# Does Hosting the Tour de France Yield Tangible Benefits?

**WORKING PAPER**

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## ABSTRACT

The consensus among economists is that tangible effects associated with hosting major sporting events are close to non-existent. Costs associated with these events are usually covered by public funds, creating opportunity costs that outweigh the associated benefits. However, existing research has mainly focused on major international sporting events that require large-scale (public) investments to build the necessary facilities to host them. This paper focuses on the world's most prominent professional cycling event, the Tour de France, which does not require large-scale infrastructural investments. Deploying appropriate regression modeling to regional level data, we find that hosting the Tour de France does not seem to have a significant impact on the annual gross domestic product (GDP) or employment in related sectors. (JEL Z23, L83, H41)


Key Words: Tour de France; Economic Impact; Europe

## INTRODUCTION

Hosting a major international sporting event like the Olympic Games or the FIFA World Cup is a costly endeavor (Zimbalist, 2015). One of the most significant challenges is the demand for resources to build or improve infrastructures such as hotels, airports, roads, transportation and hospitality, and sports facilities (Agha & Taks, 2015; Baade & Matheson, 2016). These expenditures usually exceed the budget significantly (Flyvbjerg et al., 2021; Flyvbjerg & Stewart, 2016), and the sports facilities are typically paid for with taxpayers' money but are often underutilized when the event is over (Alm et al., 2014). Sometimes they are not used at all, as is the case for many of the facilities that were constructed in Greece for Athens to host the 2004 Olympic Games (Guardian, 2014).

Advocates of hosting high-cost events claim that they are beneficial to the local economy (Maennig, 2019). The international media exposure associated with hosting provides invaluable branding (Zimbalist, 2017), attracting tourists and newcomers, which increases employment, economic growth, and thus the tax base (Jakobsen et al., 2013). Although hosting an event can temporarily increase awareness of a city, this interest steadily declines and may not materialize into increased tourism (Ritchie & Smith, 1991). Thus, the revenue stemming from attracting international visitors to the host nation is often lower than expected (Andreff, 2017). Theoretically, no city, region, or country has all the required resources to host a major international sporting event (Agha & Taks, 2015), and few have the capacity (Baade & Matheson, 2016). Therefore, it is almost impossible to achieve the optimal economic impact from hosting them (Agha & Taks, 2015).

Further, because associations like the IOC and FIFA have considerable market power (Andreff, 2012), the competition between applicants leads to a type of auction

where they bid to the point where costs equal benefits (Maennig & Zimbalist, 2012). Because of imperfect information, it is often the most optimistic applicant who wins the bidding, resulting in the winner's curse where costs end up outweighing benefits (Sandy et al., 2004). Thus, the winner would, in many cases, have been better off losing the bid. Therefore, it is likely that most financial resources diverted to these events (Maennig, 2019) could have achieved a more considerable impact if used for other purposes (Késenne, 2005; Taks et al., 2011). Hence, using taxpayers' money to host large-scale events incurs significant opportunity costs for society (Alm et al., 2014; Coates & Humphreys, 2008). In line with this, the consensus among economists is that the overall impact of hosting such events is marginal at best and often negative (Baade & Matheson, 2004b; de Nooij & van den Berg, 2018). For smaller events (Agha & Taks, 2019), the opportunity costs are lower due to the smaller public resource input and the less competitive bidding process (Higham, 1999). So, in contrast, smaller events are more likely to positively impact local economies (Agha & Taks, 2015; Coates, 2012; Daniels & Norman, 2003; Matheson, 2006).

Cycling's hallmark event, the Tour de France, is an example of a major international athletic competition that does not demand large-scale facilities. The race attracts millions of spectators (Rebeggiani & Tondani, 2008) and television audiences of up to 50 million people during important stages (Van Reeth, 2013). Local investment in the event represents a fraction of what it costs to host the Olympics or the FIFA World Cup. As the Tour de France is a large event with relatively low opportunity costs, it could have a positive effect on local economies. Most studies are concerned with measuring the impact of the Olympic Games and FIFA World Cup, which are typically defined as mega-events (for a discussion of what constitutes different event types, see Getz, 2012; Müller, 2015). Other sporting events – with the exception of the Super Bowl – are generally

underexplored in contemporary economic literature (Matheson, 2006), and to date, no academics have investigated the tangible economic impact of the Tour de France.

Applying econometric modeling, we will use the example of the Tour de France to examine whether sporting events can have positive effects on local economies when opportunity costs are foreseeable. The chapter is structured as follows: First, we briefly review the literature on the *ex-post* effects of hosting non-mega sports events. Second, we present the data and the specific estimation techniques. Third, we present the results, followed by a discussion and conclusion focusing on the implications and limitations of our findings.

## LITERATURE REVIEW

Relatively few studies measure the *ex-post* effects of hosting non-mega[1] events by applying econometric modeling, and few investigate classic economic activity parameters such as GDP, income, and employment. However, one that does is a study on Major League Baseball (MLB) All-Star Games from 1973 to 1997 by Baade and Matheson (2001). These authors find that host cities experienced a decline in annual employment of more than 8,000 jobs below what would have been expected without hosting the event. Similarly, Storm et al. (2019) cannot find evidence that hosting a Formula 1 race has positive effects on annual employment or GDP in European regional economies. On the contrary, their estimations even suggest a lagged negative effect on both measures.

Baade and Matheson (2004a) examine the effect of hosting the NCAA college basketball tournament Final Four for men and women, respectively, on the change in annual GDP. While the effects are minor, they are positive when it comes to hosting the women's finals but negative for the men's finals. Using metropolitan statistical area data, Baade and Matheson (2006) investigate how the Super Bowl affects income in host cities. On average, income rises by $92 million, which is significantly lower than the $300-400 million claimed by civic boosters. Their findings are supported by several other studies reporting non-significant effects of hosting the Super Bowl on per capita income (Coates & Humphreys, 2002; Davis & End, 2010).

Because of general fluctuations in regional economies (Baade et al., 2008), it can be challenging to measure the economic 'shock' created by sporting events (Taks et al., 2016), especially smaller events because of their minor production externalities (Agha & Taks, 2019). Thus, to isolate the potential effect of hosting an event, some studies

[1] Most studies are concerned with measuring the effects of hosting the Olympic Games or the FIFA World Cup.

disaggregate the data on a time scale, on the scale of the target variable, on an industry scale, and a regional scale (Feddersen & Maennig, 2013). Studies disaggregating the target variable often use a substitute for the actual parameter of interest related to, for example, the tourism industry, taxable sales, or real estate prices (p. 581). Heller and Stephenson (2021) examine the impact of hosting the Super Bowl across four cities by focusing on daily hotel room rentals, daily room rates, and average daily room revenue. In doing so, they find that the benefits differ substantially across the host cities. At the general level, hosts experience significant increases in room rentals on Super Bowl night and the three nights leading up to the event. However, rentals decrease the four days following the event, and almost 90% of the increases in room revenue during the period can be ascribed to higher room rates. Storm et al. (2019) do not find any significant effect of hosting a Formula 1 race on annual overnight stays in tourist accommodation at the regional level.

Coates and Matheson (2011) examine the impact of hosting the Super Bowl, the Olympics, and the World Cup on rental housing prices. For the Super Bowl, there are indications that inner-city areas may have lower rental rates during the year of the game and in the year leading up to the game, while the outer areas could see an increase in rental rates in the hosting year. However, both the magnitude and the significance of these effects decline when including year-specific effects in their estimations. Coates and Gearhart (2008) investigate whether a NASCAR track or a NASCAR-sanctioned event affects monthly rental rates for residents in the community. Although the evidence is mixed, the results generally refute that having a track or hosting an event results in large benefits (or costs) for the residents.

Other examples of target variables include taxable sales and tax revenue. Baade et al. (2008) use monthly data on taxable sales in Florida to estimate the economic impact

of new stadiums, franchises, and hosting different sporting events, including the finals and All-Star Games of the US Major League Sports and the NCAA college basketball tournament Final Four. Their results are ambiguous. Hence, they argue that hosting can both increase and reduce taxable sales. Similarly, Baade and Matheson (2001) use quarterly county data on taxable sales in California from 1986 to 2000 to examine the economic effect of the MLB All-Star Game. Their analysis of three Californian host cities suggests that hosting the game leads to an average drop in taxable sales of close to $30 million. Coates and Depken (2011) report that having a college football team affects monthly tax revenue positively. They also find positive effects of hosting a Super Bowl or an NBA All-Star Game, but negative effects of hosting an MLB All-Star Game.

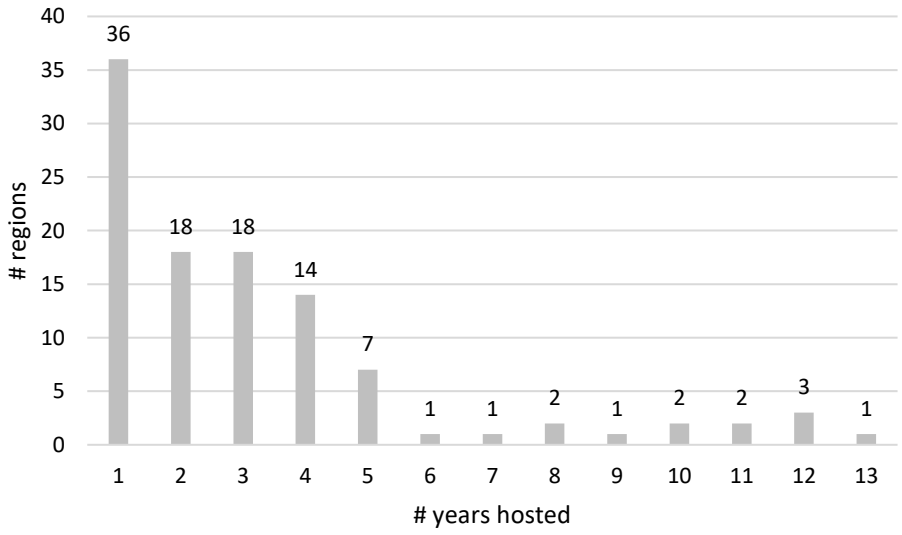
This review indicates that many scholars have focused on American sports in their analyses, with Storm et al. (2019) being the exception. Thus, there is a research gap regarding the effects of large international – but non-mega – sporting events on European economies. This chapter will help to address this gap.

## DATA, METHODS, AND EMPIRICAL MODELS

*Presentation of data*

Inspired by the approach of Storm et al. (2019) in their study of Formula 1, we examine the effect of hosting Tour de France stages on the overall economy and employment in related sectors, applying dynamic panel regressions to regional data from 2004 to2018. Our data contains a balanced panel of 106 regions in France (81), Belgium (12), the Netherlands (4), Spain (3), Germany (3), Italy (2), and Luxembourg (1) with variations in hosting frequency. We include regions that have hosted at least one Tour de France arrival or departure during the period. Thus, we compare the years of hosting with those of not hosting to measure its impact on gross domestic product (GDP) and employment. Of the 106 regions, 36 (34%) have only hosted once during the period, while 13 (12%) have hosted more than five times (see Figure 1).[2]

**Figure 1: Number of years hosted by the number of regions (2004-2018)**




[2] See Appendix, Note 1 for a graphical overview of the regions.

We use annual GDP as the dependent variable to test the (potential) effects of hosting the Tour de France on the region's overall economy. The data are collected from Eurostat (2018) and classified in a hierarchical system (NUTS) from levels 1-3. Level 1 represents 104 'major socio-economic regions', level 2 represents 283 'basic regions for the application of regional policies', and level 3 represents 1,345 'small regions for specific diagnosis'. As the economic activity generated by hosting a Tour de France stage is likely to be small compared to the overall regional economy (Baade & Matheson, 2001), and as we are interested in the highest level of sensitivity, we use level 3 data. Extending the sensitivity argument, high-frequency data – on a monthly, weekly, or daily level – is preferable. Unfortunately, only annual data are available, so we test the effect of hosting the event on yearly GDP disaggregated at a regional scale.[3]

Further, those who advocate subsidizing large sports events typically claim that the events will increase jobs in the local economy (Jakobsen et al., 2013). Therefore, we test whether being a host can have a measurable effect on annual employment in *trade, transportation, accommodation, and food services* (Employment TTAF), which are the industries that are *a priori* expected to benefit the most from hosting. The data cover a population of 697,814 on average, with a standard deviation (SD) of 667,177. Overall, it may be too insensitive to capture minor effects. However, the data power is still likely to catch any (potential) sizeable impact anticipated by event boosters (Storm et al., 2019).

Although they have hosted Tour de France stages, there is no available data from Andorra, Monaco, and Switzerland because they are not a part of the European Union. In addition, information is not available after 2016 for the six English regions that hosted the Tour de France. Moreover, because Paris hosts the Tour de France annually, it is not

[3] We return and discuss the limitations of this in the concluding section.

possible to determine whether any differences between Paris and regions that have not hosted a stage (in a given year) are a result of hosting the event or are due to other differences. Hence, these regions are not included in the analysis. Additionally, we exclude Landes in France because of irregular fluctuations in GDP likely to be caused by an error in the available data. Further, no data exists on Employment TTAF for six regions – three German and three Spanish, including Barcelona. Consequently, these regions are not included in the models estimating effects on Employment TTAF, but they are included in the models assessing the impact on GDP.

*Specifications*

We use regression analysis, a statistical technique to estimate the relationship between a dependent variable and one or more independent variables. In our case, we want to test whether hosting the Tour de France (independent variable) respectively influences *GDP* and *Employment TTAF* (our dependent variables), holding other factors constant. We present four models: Two with *GDP* and two with *Employment TTAF*. [4] If a region has hosted *(Host)* at least one Tour de France stage (arrival/departure) in a given year, it is given the value 1 in that specific year (else 0). Additionally, we include a one-year lag *($Host_{t-1}$)* of the *Host* variable (Jakobsen et al., 2013; Storm et al., 2019) to test whether any effect occurs in the year after hosting. The argument for including a lag is that because the Tour de France runs in July, positive effects on tourism from international media exposure are more likely to manifest during the following year.

To examine the pure effect of hosting a Tour de France stage on our dependent variables, we need to consider other factors that influence *GDP* and *Employment TTAF*. Therefore, to isolate the effect of *Host* and $Host_{t-1}$ we control for these other factors –

[4] Both dependent variables are log-transformed to deal with skewness and kurtosis.

holding them constant – by including them in our models as independent variables. Thus, we include controls expected to be significant drivers of our dependent variables. For *GDP*, we consider *Education*, which is the share of the population aged 25-64 with tertiary education (education beyond high school), expecting a positive sign (a positive effect), as a higher level of human capital should have a positive effect on economic output.[5] In addition, we include the log(*Population)*, arguing that the economic effect of hosting the Tour de France is dependent on the size of the region. For example, it takes more impact to make a significant difference to a large region such as Barcelona, with a population greater than 5 million, than in Lozère, with just over 75,000 inhabitants in 2018 (Jakobsen et al., 2013; Matheson & Baade, 2006). In the *Employment TTAF* models, we control for *Education*, log*(GDP per capita)*, and log*(Population)*, expecting a positive sign. Many of the jobs in *trade, transportation, accommodation, and food services* may not require a tertiary education, and in this case, the regional education level should be less critical. Table 1 represents the descriptive statistics included in the models.

**Table 1: Descriptives statistics, 2004-2018**

| Variable | N | Mean | SD | Minimum | Maximum |
|---|---|---|---|---|---|
| **GDP (in millions €)** | 1,590 | 22,259 | 24,549 | 1,579 | 174,935 |
| **Employment TTAF (1,000)** | 1,500 | 62.69 | 53.03 | 5.24 | 233.20 |
| **Host** | 1,590 | 0.218 | 0.413 | 0 | 1 |
| **$Host_{t-1}$** | 1,590 | 0.216 | 0.411 | 0 | 1 |
| **Education (%)** | 1,590 | 0.292 | 0.072 | 0.103 | 0.584 |
| **Population (1,000)** | 1,590 | 697.81 | 667.18 | 75.78 | 5,518.28 |
| **Employment (%)** | 1,590 | 0.415 | 0.087 | 0.292 | 0.879 |
| **GDP per capita (1,000)** | 1,500 | 28..791 | 10.840 | 18.104 | 108.043 |

[5] *Education* is only available at level 2 and thus covers a larger area, deviating from the educational level at level 3. Nevertheless, it is reasonable to assume that education at level 2 approximates education at level 3.

(This last part of the specifications can be challenging for readers with no or limited knowledge of statistics. However, it is not necessary to read this part to understand our general approach. Thus, please feel free to skip it.)

It is reasonable to assume that regions are not directly comparable due to various unobserved factors. Thus, we present fixed effects (FE) models (with robust standard errors) that control for unobserved time-invariant heterogeneity across units (regions), reducing the risk of spurious relationships (Beck, 2008; Mehmetoglu & Jakobsen, 2017). We therefore include dummy variables for all regions minus one. A Hausman test (1978) confirms that FE are preferable to random effects (RE) for both *GDP* and *Employment TTAF*. Additionally, we include year dummies to account for general economic development. As we examine *GDP* and *Employment TTAF* over time, autocorrelation is a serious concern, which is confirmed by running a range of different tests.[6] However, this consideration can be dealt with by lagging the dependent variable on the right side of the equation (Mehmetoglu & Jakobsen, 2017). Including a lagged dependent variable also functions as a correction for omitted variables in the regression considering historical factors that can otherwise be difficult to quantify (Jakobsen et al., 2013).

One potential problem with using FE with a lagged dependent variable is Nickell bias (1981), as $y_{i,t-1}$ is correlated with the FE in the error term leading to inconsistent estimates, which becomes even more prominent when *T* is small (Roodman, 2009). Therefore, we also present Arellano-Bond estimates (Arellano & Bond, 1991) using moment conditions (Arellano & Bover, 1995; Blundell & Bond, 1998) to remove the bias from the correlation between the fixed effects and the lagged dependent variable[7] by

[6] Wooldridge test for autocorrelation in panel data (Wooldridge, 2002), Arellano-Bond test for AR(1) (Roodman, 2009), and Inoue and Solon (2006) all reject the null hypothesis of no autocorrelation.

[7] We do this by utilising the *xtabond2* command in STATA.

specifying that all available lags of *Y* are used as separate instruments. Running our models, we enter the same variables as for the FE models, including time dummies, which prevent contemporaneous correlation (Roodman, 2009 p. 121).[8]

[8] For a detailed description of the technique, see Roodman (2009).

## RESULTS

None of our four models indicate that hosting a Tour de France stage significantly affects annual *GDP* or *Employment TTAF* regionally. As it appears from Table 2, column one, which represents the estimates for log*(GDP)* regional FE with year dummies, both *Host* and $Host_{t-1}$ have a negative sign. However, they are both non-significant, indicating that hosting a Tour de France stage does not have any impact on annual GDP regionally. This is in line with most of the literature on the subject, which concludes that hosting sports events does not have a positive effect on the overall economy. The control variables, *Education*, log*(Population)*, and *Employment* are all significant at the 1% level. However, while the latter two have the expected positive sign in both models, *Education* has a negative sign.[9]

For *Employment TTAF* in column two, the signs are positive but non-significant for *Host* and $Host_{t-1}$, indicating that hosting does not affect employment in the TTAF sector(s). All control variables have a positive sign, as expected. However, only log*(Population)* is significant (5% level).

[9] It is likely that this is caused by multicollinearity issues. When running the model without yearly dummies, *Education* shifts sign.

**Table 2: Fixed effects estimation of hosting a Tour de France stage on GDP and Employment TTAF**

| | (1) log*(GDP)* | (2) log*(Employment TTAF)* |
|---|---|---|
| *Dependent*$_{t-1}$ | 0.708*** | 0.875*** |
| | (0.026) | (0.035) |
| *Host* | -0.000 | 0.000 |
| | (0.001) | (0.001) |
| *Host*$_{t-1}$ | -0.001 | 0.000 |
| | (0.001) | (0.001) |
| *Education* | -0.103*** | 0.011 |
| | (0.038) | (0.018) |
| *log(Population)* | 0.348*** | 0.099** |
| | (0.048) | (0.047) |
| *Employment* | 0.837*** | |
| | (0.104) | |
| *log(GDP per capita)* | | 0.013 |
| | | (0.013) |
| *Constant* | 0.301 | -0.186 |
| | (0.189) | (0.182) |
| N | 1,590 | 1,500 |
| R-squared | 0.945 | 0.891 |
| Groups | 106 | 100 |
| Yearly FE | YES | YES |

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.10

Applying the Arellano-Bond models in Table 3, *Host* and *Host*$_{t-1}$ remain non-significant with the same signs as in the FE models.[10] The log*(Population)* controls are significant at 1% and 5%, respectively, with the expected sign. *Employment* is significant (1% level) in the GDP model, while no other control variables are significant.[11]

[10] The tests for autoregressive errors suggest that only a first-order autoregressive term should be included. Yet, the test is borderline significant for *GDP* (p-value = 0.114). The Hansen test for over-identifying restrictions indicates that our instrument set is appropriate.

[11] Yet, we note that the number of instruments for log*(Employment TTAF)* surpasses the number of groups, which can lead to (highly) biased estimates (Roodman, 2009, p. 99). Therefore, we have run additional models for robustness that are not presented here. These include OLS, RE, and first differences. We experimented with different transformations and models of the Y and X variables, with and without a lagged dependent variable, yielding similar conclusions. Considering that fans are more interested in the final part of the stage where the race is decided, we also divided the *host* variable and its lag into arrivals and departures but found no significant differences.

**Table 3: Arellano-Bond estimation of hosting a Tour de France stage on GDP and Employment TTAF**

| | (1) log(GDP) | (2) log(Employment TTAF) |
|---|---|---|
| *Dependent*$_{t-1}$ | 0.415*** | 0.747*** |
| | (0.101) | (0.093) |
| *Host* | -0.005 | 0.003 |
| | (0.008) | (0.004) |
| *Host*$_{t-1}$ | -0.014 | 0.003 |
| | (0.010) | (0.003) |
| *Education* | -0.002 | -0.022 |
| | (0.141) | (0.063) |
| *log(Population)* | 0.689*** | 0.286** |
| | (0.173) | (0.124) |
| *Employment* | 1.718*** | |
| | (0.628) | |
| *log(GDP per capita)* | | 0.049 |
| | | (0.080) |
| N | 1,484 | 1,400 |
| Groups | 106 | 100 |
| Instruments | 105 | 105 |
| AB test for AR(1) | -4.95*** | -5.19*** |
| AB test for AR(2) (p-value) | 1.58 (0.114) | -0.09 (0.929) |
| Hansen test for overidentification (p-value) | 91.62 (0.292) | 88.31 (0.382) |

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.10

## CONCLUSION, IMPLICATIONS, AND LIMITATIONS

### *Conclusion*

This paper considers the impact of cycling's hallmark event, the Tour de France, on the overall economy across 106 regions and sector-specific employment across 100 regions, using robust panel data regression techniques on objective data from Eurostat. The results suggest that hosting a Tour de France stage does not have any measurable positive effect on the overall economy. Nor does it have an impact on sector-specific employment in the given year or the following year. These findings support existing research that typically concludes that the effects of hosting sports events are non-existent or even harmful for the economy (Coates & Humphreys, 2008).

### *Implications*

Although our results indicate that effects are non-existent, we cannot exclude that hosting the event can have a minor positive (or negative) effect on the overall economy. However, hosting does not seem to bring with it a general wave of economic activity, as civic boosters claim. Instead, our study indicates that the tangible benefits associated with hosting are negligible at best. It is not that the cost of hosting is substantial, but that the benefits to the economy and employment are marginal.

Therefore, similar to Storm et al. (Storm et al., 2019), the results suggest that stakeholders should turn to other arguments for hosting a large sporting event. Although hosting does not necessarily materialize into increased tourism (Ritchie & Smith, 1991), it can positively affect a city’s public image (Lee, 2014). However, effects might be modest, as was the case for Euro 2000 host cities (Oldenboom, 2008). Hosting sports events can also bring a range of intangible benefits to locals, including increased happiness, social cohesion, collective memory, identity, and prestige (Barget & Gouguet,

2007; Süssmuth et al., 2010). These factors have the characteristics of a public good: They are non-rivalrous in the sense that their supply is unaffected by the level of consumption; they are also non-excludable, meaning that they are available for all citizens to enjoy simultaneously. However, as no market exists for these non-use values, they cannot be measured using traditional market-based approaches by observing behavior in the marketplace. Instead, their economic value to society can be measured using the contingent valuation method where a sample from a given population – it could be a city, region, or country – is surveyed about their willingness to pay for a given project or policy (Bateman et al., 2002). Here, the respondent is asked to make purchasing decisions in a hypothetical market. The value of the specific sporting event for that particular respondent is equal to the amount of money the respondent is willing to give up for hosting the event. The willingness to pay of the sample can then be extrapolated to the population to assess the event's value to society. This has been done for the Giro d'Italia (de Boer et al., 2019) and the Tour of Flanders (Vekeman et al., 2015). This information should ideally be used in a cost-benefit analysis assessing net benefits when all benefits and (opportunity) costs are considered (Késenne, 2005; Taks et al., 2011). However, because cost-benefit analyses are rather costly, it may be unrealistic to implement them as an evaluation tool for events with a relatively modest budget (Davies et al., 2010). Still, from academic and practical points of view, it is highly relevant to gain more knowledge of how sporting events of different types and scales benefit society.

*Limitations*

The primary issue that needs attention in our study is the strength of our data. As pointed out in previous studies, using annual regional-level data to examine the potential effects of (even) a major sporting event is somewhat problematic. Baade, Baumann, and Matheson (2008) argue that the general fluctuations in regional economies make it

difficult to find an effect even for large events in large economies. Agha and Taks (2019) extend this argument, concluding that it is nearly impossible to locate a “tiny event's” effect on a city (p. 398). Although the size of the Tour de France is substantial (and not characterized as a “tiny event”), it is reasonable to assume that the production externalities from the individual stages are small compared to mega-events. Therefore, for larger economies, the impact of hosting is probably comparable to a 'drop in the ocean' (Jakobsen et al., 2013). Although many of the regional economies in our dataset are relatively small, the question is whether it is realistic that a one- or two-day event is enough to impact GDP and employment in related sectors on an annual basis. However, this study examines the impact using the best available data. We believe that using the deployed dataset is a sound approach to dealing with the problem in question, although it may not be entirely sufficient.

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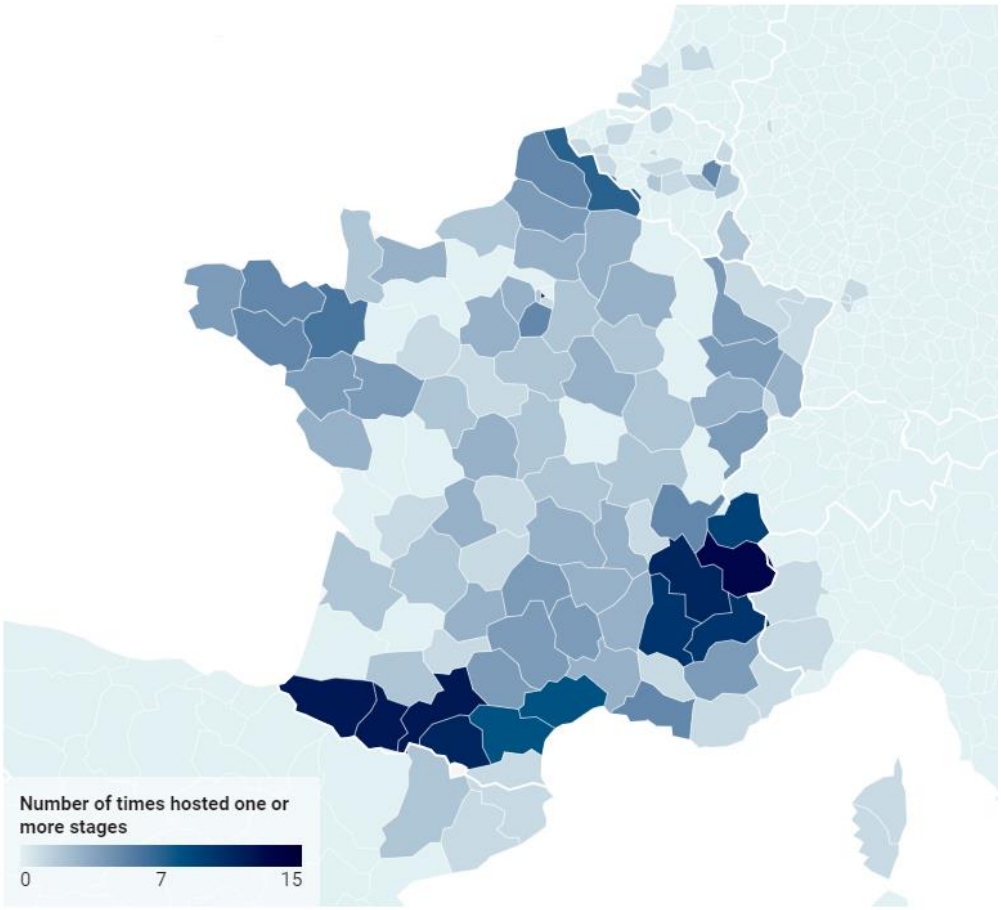
# APPENDIX

**Note 1: Number of years regions have hosted one or more Tour de France stages (2004-2018)**




Stages hosted in the UK, Monaco, Andorra and Switzerland have been excluded.