, mild crowding-out effects around match days (see Appendix Fig. D.2). Again, accommodation spending constitutes a prominent exception. Accommodation expenditures by international consumers increase around match days, even though we observe hotel payments only during the stay. In contrast, domestic consumer accommodation spending declines sharply, suggesting a reallocation of scarce hotel capacity from domestic to international visitors.

Taken together, the consumption effects of hosting the EURO 2024 are short-lived, highly localized, and concentrated in sectors and locations most exposed to international visitor demand. Spending increases are strongest during the group stage and on match days, when visitor inflows are largest and most predictable, and are spatially concentrated in city centers and at major transportation hubs. At the same time, domestic consumption remains broadly unchanged in aggregate, with evidence of spatial displacement rather than overall crowding out.

<sup>12</sup> For example, data on jewelry, electronics, and furniture stores tend to be missing throughout the sample as coverage criteria are rarely met.

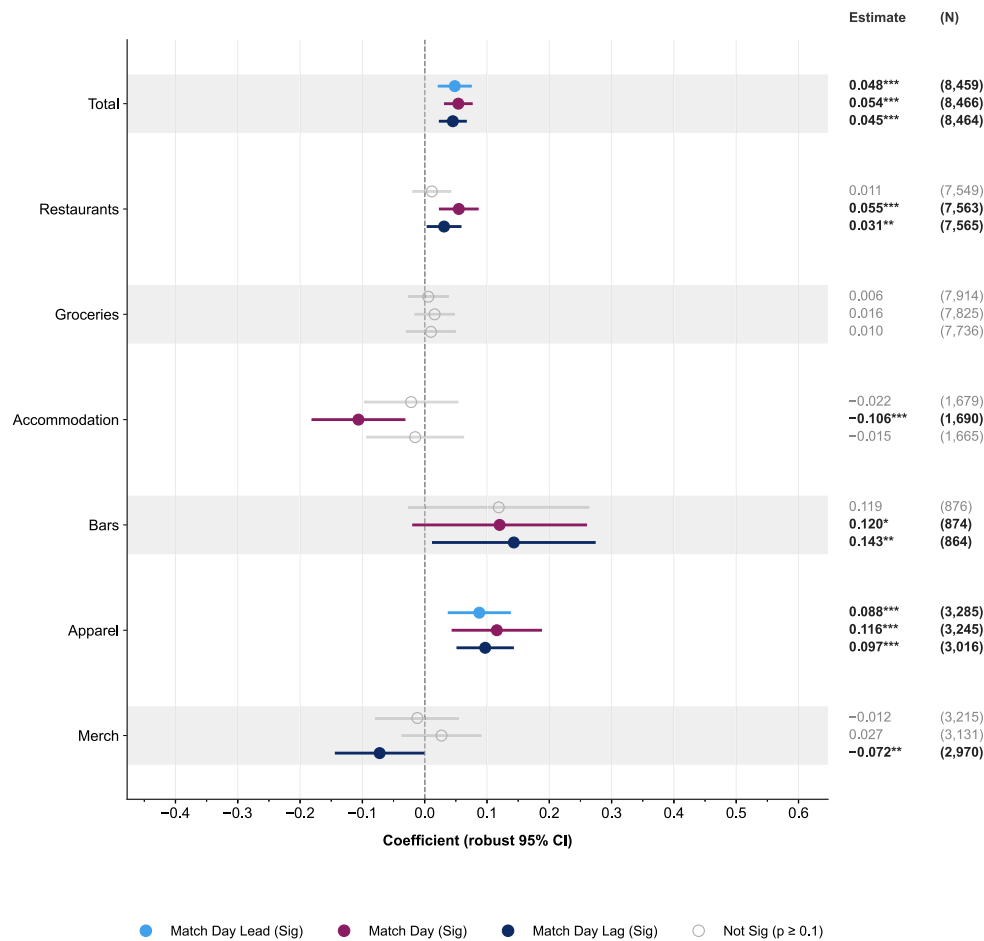


**Fig. 3.** Match Day-Specific Effects by Industry: Overall Spending.

*Notes:* The figure displays dynamic difference-in-differences estimates of match day-specific spending effects by industry, based on a local projections approach. The reported coefficients capture overall spending responses on match days and on the corresponding lead and lag days (i.e., the day before and the day after a match) for host cities. Regressions are estimated separately for each industry. The treatment indicator equals one for host cities on match days as well as on the day before and the day after a match. All specifications include postcode fixed effects and control for school holidays, temperature, precipitation, and other soccer-related events. Due to confidentiality restrictions, the dataset includes only postcodes meeting a minimum transaction threshold, resulting in differing sample sizes across groups despite the broad coverage of the underlying transaction data. Regressions are weighted by postcode-level transaction volume in the preceding year. Point estimates are shown with 95% confidence intervals. The colors represent estimated coefficients that are statistically significant at conventional levels (up to the 10% significance level). Standard errors are clustered at the postcode level.

## 7. Discussion

Public debates often arise around the potential benefits and financial risks of hosting mega-sports events. Hosting often involves considerable public expenditures that frequently exceed initial budgets and are financed by public debt. In addition, the fiscal burden can outweigh the benefits of alternative public investments with higher social returns. Further costs may arise from the risk of post-event under-utilization of the newly built facilities. Stadiums and other specialized venues may generate limited ex-post benefits, becoming “white elephants” that impose ongoing maintenance and opportunity costs. Mega-events may also generate distributional short-term effects by displacing local residents, small businesses, and other tourists.

However, supporters of hosting mega-sports events often emphasize that public expenditures are justified by potential economic benefits. For example, hosting mega-sports events is associated with large-scale public investment or infrastructure modernization, including sports venues, road networks, and public transportation systems. If these investments alleviate pre-existing infrastructure constraints and are integrated into the host country’s or host city’s long-run development strategy, they may yield persistent economic gains beyond the event itself. Infrastructure projects that improve general transport efficiency

or urban connectivity are more likely to yield positive net returns than event-specific capital investments with limited alternative use. Mega-events can also generate short-term demand-side effects by increasing international tourism, thereby boosting local consumer spending, or by potentially crowding out other spending. In addition, mega-events may increase the host country’s international visibility, potentially affecting future tourism inflows and foreign investments.

Our estimates add robust empirical evidence to the discussion by showing that hosting the EURO championship in Germany indeed had a positive effect on consumer spending in host cities during the event period, driven by additional international tourists. To obtain an approximate monetary valuation of this effect, we conduct a rough back-of-the-envelope calculation. As described in [Appendix G](#), we aggregate city-level expenditure data on brick-and-mortar retail, hospitality, and entertainment spending, and apply our estimated spending increase of 3.1% over the event period. The resulting estimate suggests an increase in consumer spending in the selected tourist-related sectors of slightly above 300 million Euros. It is important to emphasize that this figure captures only consumer expenditures in retail, hospitality, and entertainment and may understate hotel-related spending. Moreover, other sectors potentially affected by the event, such as transport, construction, and business services, are not included in the calculation. As a

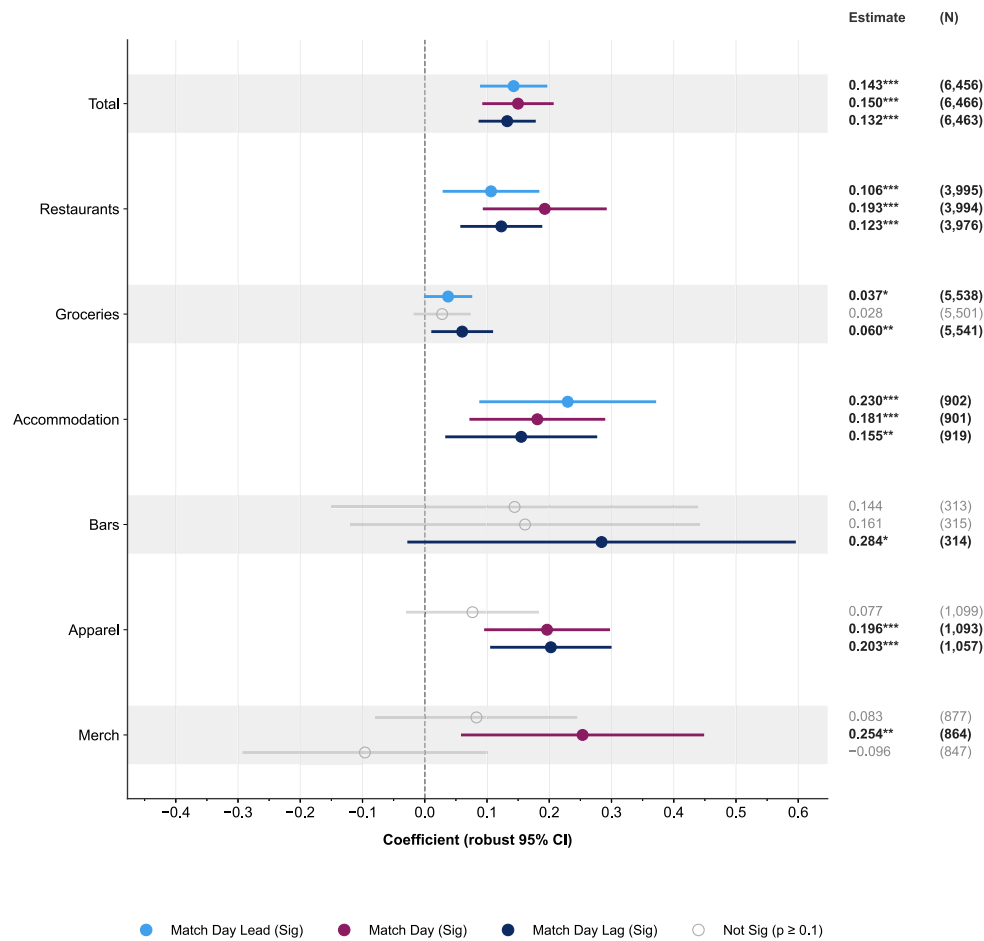


**Fig. 4.** Match Day-Specific Effects by Industry: International Spending.

*Notes:* The figure displays dynamic difference-in-differences estimates of match day-specific effects on international spending by industry, based on a local projections approach. The reported coefficients capture spending responses attributable to international demand on match days and on the corresponding lead and lag days (i.e., the day before and the day after a match) for host cities. Regressions are estimated separately for each industry. The treatment indicator equals one for host cities on match days as well as on the day before and the day after a match. All specifications include postcode fixed effects and control for school holidays, temperature, precipitation, and other soccer-related events. Due to confidentiality restrictions, the dataset includes only postcodes meeting a minimum transaction threshold, resulting in differing sample sizes across groups despite the broad coverage of the underlying transaction data. Regressions are weighted by postcode-level transaction volume in the preceding year. Point estimates are shown with 95% confidence intervals. The colors represent estimated coefficients that are statistically significant at conventional levels (up to the 10% significance level). Standard errors are clustered at the postcode level.

result, this calculation may underestimate the total impact on consumer spending in host cities during the hosting period.

Host cities for the EURO 2024 championship in Germany used existing stadiums and infrastructure, with targeted investments to modernize them. Associated infrastructure and sports facilities are expected to remain in intensive use beyond the event, increasing the likelihood of positive long-term returns on investment. In total, public expenditures associated with hosting amounted to approximately 333 million Euros, of which around 292 million were borne by the host cities themselves. Against this benchmark, our estimates suggest that the short-term consumer spending gains in selected tourist-related retail and service sectors are of a similar order of magnitude to the public expenditures for hosting the event.

This comparison, however, conflates gross consumer spending with public revenue. From a fiscal perspective, the latter constitutes the relevant benchmark for whether hosting is self-financing for host city budgets. As we show in [Appendix G](#), only a small fraction of the additional spending translates into tax revenue: Our estimates suggest additional VAT and business tax receipts of at most a few tens of millions of Euros, well short of the roughly 292 million Euros in costs borne by host cities. From a public budget perspective, the EURO 2024 is best understood not as a self-financing investment but as a targeted subsidy to tourist-facing sectors, funded by host-city and federal taxpayers.

A second, distinct consideration concerns not the fiscal capture of the spending increase, but whether the spending increase itself reflects a net annual gain or a reallocation of visits that would have occurred regardless of hosting. This concern is motivated by [Allmers and Maennig \(2009\)](#), who find that the increase in tourism during the 2006 FIFA World Cup in Germany was partly offset by a reduction in tourism in the months surrounding the event. Our identification strategy is, however, not designed to detect a nationwide version of this pattern as in [Allmers and Maennig](#): because day fixed effects absorb any uniform, economy-wide substitution towards or away from Germany as a travel destination, our design cannot distinguish whether aggregate national tourism increased (e.g., through a marketing or awareness effect) or decreased (e.g., through displaced trips) around the tournament.<sup>13</sup>

<sup>13</sup> Descriptive evidence from administrative tourism statistics, however, does not indicate a decline in tourism in other months of the year: throughout the remainder of 2024, international overnight stays in Germany rose relative to the same period a year earlier (up 4.5% year-on-year, against a 2.1% increase in domestic stays), with positive year-on-year growth in international tourism in every month of the year. This comparison, based on [Statistisches Bundesamt \(2024\)](#), is descriptive rather than causal, since it lacks a control group for

We find no evidence of offsetting effects in host cities in the months preceding the EURO, though: Spending in host and control cities evolved along a comparable trajectory until shortly before the tournament, with host city spending increasing in early June (see [Appendix C](#)). This indicates no evidence of a major reallocation of spending to host cities that would otherwise have occurred in earlier months of the year, but it potentially hints at additional spending from early-arriving visitors or a shift in visits to just before the tournament. As such spending falls outside our event window, a modest potential bias runs in the opposite direction, towards understating the total spending effect of hosting. We cannot, however, investigate a potential temporal reallocation of tourist spending to the months following the EURO, as our spending data do not extend sufficiently far beyond the tournament. Whether our event period estimates could under- or overstate the annual impact on host cities, therefore, remains ambiguous: if visitors shifted the timing of an already planned trip to coincide with the tournament, our short-run estimate would overstate the annual gain. Conversely, if visitors who would otherwise have traveled to host cities in June or July had reallocated their visits to a different time, or if the tournament increased attention to host cities as tourist destinations and thereby attracted additional visitors later in the year, the annual effect could exceed our short-run estimate. Our design does not allow us to determine which of these effects dominates or to which extent they play a role in the months after the EURO.

At a shorter horizon, however, we do find evidence of temporal displacement within host cities themselves, which is factored into our estimates: As discussed in [Section 6.1](#), average spending effects over the full knockout stage are statistically insignificant, even though effects on individual match days remain large and significant, consistent with a modest reallocation of visitor spending towards match days at the expense of surrounding non-match days within the same city and month. We therefore interpret our estimates as capturing a genuine, localized demand shock concentrated around match days, net of immediate within-tournament displacement, while noting that our design cannot capture broader temporal substitution in travel patterns that may affect the overall annual impact of hosting.

A further policy-relevant factor is whether higher consumer spending translates into additional local employment. Existing evidence on the employment effects of mega-events is mixed, and higher consumer spending should therefore not necessarily be interpreted as evidence of broader labor market gains. [Hagn and Maennig \(2008\)](#) find no significant employment effects following the 1974 FIFA World Cup in Germany, consistent with firms meeting additional demand through existing capacity rather than net hiring. Similar conclusions emerge from the stadium literature: [Coates and Humphreys \(2003\)](#) find that spending associated with professional sports generates only limited aggregate employment gains. Evidence from other place-based local development projects, such as casino openings, suggests a further limitation: even where local employment gains do materialize, they tend to concentrate narrowly in hospitality and leisure sectors rather than generating broad-based labor market improvements ([Anisfeld and Rosenthal-Kay, 2025](#)). Given the relatively short duration of the EURO 2024 in particular, firms in host cities may have responded primarily through higher capacity utilization, overtime work, or temporary staffing arrangements rather than sustained increases in employment or wages.<sup>14</sup>

While our study focuses on short-term effects on consumer spending behavior, note that hosting a large-scale sporting event may entail additional benefits not captured in our setting. For instance, [Rose and Spiegel \(2011\)](#) argue that mega-events may serve as a signaling device,

potentially increasing exports for host countries. [Song \(2010\)](#) shows that effects on exports are slow and persistent, whereas those on tourists are short-lived. Hosting may also yield intangible benefits and positive social externalities, including feel-good effects, improvements in international image, increased civic pride, and participation in sports and cultural activities, which could translate into longer-term social and health benefits ([Baade and Matheson, 2016](#); [Kavetsos and Szymanski, 2010](#)). Consistent with this view, [Dolan et al. \(2019\)](#) document increases in subjective life satisfaction among London residents following the 2012 Olympic Games, but do not find strong legacy effects. While such channels are not reflected in our spending estimates, they may nonetheless factor into a government's or city's decision to host a major event.

Taken together, our results suggest that the case for hosting the EURO 2024 is more nuanced than a direct comparison of spending gains to public costs would imply. The increase in local consumer spending is real and economically meaningful, but only a small share of it accrues to host city budgets as tax revenue, and part of the underlying tourism inflow may reflect a shift in timing. Unmeasured benefits, such as reputational or social gains, may in turn weigh in favor of hosting. Even so, given its economic incidence, hosting resembles a targeted subsidy for tourist-facing sectors. We do not observe whether this was the rationale communicated to the public in host cities' bids, nor whether voters, if informed of this incidence, would endorse it. Public support for hosting mega-events in Germany cannot be taken for granted: Hamburg, one of our ten host cities, rejected a bid to host the 2024 Summer Olympics in a 2015 referendum, with cost concerns featuring prominently among voters' objections. Whether a transparent accounting of these considerations, rather than the broader growth and prestige narratives typically used to build support for hosting bids, would alter public backing for future bids is a question for future work. Because both costs and benefits vary substantially across cities and events, hosting decisions warrant careful, context-specific scrutiny, with policymakers weighing the fiscal, labor market, and infrastructure circumstances of their own city against alternative uses of public funds.

## 8. Conclusion

This paper provides new evidence on the short-term local consumption effects of hosting major sports events, focusing on the UEFA EURO 2024 in Germany. Leveraging daily card spending data at the post-code level, we document a statistically and economically meaningful increase in local consumer spending in host cities during the tournament. In contrast to much of the earlier literature based on aggregated national or regional indicators, our findings show that hosting can generate detectable short-term increases in local consumer spending when measured at sufficiently fine spatial and temporal scales.

The estimated effects are concentrated along three key dimensions. First, they are driven almost exclusively by international visitors, while domestic spending remains unchanged in aggregate, indicating little evidence of overall crowding out. Second, the effects are localized in space, with particularly strong increases in city centers and tourist-facing areas, accompanied by modest spatial displacement of domestic consumption. Third, the timing of the effects matters: spending increases are most pronounced during the group stage and on match days, when travel planning is predictable.

Taken together, these patterns help rationalize the continued political support for bidding for mega-events with the mixed evidence on aggregate economic effects. While hosting does not generate sizeable economy-wide gains, it produces short-lived but highly concentrated increases in local consumer spending within specific locations and sectors. A simple back-of-the-envelope calculation indicates that consumption gains in tourist-related services and retail sectors are of a similar order of magnitude as local public expenditures, though the tax revenue captured by host cities falls well short of these costs. In this sense, hosting the EURO effectively operated as a targeted subsidy to

aggregate German tourism absent the EURO 2024, and does not take into consideration other factors, such as the business cycle, that may affect tourism.

<sup>14</sup> Our data do not include direct measures of local employment or wages, precluding a direct test of these channels.

internationally exposed urban sectors, funded substantially by host-city and federal taxpayers, with benefits that are spatially and sectorally concentrated rather than broadly diffused.

More generally, our findings underscore that evaluating large-scale events through aggregate national or regional indicators can obscure economically significant local reallocations occurring over short horizons. The economic case for hosting, therefore, rests less on aggregate growth and more on distributional incidence, local objectives, and the extent to which complementary policies enable host cities to transform temporary demand shocks into more persistent gains. Viewed through this lens, mega-events are best understood not as engines of national growth, but as place-based interventions with uneven local effects whose long-run consequences depend critically on local economic structures and policy choices. Future research could build on this approach to clarify which local conditions and policy choices determine whether hosting events translates into more persistent economic benefits.

### CRedit authorship contribution statement

**Florian Dorn:** Writing – review & editing, Validation, Funding acquisition, Conceptualization. **Marie-Theres Gasser:** Writing – review & editing, Writing – original draft, Visualization, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Kevin Kloiber:** Writing – review & editing, Visualization, Methodology, Investigation, Formal analysis. **Simon Krause:** Investigation, Formal analysis, Data curation, Conceptualization. **Carla Krolage:** Writing – review & editing, Writing – original draft, Validation, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization.

### Declaration of generative AI and AI-assisted technologies in the manuscript preparation process

During the preparation of this work the authors used ChatGPT to improve the clarity and quality of the English language. The AI tool did not contribute to the scientific content, analysis, or interpretation. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the published article.

### Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Carla Krolage reports financial support was provided by the cities and municipal tourism agencies of Berlin, Hamburg, Munich and Stuttgart. Florian Dorn reports financial support was provided by the cities and municipal tourism agencies of Berlin, Hamburg, Munich and Stuttgart. The funding institutions had no influence on study design, data analysis, interpretation of findings, or manuscript preparation. All conclusions and interpretations presented in this study are solely those of the authors.

Florian Dorn was elected to the German Parliament in 2025. His work on this project precedes his political office and was conducted while employed as a researcher at ifo Institute, where he retains an affiliation. His current political office has no impact on any content of the paper. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### Appendix A. The EURO 2024

Fig. A.1 provides an overview of the respective host and applicant cities and their stadium capacities. The following stadiums have been selected to host the EURO: Olympiastadion (Berlin), Signal Iduna Park (Dortmund), Merkur Spiel-Arena (Düsseldorf), Deutsche Bank Park (Frankfurt am Main), Veltins-Arena (Gelsenkirchen), Volksparkstadion (Hamburg), Rheinenergiestadion (Cologne), Red Bull Arena (Leipzig), the MHP Arena (Stuttgart), and the Allianz Arena (Munich).



Fig. A.1. EURO 2024 Host vs Non-Host Cities and Stadium Capacity. Notes: Own illustration based on Frankfurter Allgemeine Zeitung (2017).

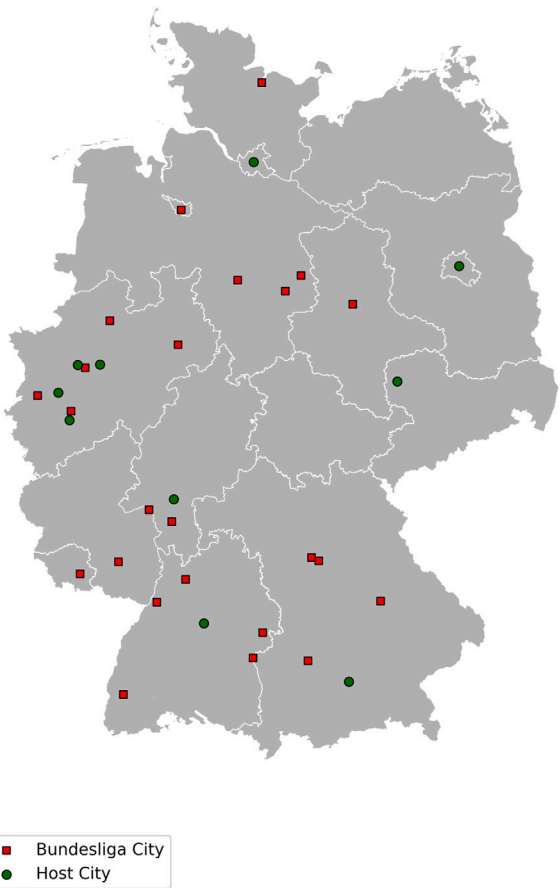


Fig. A.2. EURO 2024 Host Cities vs Further First and Second Bundesliga Cities.

**Table A.1**

UEFA EURO 2024: Matches per Host City.

| City          | Group Stage | Finals                                | Total |
|---------------|-------------|---------------------------------------|-------|
| Berlin        | 3           | 3 (Round of 16, Quarter-final, Final) | 6     |
| Dortmund      | 4           | 2 (Round of 16, Semi-final)           | 6     |
| Munich        | 4           | 2 (Round of 16, Semi-final)           | 6     |
| Düsseldorf    | 3           | 2 (Round of 16, Quarter-final)        | 5     |
| Hamburg       | 4           | 1 (Quarter-final)                     | 5     |
| Cologne       | 4           | 1 (Round of 16)                       | 5     |
| Frankfurt     | 4           | 1 (Round of 16)                       | 5     |
| Stuttgart     | 4           | 1 (Quarter-final)                     | 5     |
| Gelsenkirchen | 3           | 1 (Round of 16)                       | 4     |
| Leipzig       | 3           | 1 (Round of 16)                       | 4     |

**Table A.2**

Overall Expenditures for Hosting (in Million Euros).

| City                                        | Costs       |
|---------------------------------------------|-------------|
| Berlin                                      | 83.7        |
| Stuttgart                                   | 38.4        |
| Frankfurt am Main                           | 30.2        |
| Hamburg                                     | 30.0        |
| Dortmund                                    | 21.0        |
| Munich                                      | 21.0        |
| Düsseldorf                                  | 20.5        |
| Gelsenkirchen                               | 19.0        |
| Leipzig                                     | 15.0        |
| Cologne                                     | 13.8        |
| <b>Total expected expenditures (cities)</b> | <b>292</b>  |
| Federal government                          | ~41         |
| <b>Total public expenditures</b>            | <b>~333</b> |
| EURO 2024 GmbH (UEFA & DFB)                 | ~357        |
| <b>Total</b>                                | <b>~690</b> |

Notes: Costs refer to estimated expenditures prior to the event, and are derived from officially published figures. The illustration is based on Wicker et al. (2024). Reported figures exclude security-related expenditures and investments in transport infrastructure.

## Appendix B. Mastercard industry categories

The data from the Mastercard network used in our analysis covers 11 distinct merchant categories, which we refer to as industry category. Mastercard classifies businesses using Merchant Category Codes (MCCs), which are four-digit identifiers that describe the primary type of goods or services offered by a merchant. MCCs play a key role in transaction processing, consumer behavior analysis, regulatory compliance, and the implementation of rewards programs and expense management systems. Detailed information on MCCs is available in the Mastercard Quick Reference Booklet (Mastercard, 2025).

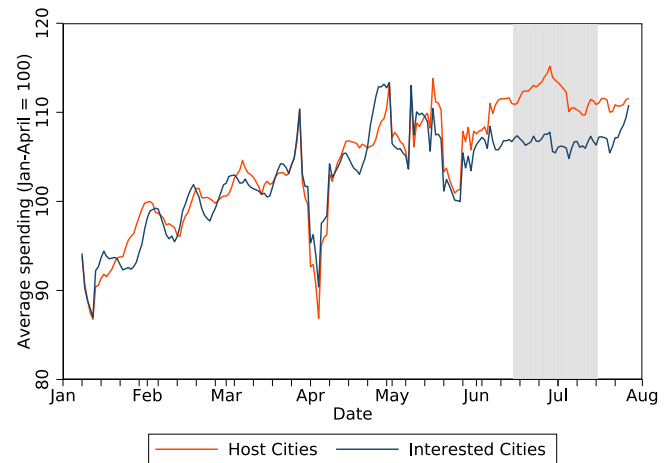
Each MCC corresponds to a specific merchant type and allows financial institutions and network operators to identify the nature of a transaction. Categories are assigned by the acquiring bank during merchant onboarding based on the merchant's primary business activity. Each merchant is classified under a single MCC that reflects its dominant source of revenue, in accordance with Mastercard's standardized definitions. MCC assignments are subject to review and may be updated if a merchant's business model changes. While the MCC system supports highly granular classification, the data used in this study are aggregated to a category level. The dataset is restricted to transactions processed at physical points of sale and excludes online and other card-not-present transactions.

The data are aggregated at the daily postcode level and are subject to confidentiality thresholds that suppress observations falling below a minimum transaction count. This restriction reduces data availability in more granular industry-category breakdowns, leading us to exclude industries with insufficient coverage from the analysis and focus on 8 categories with sufficient coverage. All industry categories included in our analysis are summarized in Table B.3. MCCs are designed to be

stable over time, which limits short-term reclassification and ensures consistency in longitudinal analyses. Because classification is based on a merchant's primary activity, transactions may not perfectly reflect the specific item purchased, introducing potential within-category heterogeneity. Nevertheless, the standardized MCC framework enables comparability across regions and acquiring institutions, making the data particularly well suited for analyzing aggregate spending patterns across industry types.

## Appendix C. Raw trends and placebo test

Fig. C.1 plots raw trends in our consumer spending data for host cities and the control group of cities interested in hosting leading up to and during EURO 2024. We compute the average consumer spending index at the postcode level and standardize it to a mean of 100 over the months January to April, a time period with limited large scale-events in host and control group cities.<sup>15</sup>

**Fig. C.1.** Raw Trends in Spending Leading up to the EURO.

Notes: This figure depicts trends in host city and control group spending in the months leading up to and during the EURO, plotted as a 7-day moving average to smooth out spending variation across weekdays. Spending is averaged over postcodes and standardized to a mean of 100 over the months January to April.

Spending trends evolve largely in parallel until May, after which they begin to diverge in June, with the strongest divergence occurring during the group stage of the tournament. These anticipation effects shortly before the EURO likely reflect the earlier arrival of visitors and, potentially, a temporal displacement of other activities related to a high concentration of trade fairs in early June, as well as to trips shifted to the pre-tournament period. Note that the figure does not control for any covariates. Earlier fluctuations may therefore be driven by unrelated events, particularly trade fairs. For instance, the control group city of Hanover hosted the world's leading industrial development fair from May 22 to 26, which likely contributed to the increase in control group spending observed in late May. To avoid an arbitrary selection of control events, we do not explicitly control for such other events in our estimations. Apart from trade fairs, we are not aware of any further large-scale events in the months leading up to the EURO. Note also that, given the prominence of the EURO among the German public, no major competing events or trade fairs were scheduled concurrently with the tournament across the host and control cities. In addition, other factors such as weather conditions or local holidays may influence consumer spending; while they may lead to fluctuations in the raw data, they are accounted for in our main specification.

<sup>15</sup> Using alternative normalization periods or weighted spending measures yields a qualitatively similar pattern.

**Table B.3**  
Industry categories.

| Industry Category                  | Description                                                                                                                                                                                                                                                                                                                              |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Total Spending                     | Aggregates all physical point-of-sale transactions included in the dataset, spanning all merchant categories.                                                                                                                                                                                                                            |
| Restaurants                        | Merchants serving food and beverages intended for immediate consumption, typically on the premises, and that may also offer catering services. Transactions processed by restaurants, including those operating within hospitals, hotels, cruise ships, or similar locations. Table service is provided, and gratuities may be included. |
| Grocery and Food Stores            | Merchants that sell food merchandise for home consumption.                                                                                                                                                                                                                                                                               |
| Accommodations                     | Hotels, motels, resorts, and other lodging facilities.                                                                                                                                                                                                                                                                                   |
| Bars, Taverns, Nightclubs          | Merchants selling alcoholic beverages—including wine, beer, ale, mixed drinks, and spirits—for on-premises consumption. Includes bars, beer gardens, microbreweries, pubs, taprooms, cocktail lounges, discotheques, nightclubs, saloons, taverns, comedy clubs, and wine bars.                                                          |
| Apparel                            | Clothing stores offering apparel, accessories, and related merchandise.                                                                                                                                                                                                                                                                  |
| Art, Entertainment, Recreation     | Merchants that operate tourist attractions and exhibits for entertainment, including expositions, botanical gardens, craft shows, museums, and wineries. This category encompasses all merchants classified under arts, entertainment, and recreation activities.                                                                        |
| Department and General Merchandise | Retailers offering a broad range of general merchandise, including building materials, hardware, garden supplies, and food products, as well as discount and department stores. Merchants primarily selling apparel are classified as clothing stores; eating and drinking establishments are classified separately.                     |

Notes: Industry categories are based on Mastercard Merchant Category Codes (MCCs), which classify merchants according to their primary business activity. Spending data include physical point-of-sale transactions processed via the Mastercard network. Online transactions, prepaid bookings, and cash payments are not observed. Category-level observations may be censored due to confidentiality restrictions that suppress observations falling below a minimum transaction count.

**Table C.1**  
Placebo test.

|                         | Overall            | International      | Domestic           |
|-------------------------|--------------------|--------------------|--------------------|
| Host City × Placebo     | 0.0041<br>(0.0124) | 0.0201<br>(0.0190) | 0.0028<br>(0.0118) |
| Control Group           | Interested         | Interested         | Interested         |
| N                       | 386,095            | 370,948            | 385,495            |
| Adjusted R <sup>2</sup> | 0.95               | 0.93               | 0.94               |
| Within R <sup>2</sup>   | 0.02               | 0.01               | 0.03               |
| Controls                | Yes                | Yes                | Yes                |

Notes: This table reports placebo difference-in-differences estimates using the same specification as Table 1, but assigning the treatment to a pre-event period in which no UEFA EURO 2024 matches took place. The control group consists of non-host but interested cities. The treatment indicator equals one for placebo host cities during the placebo period. Observations from June 2024 onward are excluded. All regressions include postcode and date fixed effects and controls for public and school holidays, temperature, precipitation, non-EURO-2024 matchdays. Due to confidentiality restrictions, the dataset includes only postcodes meeting a minimum transaction threshold, resulting in differing sample sizes across groups despite the broad coverage of the underlying transaction data. Regressions are weighted by postcode-level transaction volume in the preceding year. Standard errors are clustered at the postcode level. \*\*\**p* < 0.01, \*\**p* < 0.05, \**p* < 0.1.

We next re-estimate our specification using data up to the end of May only, treating May as a placebo month and controlling for the same set of covariates. This yields no significant difference in spending between host cities and their control group (Table C.1).

**Appendix D. Robustness checks**

*D.1. Alternative clustering of standard errors*

In our main specification, we cluster standard errors at the postcode level to capture localized spatial correlation in spending behavior. As a robustness check, we alternatively cluster at the city level, which assumes a broader correlation structure across postcodes within the same urban area. While the city-level clustering produces slightly larger standard errors, the key coefficients remain stable in significance, reinforcing the robustness of our main findings (see Table D.1 and Table D.2).

**Table D.1**  
Overall Spending Increase during the EURO 2024: Standard Error Clustered at the City level.

|                         | Overall               | International          | Domestic           |
|-------------------------|-----------------------|------------------------|--------------------|
| Host City × Period      | 0.0311 **<br>(0.0110) | 0.0637 ***<br>(0.0225) | 0.0051<br>(0.0147) |
| Control Group           | Interested            | Interested             | Interested         |
| N                       | 428,820               | 412,825                | 428,172            |
| Adjusted R <sup>2</sup> | 0.95                  | 0.93                   | 0.94               |
| Within R <sup>2</sup>   | 0.02                  | 0.01                   | 0.03               |
| Controls                | Yes                   | Yes                    | Yes                |

Notes: The table reports the differential effect of hosting UEFA EURO 2024 matches on local spending in host cities relative to non-host but interested cities, separately for overall, international, and domestic visitors. The treatment indicator equals one for host cities during the event period. All regressions include postcode and date fixed effects as well as controls for public and school holidays, temperature, precipitation, and non-EURO-2024 match days. Due to confidentiality restrictions, the dataset includes only postcodes meeting a minimum transaction threshold, resulting in differing sample sizes across groups despite the broad coverage of the underlying transaction data. Regressions are weighted by postcode-level transaction volume in the preceding year. Standard errors are clustered at the city level. \*\*\**p* < 0.01, \*\**p* < 0.05, \**p* < 0.1.

**Table D.2**  
Differential Effects by Tournament Stage: Alternative Clustering.

|                            | Overall                | International          | Domestic            |
|----------------------------|------------------------|------------------------|---------------------|
| Host City × Group Stage    | 0.0475 ***<br>(0.0106) | 0.1128 ***<br>(0.0316) | −0.0028<br>(0.0150) |
| Host City × Knockout Stage | 0.0147<br>(0.0151)     | 0.0163<br>(0.0224)     | 0.0106<br>(0.0164)  |
| Control Group              | Interested             | Interested             | Interested          |
| N                          | 428,820                | 412,825                | 428,172             |
| Adjusted R <sup>2</sup>    | 0.95                   | 0.93                   | 0.94                |
| Within R <sup>2</sup>      | 0.02                   | 0.01                   | 0.03                |
| Controls                   | Yes                    | Yes                    | Yes                 |

Notes: The table reports difference-in-differences estimates for the group and knockout stages of UEFA EURO 2024. Coefficients correspond to interactions between the host city indicator and stage-specific tournament indicators. Estimates are based on Eq. (1), using non-host but interested cities as the control group. All regressions include postcode and date fixed effects as well as controls for public and school holidays, temperature, precipitation, and non-EURO 2024 match days. Due to confidentiality restrictions, the dataset includes only postcodes meeting a minimum transaction threshold, resulting in differing sample sizes across groups despite the broad coverage of the underlying transaction data. Regressions are weighted by postcode-level transaction volume in the preceding year. Standard errors, clustered at the city level, are reported in parentheses. \*\*\**p* < 0.01, \*\**p* < 0.05, \**p* < 0.1.

**Table D.3**

Robustness Check: Sample Restrictions for Spillovers.

|                       | Overall              |                       | International         |                       | Domestic            |                    |
|-----------------------|----------------------|-----------------------|-----------------------|-----------------------|---------------------|--------------------|
| Host City × Period    | 0.0261**<br>(0.0113) | 0.0317***<br>(0.0120) | 0.0680***<br>(0.0229) | 0.0684***<br>(0.0235) | −0.0021<br>(0.0107) | 0.0064<br>(0.0113) |
| Control Group         | Bundesliga           | Bundesliga            | Bundesliga            | Bundesliga            | Bundesliga          | Bundesliga         |
| Control Distance      | >100 km              | >100 km               | >100 km               | >100 km               | >100 km             | >100 km            |
| Without NRW           | –                    | Yes                   | –                     | Yes                   | –                   | Yes                |
| N                     | 419,864              | 349,900               | 404,737               | 337,275               | 419,278             | 349,334            |
| R <sup>2</sup>        | 0.95                 | 0.95                  | 0.93                  | 0.94                  | 0.94                | 0.94               |
| Within R <sup>2</sup> | 0.02                 | 0.02                  | 0.01                  | 0.01                  | 0.03                | 0.03               |
| Controls              | Yes                  | Yes                   | Yes                   | Yes                   | Yes                 | Yes                |

Notes: This table reports robustness checks restricting the sample to non-host cities located more than 100 km from any host city, using Bundesliga cities as the control group. The second column in each panel excludes cities in North Rhine-Westphalia (NRW) to test for potential regional spillovers. All regressions include postcode fixed effects and control for public and school holidays, temperature, precipitation, non-EURO-2024 match days, and date fixed effects. Due to confidentiality restrictions, the dataset includes only postcodes meeting a minimum transaction threshold, resulting in differing sample sizes across groups despite the broad coverage of the underlying transaction data. Regressions are weighted by postcode-level transaction volume in the preceding year. Standard errors are clustered at the postcode level. \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$

**Table D.4**

Location-Specific Effects: Match Days.

|                                          | Overall               |                       |                       | International         |                       |                       | Domestic              |                     |                      |
|------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------------------|----------------------|
|                                          | Lead                  | Gameday               | Lag                   | Lead                  | Gameday               | Lag                   | Lead                  | Gameday             | Lag                  |
| City Center ×<br>Host City × Match Day   | 0.1364***<br>(0.0478) | 0.1018***<br>(0.0238) | 0.1144***<br>(0.0234) | 0.3046***<br>(0.1152) | 0.3775***<br>(0.1096) | 0.3289***<br>(0.0810) | 0.0662<br>(0.0636)    | 0.0132<br>(0.0170)  | 0.0453**<br>(0.0176) |
| Stadium ×<br>Host City × Match Day       | −0.0405<br>(0.0480)   | 0.1971*<br>(0.1131)   | 0.0218<br>(0.0271)    | −0.0209<br>(0.0900)   | 0.3013<br>(0.1910)    | 0.0589<br>(0.0592)    | −0.0750<br>(0.0470)   | 0.1676*<br>(0.0975) | −0.0369<br>(0.0348)  |
| Transport Hub ×<br>Host City × Match Day | 0.0014<br>(0.0378)    | 0.0128<br>(0.0221)    | 0.0832**<br>(0.0392)  | 0.1889*<br>(0.1001)   | 0.0829<br>(0.0810)    | 0.2188**<br>(0.1038)  | −0.0864**<br>(0.0387) | −0.0363<br>(0.0276) | −0.0059<br>(0.0302)  |
| Remainder of Host City ×<br>Match Day    | 0.0357**<br>(0.0140)  | 0.0447***<br>(0.0130) | 0.0335***<br>(0.0112) | 0.1177***<br>(0.0295) | 0.1155***<br>(0.0315) | 0.1019***<br>(0.0218) | −0.0111<br>(0.0116)   | 0.0039<br>(0.0123)  | −0.0092<br>(0.0099)  |
| N                                        | 8459                  | 8466                  | 8464                  | 6456                  | 6466                  | 6463                  | 8384                  | 8263                | 8441                 |
| Adjusted R <sup>2</sup>                  | 0.29                  | 0.28                  | 0.23                  | 0.14                  | 0.13                  | 0.12                  | 0.31                  | 0.25                | 0.23                 |
| Within R <sup>2</sup>                    | 0.04                  | 0.04                  | 0.05                  | 0.05                  | 0.06                  | 0.06                  | 0.02                  | 0.02                | 0.02                 |
| Controls                                 | Yes                   | Yes                   | Yes                   | Yes                   | Yes                   | Yes                   | Yes                   | Yes                 | Yes                  |

Notes: The table reports dynamic difference-in-differences estimates of match day specific effects during the overall event period, based on a local projections approach, allowing for location-specific treatment effects within host cities. The reported coefficients correspond to interactions between location indicators and the event-period indicator. City center refers to the postcode containing the town hall. Transport hub denotes the postcode of the main railway station. Stadium refers to the postcode containing the host stadium. Remainder of the host city captures all other postcodes within host cities. All regressions include postcode fixed effects and controls for school holidays, temperature, precipitation, and non-EURO-2024 match days. Due to confidentiality restrictions, the dataset includes only postcodes meeting a minimum transaction threshold, resulting in differing sample sizes across groups despite the broad coverage of the underlying transaction data. Regressions are weighted by postcode-level transaction volume in the preceding year. Standard errors are clustered at the postcode level. \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$ .

## D.2. Sample restrictions for spillovers

We exclude all control cities located within a 100 km radius of any host city to account for potential spillover effects, ensuring that nearby non-host cities are not indirectly affected by tournament-related activity. This analysis is conducted using the sample of all cities with a Bundesliga stadium, which provides a larger set of cities and thus greater statistical power. Given the spatial concentration of host cities, this restriction primarily affects cities in North Rhine-Westphalia (NRW), where spillovers are most likely to occur. The estimated effects remain similar in magnitude and direction to our baseline results when excluding cities in North Rhine-Westphalia (see Table D.3).

## D.3. Further robustness checks

See Figs. D.1, D.2, Table D.4, Table D.5.

## Appendix E. Card payments

See Fig. E.1.

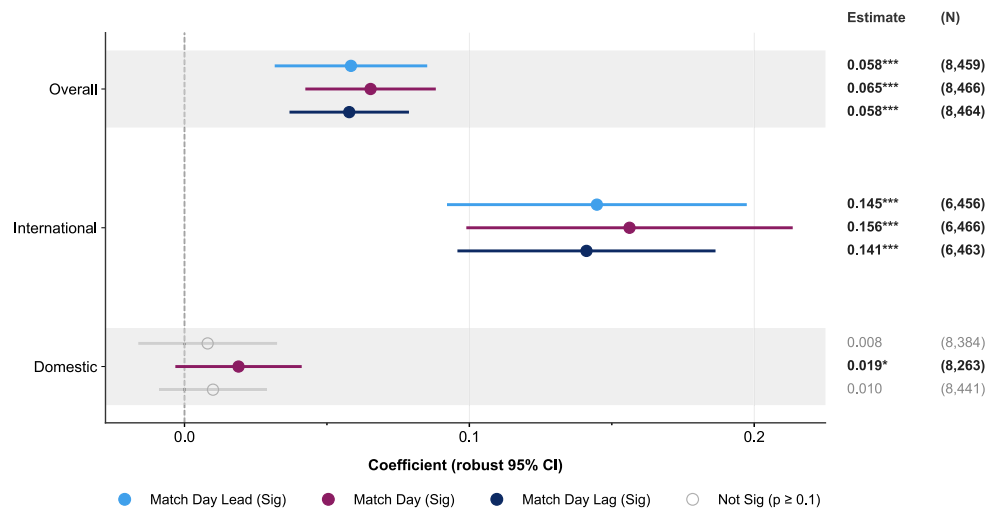


**Fig. D.1.** Match Day-Specific Effects without Controls.

*Notes:* The figure displays dynamic difference-in-differences estimates of the effect of hosting the UEFA EURO 2024 around match days, based on a local projections approach. The reported coefficients correspond to leads and lags relative to match days for host cities. The treatment indicator equals one for host cities on match days and on the corresponding lead and lag days (i.e., the day before and the day after a match). Due to confidentiality restrictions, the dataset includes only postcodes meeting a minimum transaction threshold, resulting in differing sample sizes across groups despite the broad coverage of the underlying transaction data. Regressions are weighted by postcode-level transaction volume in the preceding year. Point estimates are shown with 95% confidence intervals. The colors represent estimated coefficients that are statistically significant at conventional levels (up to the 10% significance level). Standard errors are clustered at the postcode level.

**Table D.5**  
Effects Including Spillovers to Surrounding Postcodes.

|                         | Overall              | International         | Domestic            |
|-------------------------|----------------------|-----------------------|---------------------|
| Host City × Period      | 0.0251**<br>(0.0115) | 0.0578***<br>(0.0191) | 0.0002<br>(0.0093)  |
| Surroundings × Period   | −0.0095<br>(0.0120)  | 0.0254<br>(0.0209)    | −0.0133<br>(0.0099) |
| Control Group           | Interested           | Interested            | Interested          |
| N                       | 752,106              | 650,251               | 743,750             |
| Adjusted R <sup>2</sup> | 0.94                 | 0.93                  | 0.93                |
| Within R <sup>2</sup>   | 0.02                 | 0.01                  | 0.02                |
| Controls                | Yes                  | Yes                   | Yes                 |

*Notes:* The table reports difference-in-differences estimates including spillover effects to postcodes surrounding host cities. Host Cities refers to host cities of UEFA EURO 2024, while Surroundings captures adjacent postcodes within a distance band of 30 kilometers. The control group consists of non-host but interested cities. All regressions include postcode fixed effects and date fixed effects, as well as controls for public and school holidays, temperature, precipitation, and non-EURO 2024 match days. Due to confidentiality restrictions, the dataset includes only postcodes meeting a minimum transaction threshold, resulting in differing sample sizes across groups despite the broad coverage of the underlying transaction data. Regressions are weighted by postcode-level transaction volume in the preceding year. Standard errors are clustered at the city level and reported in parentheses. \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$ .

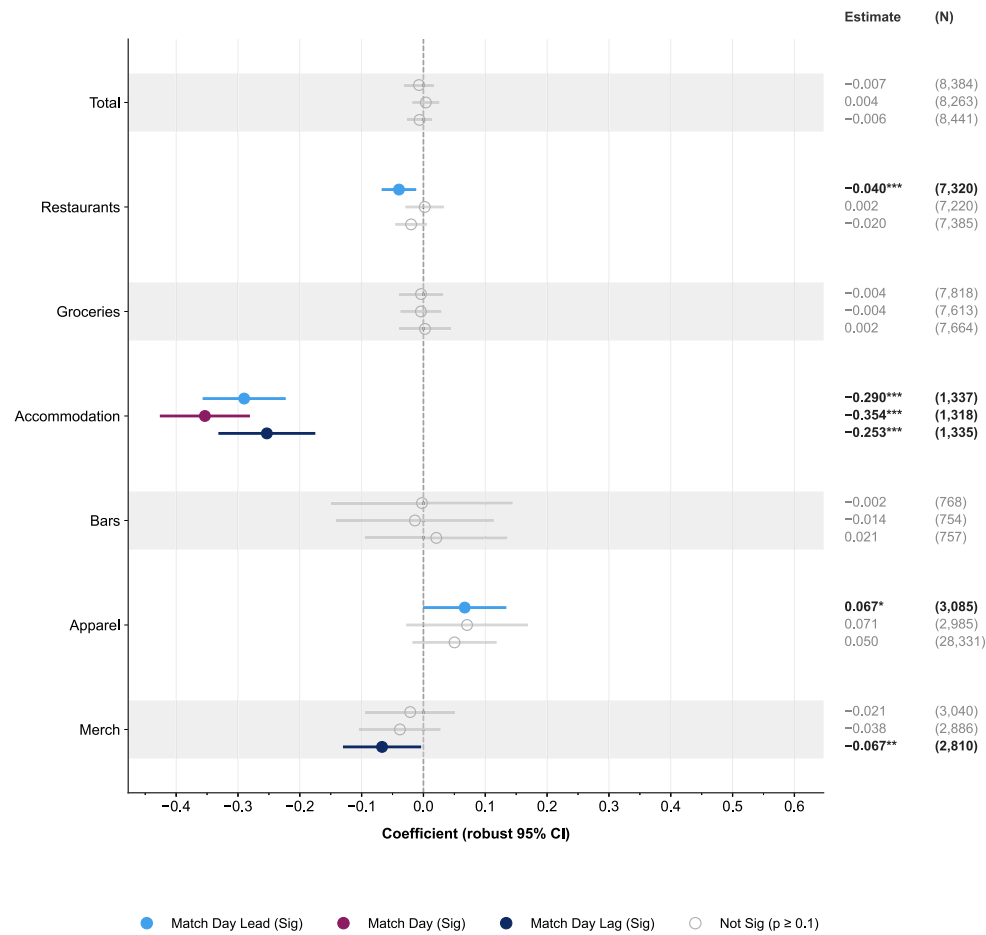


**Fig. D.2.** Match Day-Specific Effects by Industry: Domestic Spending.

*Notes:* The figure displays dynamic difference-in-differences estimates of match day-specific effects on domestic spending by industry, based on a local projections approach. The reported coefficients capture spending responses attributable to domestic demand on match days and on the corresponding lead and lag days (i.e., the day before and the day after a match) for host cities. Regressions are estimated separately for each industry. The treatment indicator equals one for host cities on match days as well as on the day before and the day after a match. All specifications include postcode fixed effects and control for school holidays, temperature, precipitation, and other soccer-related events. Due to confidentiality restrictions, the dataset includes only postcodes meeting a minimum transaction threshold, resulting in differing sample sizes across groups despite the broad coverage of the underlying transaction data. Regressions are weighted by postcode-level transaction volume in the preceding year. Point estimates are shown with 95% confidence intervals. The colors represent estimated coefficients that are statistically significant at conventional levels (up to the 10% significance level). Standard errors are clustered at the postcode level.

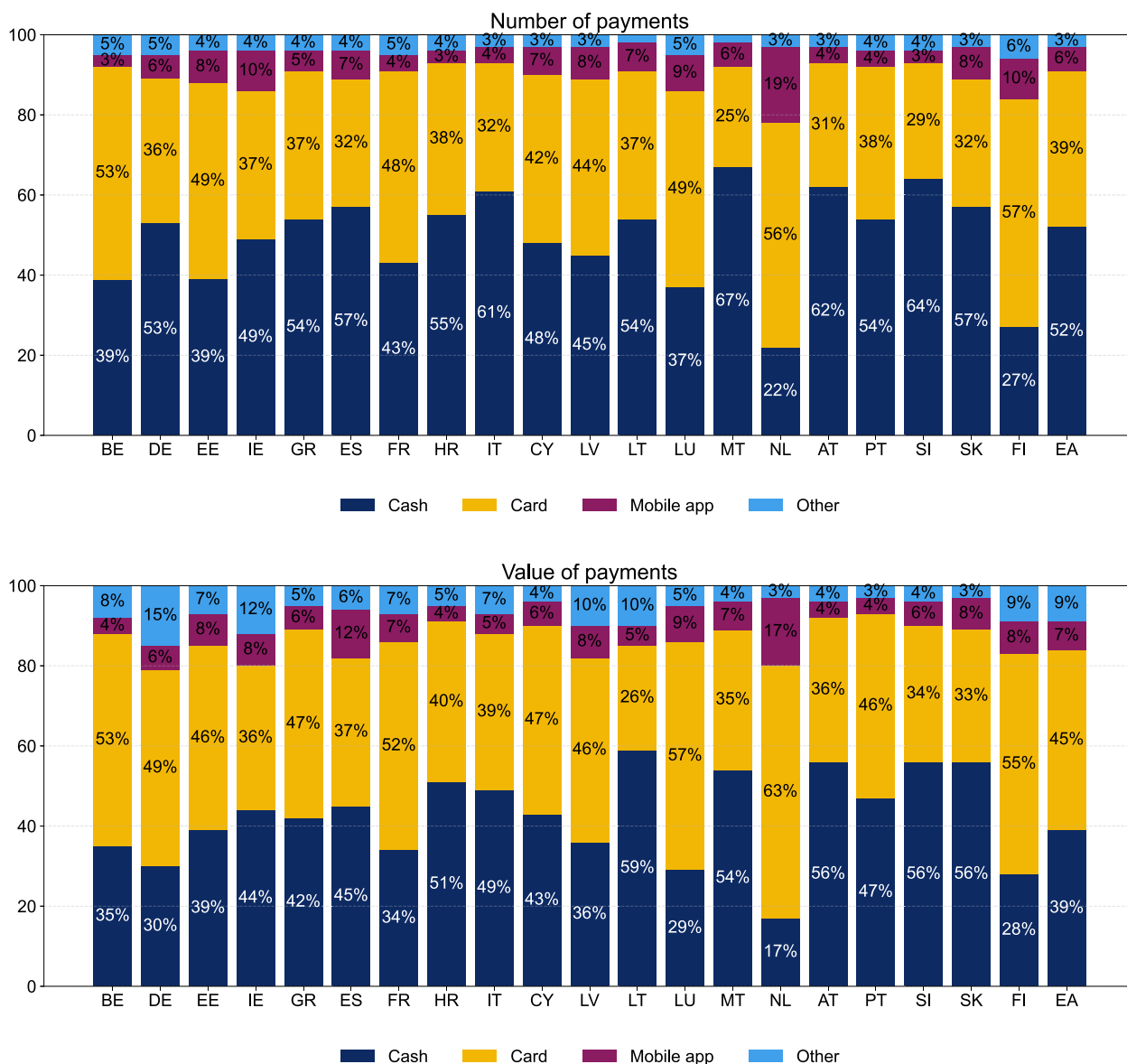


**Fig. E.1.** Share of Card Payments by Country at the Point of Sale.

Notes: Sources: [European Central Bank \(2024\)](#); own illustration based on [De Nederlandsche Bank and Dutch Payments Association \(2024\)](#) and [Deutsche Bundesbank \(2024\)](#). The category “Cards” comprises physical payment cards, including debit and credit cards as well as prepaid cards. The category “Other” covers instruments such as bank cheques, credit transfers, direct debits, loyalty points, vouchers and gift cards, and additional payment methods. The concept of POS payments applied here differs from the definition used by the Deutsche Bundesbank (2024), which restricts POS payments to transactions carried out in supermarkets, local retail stores, drugstores, and petrol stations.

## Appendix F. Tourism statistics

Fig. F.1 shows year-on-year changes in tourist nights spent for the months of June and July 2024 across the entirety of Germany, derived from administrative tourism statistics (Statistisches Bundesamt, 2024). As these data do not distinguish between host cities and a control group, they capture the aggregate effect of the EURO independent of hosting status and are therefore not directly comparable to our estimation results. Nevertheless, Fig. F.1 shows a substantial increase in nights spent by international visitors in June but not in July which aligns with our spending estimates. Fig. F.2 then shows percentage point differences in average tourist stay growth rates between host regions and the comparison group of non-host regions containing a control group city. As tourist data is only available at the regional level, this is not directly comparable to our main specification: For example, while we observe data for Berlin, our data for Munich encompasses the broad region of Upper Bavaria. Nevertheless, our results fit well with our main results, indicating a pronounced increase in tourist stays in June, driven by international visitors.

In addition, Fig. F.3 shows a marked increase in stays by tourists from EURO participant countries, also supporting that the increases in nights spent are attributable to the EURO. As the data cannot be decomposed at a daily frequency, the figures cover full calendar months, suggesting that the effects during the EURO period itself were likely even more pronounced. The small decline in domestic nights would be consistent with a slight crowding out of domestic tourists, as in Fig. 2.

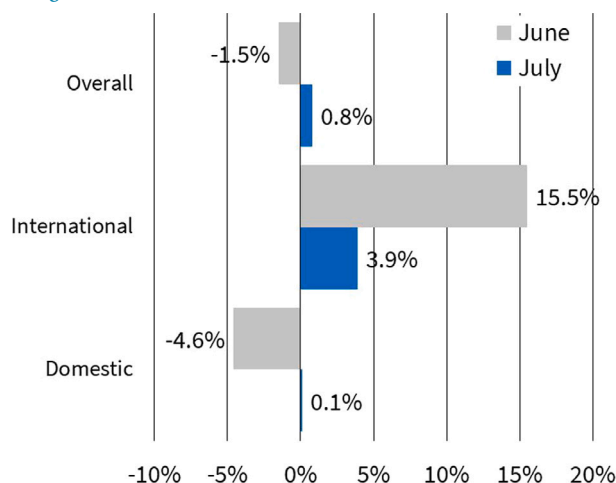


**Fig. F.1.** Year-on-year Change in Nights Spent in Germany in June and July. *Notes:* The figure displays the year-on-year changes in nights spent in Germany between June and July 2024 and June and July 2023. The data stems from administrative tourism statistics (Statistisches Bundesamt, Monatserhebung im Tourismus).

## Appendix G. Overall consumer spending impact: Back of the envelope calculation

We perform a very rough back-of-the-envelope calculation to quantify the impact on consumer spending in Euros. Specifically, we consider three expenditure categories: brick-and-mortar retail, hospitality, and entertainment spending. Data on brick-and-mortar retail spending are taken from city-level estimates by GfK (2024).<sup>16</sup> Expenditure on

<sup>16</sup> Since 2024 retail spending data are not publicly available for Frankfurt, we extrapolate 2024 spending by scaling 2023 values using the year-on-year growth rate of German retail spending in 2024. Spending in Leipzig is approximated based on average per-capita retail spending in Germany multiplied with Leipzig's population size, and scaled downwards with a multiplier of 0.91 based on a GfK statement that Leipzig's per capita retail spending is 9% below the German average.

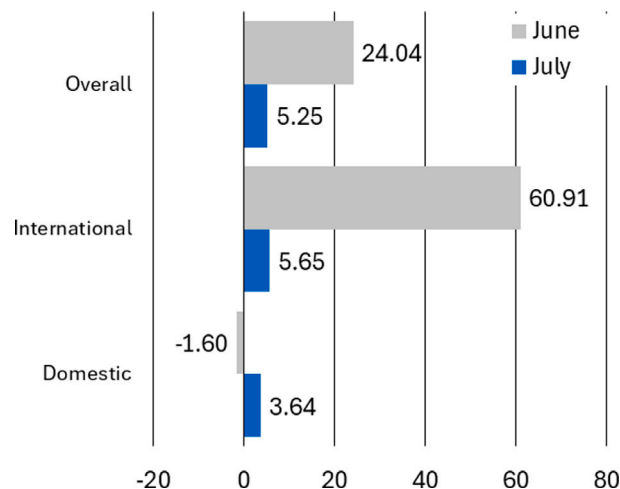


**Fig. F.2.** Percentage Point Differences in Year-on-year Change in Nights Spent in Host Regions vs. Comparison Group in June and July.

*Notes:* The figure displays the year-on-year percentage point differences in changes in nights spent in host vs. control group regions between June and July 2024 and June and July 2023. Regions partly encompass larger areas than the host cities. The data stems from administrative tourism statistics (Statistisches Bundesamt, Monatserhebung im Tourismus).

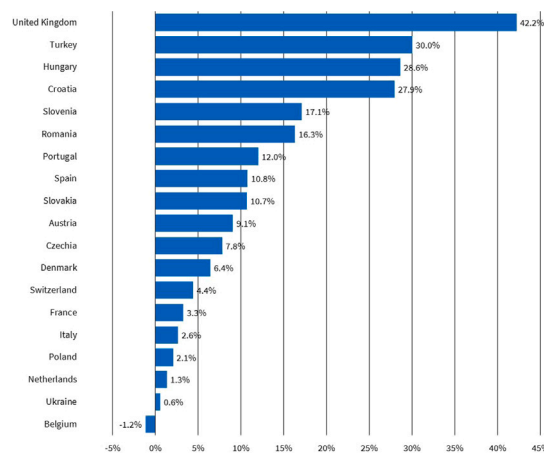


**Fig. F.3.** Year-on-year Changes in Nights Spent in Germany in June and July by Country of Origin.

*Notes:* The figure displays the year-on-year changes in nights spent in Germany between June and July 2024 and June and July 2023, separately by country of origin. The data stems from administrative tourism statistics (Statistisches Bundesamt, Monatserhebung im Tourismus).

hospitality and entertainment per city is obtained from the national accounts of the German Statistical Office (NACE categories I and R).<sup>17</sup>

Table G.1 reports approximate annual consumer spending at the city level.

Assuming that spending scales linearly to the monthly level, total consumer spending in the host cities amounts to approximately 9.8 billion Euros per month. A 3.1% increase in monthly consumer spending therefore corresponds to just over 300 million Euros. This figure is likely conservative, as we do not observe transportation spending and likely underestimate hotel spending. Nevertheless, the estimate is just slightly below total public expenditures from hosting.

<sup>17</sup> As data for Leipzig is not available, we scale state-level data for Saxony with Leipzig's population share.

**Table G.1**

Annual Retail Spending per Host City in Million EURO, 2024.

| City          | Retail        | Hospitality   | Entertainment | Total         |
|---------------|---------------|---------------|---------------|---------------|
| Berlin        | 20994         | 9434          | 3910          | 34 338        |
| Cologne       | 7260          | 306           | 1337          | 8903          |
| Dortmund      | 3588          | 563           | 569           | 4719          |
| Düsseldorf    | 4453          | 2017          | 936           | 7406          |
| Frankfurt     | 4771          | 3745          | 2984          | 11 499        |
| Gelsenkirchen | 1503          | 221           | 225           | 1949          |
| Hamburg       | 12183         | 4066          | 2509          | 18 757        |
| Leipzig       | 3795          | 545           | 264           | 4604          |
| Munich        | 11 414        | 6624          | 3761          | 21 799        |
| Stuttgart     | 4112          | 1066          | 1750          | 6928          |
| <b>Total</b>  | <b>74 073</b> | <b>28 585</b> | <b>18 244</b> | <b>120903</b> |

From a fiscal perspective, the relevant benchmark for offsetting hosting costs is not the level of consumer spending itself, but the tax revenues this spending generates. These revenues fall well short of public expenditures on hosting. First, increased consumer spending drives up revenues from value-added tax. Under Germany's 2024 VAT schedule, most retail, restaurant and entertainment spending is taxed at 19%, while accommodation services and groceries are taxed at a rate of 7%.<sup>18</sup> Depending on the split of consumer spending across VAT rates, this broadly indicates VAT revenues in the range of 40–50 million Euros. Furthermore, municipalities receive only a share of 2.8% of VAT revenues, which are allocated based on employment and business taxes, rather than on underlying consumer spending (Bundesministerium der Finanzen, 2025). Hence, little of the additional VAT revenue flows back to the ten host cities themselves. Second, host cities may generate additional revenues through the local business tax on profits, with local tax rates in host cities varying between 14.35 and 17.15%. Calibrating the fiscal impact would require data on profit margins, which we do not observe in our data. Moreover, a portion of any such revenue would not accrue to the host city itself: for firms with establishments in multiple municipalities, trade tax revenue is apportioned across locations according to a statutory formula based primarily on payroll shares, not on where sales occur. Potential additional revenues from this channel therefore again constitute only a fraction of expenditures, and additional municipal revenues from VAT and business tax combined are unlikely to exceed a few tens of millions of Euros.

Taken together, these considerations indicate that the tax revenue generated by the additional consumer spending is substantially smaller than the gross spending effect itself, and smaller still relative to the specific fiscal burden carried by host city governments. While benefits from hosting may arise beyond consumer spending (e.g., ticket sales, tourism marketing), the consumer spending impact suggests that hosting does not generate massive excess revenues. Rather, it operates as a targeted subsidy to tourist-facing sectors.

### Data availability

The authors do not have permission to share data.

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<sup>18</sup> Museums and similar cultural attractions, which make up part of our entertainment category, are also taxed at the reduced rate.

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