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"Tourists go home(?)"
Evaluating the Impact of the Sustainable Tourism Tax in the Balearic Islands using a Difference-in-Differences Approach

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Abstract

The resurgence of post-pandemic travel has intensified debates over tourist taxes as a tool to mitigate overtourism's challenges, such as congestion and environmental strain. This thesis evaluates the impact of the 2016 Sustainable Tourism Tax in the Balearic Islands using a Difference-in-Differences approach with the Canary Islands as a control. Results reveal no negative impact on tourist arrivals or length of stay while simultaneously strengthening regional budgets and financing sustainability projects. Lagged spending and occupancy rates emerged as relevant demand factors. The findings highlight the potential of modest, earmarked taxes to balance tourism demand with fiscal and environmental objectives.

Keywords: Overtourism, Tourist Tax, Sustainable Tourism, Difference-in-Differences, Balearic Islands, Tourism Demand

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Introduction

"Tourists go home," a slogan coined by thousands of protesters across Spain in 2024, encapsulates the growing tension between tourism-dependent economies and local communities bearing the burden of overtourism (*BBC News* 2024a). Their discontent rises as global tourism rebounds strongly after COVID-19 with the industry projected to contribute $11.1 trillion, or 10% of global GDP, in 2024, exceeding pre-pandemic levels (World Travel and Tourism Council 2024). Spain, one of the world's top destinations, is especially reliant on tourism, as the sector accounts for 14.5% of national GDP and accommodates over 90 million tourists annually, which is a 5% year-on-year increase projected for 2024 (Ondina 2024).

Among Spain's regions, the Balearic Islands stand out as one example of heavy reliance on tourism. The archipelago recorded 61.7 million overnight stays in 2023, contributing on average over 40% of its direct and indirect GDP between 2016 and 2019 (CaixaBank Research 2024; IBESTAT 2024). The economic importance of tourism is further highlighted in employment and growth metrics. The Balearic Islands had Spain's highest economic growth rate in 2023 at 3.8% with a per capita GDP of €29,600, above the national average (CaixaBank Research 2024). In 2023, the islands hosted 17.9 million visitors, fifteen times the number of permanent residents. However, the rise of the tourism sector has led to significant socio-economic and environmental challenges, including housing shortages, congestion, and infrastructure deterioration (Instituto Nacional de Estadistica 2023).

The United Nations World Tourism Organization (UNWTO) defines the term overtourism as "the impact of tourism on a destination that excessively influences the perceived quality of life of citizens and/or quality of visitors' experiences in a negative way" (World Tourism Organization 2018, 4). This phenomenon is acutely felt in the Balearics, where 50,000 residents in Mallorca and other islands went on the streets in 2024, demanding limits on tourism (*CNN* 2024b). The overuse of public goods without adequate compensation for the societal costs

imposed is a well-documented phenomenon in economic theory and described in a seminal paper by A. C. Pigou (Pigou 1920, 183–203). In the context of tourism, Pigou's theory highlights that such externalities call for policy interventions to preserve economic viability.

In response to this policy issue, the Balearic Government introduced the Sustainable Tourism Tax in July 2016. This Pigouvian-inspired levy aims to mitigate the adverse effects of mass tourism by funding projects that protect natural heritage, enhance local infrastructure, and promote sustainability (mallorcadiario 2015; *Deutsche Welle* 2015). The tax represents a second attempt at such a measure in the Balearics following the Eco-Tax of 2002, which was repealed after just 18 months due to strong industry opposition, poor communication, and opaque revenue spending practices (European Commission 2017; CABI News 2003). Further, tourism numbers declined by one million shortly after its introduction, which was perceived as a direct consequence of the Eco-Tax and led the newly elected conservative government to revoke it in 2003 (Ben Westwood 2003; Garau Taberner and Manera 2006). However, researchers were unable to empirically study the effects of the Eco-tax due to its brief implementation period from May 2002 to October 2003.

So far, the Sustainable Tourism Tax has endured, creating an opportunity to evaluate its effects. Despite initial resistance from the hotel and tourism sectors, the tax has generated consistent revenue allocated toward a special fund, exclusively dedicating its revenues to environmental and infrastructure projects. Nevertheless, its effectiveness remains debated. While some argue that the tax has adverse effects on the tourism industry and economy, others argue that it is not high enough and ignores broader issues, such as the environmental impact of aviation and maritime transport.

While prior studies have examined tourist taxation through theoretical frameworks, such as Computable General Equilibrium (CGE) models and elasticity analyses, these approaches often assume simplified behavioural assumptions (Ihalanayake 2012; Durbarry 2008). Empirical

analyses, particularly those examining island destinations, remain scarce. Moreover, while city-level taxes have been evaluated (Biagi, Brandano, and Pulina 2021), the unique seasonal and ecological constraints of island tourism, coupled with its potentially higher degree of substitutability, warrant further exploration. This research focuses solely on the effect of the occupancy tax on the Balearic Islands[1], as it primarily targets the tourism sector. The tax, paid per adult per day at the accommodation, can be compared across regions. (Government of the Balearic Islands 2016b). The tax design is progressive, meaning the highest amount of four Euros per day is paid in five-star hotels in the high season, whereas hostels only charge one Euro (see Table 1 and 2, Appendix). A 75 percent reduction is applied in the low-season.

This thesis addresses this gap by empirically evaluating the Sustainable Tourism Tax's impact on tourism demand using a Difference-in-Differences (DiD) approach. By comparing the Balearic Islands (treatment group) to the Canary Islands (control group), the study leverages their shared socio-economic characteristics, similar tourist profiles, and comparable infrastructure. The Canary Islands' absence of a similar tax provides a credible counterfactual, enhancing the internal validity of the analysis.

This research is the first to estimate the effects of the 2016 Sustainable Tourism Tax on tourist arrivals and behaviour in the Balearic Islands. It tests three hypotheses well-grounded in the literature and economic models: (H1) the tax reduces the number of tourist arrivals, (H2) it alters tourist behaviour by reducing the length of their stay, and (H3) it positively contributes to regional budgets and sustainability efforts. The findings aim to inform policymakers on the viability of modest, earmarked taxes as tools for managing tourism externalities while sustaining demand.

[1] I will use the term occupancy tax interchangeably with the term tourist tax in this thesis. It is paid at the accommodation and for cruise ships on a per person per day basis. This aligns with the approach in other papers as well as in the media and public communication (European Commission 2017; Borges, Vieira, and Gomes 2020; Cetin et al. 2017; Mills, Rosentraub, and Jakar 2019)

The remainder of this thesis is structured as follows: Chapter 2 reviews the literature on tourist taxation, tourists' willingness to pay, and revenue allocation. Chapter 3 outlines the methodology, including the DiD approach and its application to island tourism. Chapter 4 presents the results, while Chapter 5 discusses their policy implications, drawing comparisons with best practices from other destinations and tourism frameworks. Finally, the conclusion summarises the findings, highlights limitations, and identifies avenues for future research.

Chapter 1: The State of the Art

1.1 Literature Review

The introduction of tourist taxes has been widely studied in academic literature, often with varying conclusions depending on the methodology, geographic context, and assumptions. This chapter combines the theoretical and empirical research on tourism taxes to establish a foundation for analysing the Sustainable Tourism Tax in the Balearic Islands. The literature review addresses three main dimensions: tourists' willingness to pay (WTP), demand elasticity, and the allocation of tax revenues. By integrating these, this chapter aims to highlight the nuances of tourist taxation and identify gaps in the existing research, particularly in the context of ex-post evaluations using real-world data.

Understanding tourists' willingness to pay for additional costs imposed by taxes is one way to predict their potential impact. Surveying 50 sustainability experts in a two-round Delphi survey, Miller (Miller 2001, 357) highlighted the lack of consensus on which stakeholders should bear primary responsibility for achieving sustainable tourism. The findings indicated that experts placed greater emphasis on the role of national governments while attributing less responsibility to individuals or local governments. Empirical studies across various contexts suggest that tourists generally show low to moderate willingness to pay additional taxes. For example, a study in the Algarve region demonstrated that classic "sun and beach tourists" show low willingness to pay for an earmarked accommodation Tax, with only 15% willing to pay at all

(do Valle et al. 2012). They also showed that tourists with higher environmental awareness and education levels are more likely to support taxation policies when funds are earmarked for sustainability projects (do Valle et al. 2012; Patricia Pinto 2015). Another WTP study from Andalusia found opposing results, in which only 25% of interviewees stated they would not visit in case of a tourist tax (Durán-Román et al. 2021). In line with other research, it highlighted the importance of communicating the purpose of the tax, which increased tourists' WTP. However, the predictive reliability of WTP studies is often questioned due to the well-documented value-action gap, which can limit the applicability of such findings (Juvan and Dolnicar 2014; Loomis 2014).

To address this, demand elasticity analyses offer a complementary perspective by estimating how price changes influence actual tourist behaviour. Generally, they reveal that tourists' responses to price changes vary significantly depending on their income levels, type of destination, and the perceived value of the trip. For instance, research in the Balearic Islands in early 2000 estimated that a €1 tax would reduce demand by approximately 1.44% or around 117.000 tourists, with German and British tourists being the most affected (Aguiló, Riera, and Rosselló 2005). Another dynamic panel data model estimated short- and long-run price elasticities of 0.76% and 1.65%, respectively, for the Balearic Islands, indicating price sensitivity in tourism demand (Garín-Muñoz and Montero-Martín 2007). However, they could not find any significant effect of the previous eco-tax on demand. A similar study about the Balearic Islands by Rosselló and Sansó (Rosselló and Sansó 2017) suggested an expected reduction of 0.4% to 0.8% under two different elasticity scenarios, supporting the notion that tourism demand in island destinations is somewhat elastic at a moderate level. However, elasticity varies across contexts. Studies in the Maldives and Spain have shown that particularly budget-conscious travellers from neighbouring countries are more sensitive to price increases and are more likely to alter their travel behaviour in response to new taxes (Adedoyin et al.

2023; Gago et al. 2009). Similarly, research in Florida found that tourist taxes disproportionately affected domestic travellers, while international visitors remained slightly more inelastic (Mills, Rosentraub, and Jakar 2019). These studies highlight the critical role of price elasticity in shaping tourist behaviour. While various papers underscore the variation of price sensitivity across destinations and tourist profiles, the Balearic-specific findings suggest that even modest taxes could influence demand, albeit to a moderate extent.

Moreover, while price elasticity evaluates how tourists respond to tax rates, the success of tourist taxes also depends heavily on how revenues are allocated and communicated. In Italy, research on tourist taxes in Florence, Padua, and Rome demonstrated that the absence of adverse behavioural responses was partly attributable to clear communication about the intended use of revenues (Biagi, Brandano, and Pulina 2021). In Pahang, Malaysia, foreign tourists who were aware of the tax and perceived it as fair were also more likely to accept it without changing travel plans. They saw it mainly as a necessary contribution to maintaining the quality of the destination as long as the tax is used for environmental projects and infrastructure improvements (Mohd Asri Mohd Ali et al. 2018). Another case study in Hawaii found that earmarked funds for infrastructure projects contributed to long-term sustainability without deterring visitors (Mak and Nishimura 1979). Policymakers could foster greater acceptance of tourist taxes by ensuring transparent allocation mechanisms and regular reporting to stakeholders. However, poorly implemented earmarking can undermine public trust and jeopardise policy success. The initial iteration of the Balearic Islands' Eco-Tax in 2002 faced strong opposition due to unclear spending priorities and opaque decision-making processes, ultimately leading to its repeal (European Commission 2017; Garau Taberner and Manera 2006). These examples highlight the dual importance of effective policy design and transparent communication in ensuring the success of tourist taxation.

Despite the breadth of research on tourist taxes, several limitations persist. Most existing demand elasticity studies rely on theoretical models, such as Computable General Equilibrium (CGE) simulations, to predict the effects of taxes on demand. While these models provide valuable insights, they often rest on strong assumptions about price elasticity and homogenous behavioural responses, which may oversimplify the complexities of tourism markets. For instance, CGE models typically assume constant responsiveness across all tourist segments, ignoring variations in preferences, loyalty and education. Additionally, these models sometimes do not account for exogenous influences, such as economic anomalies, which can alter demand patterns (Rosselló and Sansó 2017). There is a growing recognition of the need for ex-post evaluations that analyse real-world data to capture actual behavioural responses to tax policies. Recent studies, such as those by Biagi et al. (Biagi, Brandano, and Pulina 2021) and Villegas et al. (Villegas, Del Carmen Delgado, and Cardenete 2024) demonstrate the potential of empirical methods to provide actionable insights.

This thesis contributes to the literature by addressing three gaps in the research. Specifically, it (1) evaluates the 2016 Sustainable Tourism Tax in the Balearic Islands, (2) examines its impact on tourist arrivals using real-world data in an island context, and (3) investigates tourists' behavioural responses to an earmarked taxation policy.

1.2 Negative Externalities of Tourism

As the introduction notes, tourism as an economic activity generates substantial negative externalities, implying that the consumption level exceeds the socially optimal threshold. In practice, this results in tourists interacting with the local environment in ways that impose unintended costs on the local population without compensating for the social harms incurred (Azzurra Rinaldi 2014; Pigou 1920). Crucially, these third-party costs are external to market prices, meaning they are not factored into the financial transactions of tourism services.

It is important to note that this analysis focuses primarily on local externalities. Beyond local impacts, tourism is also linked to global externalities, such as CO2 emissions from the aviation sector (Hannah Ritchie and Max Roser 2024).

Examining the local externalities caused or contributed by tourists, a pronounced problem for southern regions and islands is the water usage by the tourism industry (Pérez et al. 2020), particularly in the dry summer months. Some Spanish regions, such as Andalusia, imposed water restriction measures or declared a state of emergency as Catalonia did in February 2024 (Generalitat of Catalonia 2024). Leveraging data collected during the COVID-19 pandemic, one study estimates that the tourism sector accounts for 24.2% of total direct and indirect water consumption in the Balearic Islands (Garcia et al. 2023). Tourist-heavy regions experienced a 58% reduction in water consumption, underscoring tourism's substantial impact on local water supplies (Garcia et al. 2023). This is also because tourists use, on average, three to eight times the amount of water local residents need, depending on the study as well as the type of tourism (Cruz-Pérez et al. 2022; Florido-Benítez 2024; Tirado et al. 2019; Instituto Nacional de Estadistica 2020) .

Another issue is the heavy increase in rent prices, especially in the last decade. While Spain experienced an increase in rental prices averaging 78% in the last 10 years, the Balearic Islands had the highest increase of all Spanish regions, with a staggering 158% average rise from 2014 to 2024 (Fotocasa 2024). In 2014, Balearic residents had to pay an average of 562 Euro per month to rent an 80 m2 home, which surged to an average of 1,451 Euro per month in 2024 (Fotocasa 2024). This is due to the proliferation of platforms like Airbnb, reducing the housing supply (Benítez-Aurioles 2020) and foreigners buying second homes on the islands, constituting one-third of the buyers now and purchasing, on average, more expensive properties (Garriga 2023). Furthermore, tourism contributes to an outsized burden on local waste management systems, with per capita waste generation of 684 kilograms in the Balearic Islands

far exceeding the national average of 470 in 2019 (Rezero - IBESTAT 2021). Regarding pollution, the transportation sector, especially air and maritime transport, remains the leading source of greenhouse gas emissions in the Balearic Islands. In 2019, the transport sector accounted for 42% of total emissions on the islands, underscoring the environmental burden associated with mass tourism. Notably, two-thirds of the emissions from the transportation sector are attributed to air and maritime transport (Direcció General d'Energia i Canvi Climàtic, Govern de les Illes Balears 2022), reflecting the high reliance on these forms of mobility. These transportation activities contribute to CO2 emissions and exacerbate air, water and noise pollution, negatively impacting both the natural environment and local quality of life.

To summarise, while the tourism industry is a significant driver of economic growth and employment, it is also responsible for substantial negative externalities in the Balearic Islands. These findings reinforce the rationale for implementing an earmarked tourist tax by the local government, facilitating the internalisation of at least some of the negative externalities generated by tourism activities. Since it is earmarked for sustainability projects, it directly tries to remedy the social costs caused.

1.3 Hypotheses

This thesis investigates the impact of the Sustainable Tourism Tax in the Balearic Islands by testing three hypotheses derived from the literature review and the discussion of negative externalities. These hypotheses reflect the anticipated effects of tourist taxation on demand, behaviour, and fiscal and revenue contributions.

Hypotheses:

H1: ***The introduction of a tourist tax in the Balearic Islands will reduce the number of tourists.***

*H2****: The tourist tax will lead to reductions in the average duration of stay.***

H3: ***The tourist tax will generate positive fiscal impacts by supporting regional budgets, financing infrastructure, and advancing sustainability efforts.***

The first hypothesis builds on existing studies, such as Aguiló et al. (2005) and Garín-Muñoz et al. (2007), which predict moderate reductions in tourist arrivals due to price sensitivity. These findings align with economic theory, which suggests that increased costs typically reduce demand, especially for price-sensitive segments. The second hypothesis examines a claim frequently raised by the tourist industry. Due to the daily levy, they feared that tourists who only have a fixed budget may adjust their behaviour in response to cost increases and reduce the duration of their stays. The third hypothesis explores the fiscal implications of the tax, emphasizing its role in supporting sustainability initiatives and regional infrastructure. The effectiveness of the tax depends on its ability to generate sufficient revenue to offset administrative costs and fund impactful projects. Drawing on previous findings about earmarked revenues (Durán-Román, Cárdenas-García, and Pulido-Fernández 2021), this study will assess the share of the tax within the regional budget and analyse its allocation.

Chapter 2: Theoretical Framework

2.1 Difference-in-Differences Methodology

This research evaluates the impact of the Sustainable Tourism Tax introduced in the Balearic Islands in July 2016 using the Difference-in-Differences (DiD) approach. This statistical method is widely employed in policy analysis to estimate causal effects by comparing changes in outcomes over time between a treatment group (Balearic Islands) and a control group (Canary Islands) that did not implement the tax. This section explains the feasibility of using the DiD approach and why it is a suitable method for the thesis.

The DiD method accounts for time-invariant differences between the Balearic and Canary Islands, strengthening the Canary Islands' validity as a counterfactual. Additionally, DiD controls for external shocks, such as economic crises or geopolitical changes, by isolating shared influences on both regions and focusing on relative changes in tourist arrivals.

The approach also enables an assessment of whether the tax led to changes in tourist arrivals or behaviours, such as shorter stays or reduced spending. This offers policymakers valuable insights into the tax's implications for balancing tourism demand with sustainability objectives. Unlike simple before-and-after comparisons, DiD creates a reliable counterfactual by leveraging differences between treated and untreated regions.

Both the Balearic and Canary Islands are popular tourist destinations with similar profiles in terms of tourist infrastructure, visitor demographics, and economic dependence on tourism. For example, they have very similar source countries, with both receiving consistently around 50% of their tourist groups from the UK and Germany, followed by mainland Spain (Graph 4 and 5, Appendix). The two island groups share a comparable jurisdictional framework, operating under Spanish tourism regulations and funding structures, ensuring a similar policy environment. They are also both affected by similar external factors, such as economic conditions in source markets, currency exchange rate fluctuations, and geopolitical shifts, influencing tourism patterns. By choosing the Canary Islands as a control, the analysis controls for these shared external shocks, ensuring that the comparison between the Balearic and Canary Islands isolates the effect of the tourism tax.

Finally, monthly data availability for both regions is consistent across the two regional statistical offices, IBESTAT (Instituto de Estadística de las Islas Baleares) and ISTAC (Instituto Canario de Estadística), allowing for an accurate comparison across relevant variables. For the analysis, this thesis uses monthly data from January 2014 until February 2020, which the statistical agencies publicly provided. To include concerns of serial correlation in the error terms and better robustness of the approach this study only uses clustered data on the island group level and not on individual islands (Angrist and Pischke 2009, 237–39).

2.2 Parallel Trends Assumption

The parallel trends assumption states that, in the absence of treatment (i.e., the tourist tax), the difference in tourist arrivals between the Balearic Islands (treatment group) and the Canary Islands (control group) would remain constant over time. In other words, any differences in tourist arrivals observed after the tax implementation can be attributed to the tax, provided this assumption holds.

The Balearic Islands show significant seasonality, with pronounced peaks in the summer months, reflecting a highly seasonal tourism pattern (Graph 2, Appendix). This is due to geographical and climatic factors that make the Balearic Islands a more seasonal destination. Conversely, the Canary Islands have a more stable pattern throughout the year, with less dramatic seasonal fluctuations, due to a milder climate, attracting a steady flow of tourists. Seasonal differences may raise questions about the validity of the parallel trends assumption, so a pre-trend regression and visual evaluation was conducted to validate it.

The results of the pre-trend regression confirm the validity of the approach and show that the two island groups were subject to similar trends before the implementation of the tax. The timeframe of two and a half years before the implementation is seen as appropriate in the literature (Angrist and Pischke 2009, 178, 194; Goodman-Bacon 2021, 255–56; Mora Villarrubia and Reggio 2019, 12, 41). The Treatment Effect for the Balearic islands was positive but not statistically significant, suggesting no meaningful difference in average tourist arrivals before the tax. The time variable was also not statistically significant, meaning there was no observable trend in tourist arrivals over time for either group before the tax. These results indicate that the two groups had no statistically significant differences in tourist arrival trends before the intervention. To illustrate this visually, I plotted the trend lines for each island group, showing that they overlap (see Appendix, Graph 3). This means that had the tax not been introduced, we would expect both islands to continue following these similar trends. Moreover, the regression analysis includes monthly dummy variables in the fixed-effects model to account

for the seasonal differences in the DiD analysis. These controls ensure that natural fluctuations due to seasonality are accounted for, isolating the tax's effect on tourist arrivals. Although seasonality might still create some noise, the monthly controls significantly mitigate its impact, making the analysis more robust.[2]

In summary, the Canary Islands fulfil the necessary conditions for a valid DiD analysis, including parallel trends, comparable socio-economic characteristics, and the absence of tourist taxes in the control group during the study period. These factors make the Canary Islands an effective control group, allowing the analysis to evaluate the impact of the tax.

Chapter 3: Methodology

3.1 Model Specification

To evaluate the impact of the Sustainable Tourism Tax on the Balearic Islands, this thesis employed a Difference-in-Differences (DiD) model using monthly panel data from January 2014 to February 2020. The following fixed-effects regression model was used to assess the effect of the tax:

$$\begin{aligned}\text{Tourist Arrivals}_{it} = {} & \beta_0 + \beta_1 \text{interaction}_{it} + \beta_2 \text{posttax}_{it} + \beta_3 \text{lagged\_spending\_12}_{it} \\ & + \beta_4 \text{lagged\_occupancy\_12}_{it} + \beta_5 \text{CPI\_Base\_2021}_{it} \\ & + \beta_6 \text{Exchange\_Rate\_Pound\_To\_Euro}_{it} + \beta_7 \text{Average\_Length\_Stay}_{it} \\ & + \alpha_i + \delta_t + \epsilon_{it}\end{aligned}$$

Where:

- $Tourist\_Arrivals_{it}$: Number of tourists arriving in region i at time t.
- $Interaction_{it}$: Interaction term for treatment ($treatment_i = 1$) and post-tax period ($posttax_i = 1$). This captures the effect of the tax on tourist arrivals.

[2] I also performed another robustness test by simulating a pseudo-treatment period, assuming that the tourist tax was introduced in January 2014 instead of the actual introduction in July 2016. It indicated no significant difference in tourist arrival trends between the Balearic and Canary Islands during the pseudo-treatment period (2014 onwards). The insignificance of this term suggests that the model does not falsely detect a treatment effect when no such intervention occurs. For more information, please consult the Appendix.

- $posttax_{it}$: A dummy variable that equals 1 for all periods after July 2016 for both regions, to control for any time effects post-tax.
- α_i: Fixed-effects for each island group, controlling for region-specific, time-invariant characteristics.
- δ_t: Time-fixed effects, controlling for monthly shocks that could affect both regions, such as global events.
- ϵ_{it}: Error term.

Control Variables:

- $lagged\_spending\_12_{it}$: The 12-month lagged daily average spending, controlling for past economic conditions influencing tourist behaviour.
- $lagged\_occupency\_12_{it}$: The 12-month lagged occupancy rate, controlling for historical tourism patterns, inertia and accommodation availability.
- $CPI\_Base\_2021_{it}$: Consumer Price Index (CPI) for each region, indexed to base year 2021, capturing inflationary changes at the island group level.
- $Exchange\_Rate\_Pound\_To\_Euro_{it}$: The exchange rate, as the UK is a major tourist market for the regions.
- $Average\_Length\_Stay_{it}$: Average length of stay in days, used to assess any behavioural adjustments in tourist duration of visits.

3.2 Data and Variables

This thesis adopts a simple model to avoid overfitting and multicollinearity, identified through Variance Inflation Factor testing. For example, variables like Hours of Sunshine were excluded due to multicollinearity issues. Moreover, it omitted other variables because of negligible explanatory power due to large confidence intervals and p-values such as the local unemployment rate, likely subject to reverse causality, along with real disposable income per capita and the CPI in Germany and the UK. The data suggest that economic conditions in major tourist-origin countries had limited influence on overall tourist arrivals, despite their substantial share (Graph 4 and 5, Appendix), contrary to results in other studies that found a correlation using the CPI and GDP per capita numbers of Germany and the UK (Garín-Muñoz and Montero-Martín 2007). The relatively stable economic conditions in Germany and the UK between 2014 and 2020 likely contributed to the limited variation in the data, contrary to the

time of the study by Garín-Muñoz et al., which included the economic crisis in 2000-2001. This thesis purposefully excludes the COVID-19 period which started to materialize in March 2020 in order to avoid pandemic related distortions. Below, I briefly introduce the included variables and their theoretical relevance.

The interaction term is the key variable of interest and allows us to measure the impact of the tourism tax. Lagged spending and occupancy rates, each with a 12-month lag, are included to capture historical tourism dynamics, reflecting the gradual adaptation of tourist behaviour to tax changes. The inclusion of the occupancy rate aims to assess whether tourists exhibit loyalty to specific destinations, returning annually as part of established traditions. The inclusion of these two variables allows the analysis to test whether the tax induces a lagged behavioural change, such as the length of stay or occupancy rates. The Consumer Price Index, with its base year in 2021, controls for inflation that could influence spending power. This variable controls for the supposition that increases in destination costs may prompt tourists to seek alternatives where their purchasing power remains stable. The Exchange Rate from Pound to Euro reflects the relative purchasing power of tourists from the UK, a major tourism contributor. As tourists from the UK experience fluctuating purchasing power, they might look for holiday options with more favourable exchange values. The variable Average Length of Stay is included to assess whether tourists adjusted their behaviour in response to the tax by shortening their visits, a concern tour operators warned about.

Chapter 4: Results

4.1 Regression Results and Analysis

As shown in section 1.4, this analysis tests three hypotheses: (H1) the tourist tax will reduce the number of tourists in the Balearic Islands; (H2) the tourist tax will lead to reductions in the average duration of stay; (H3) the tourist tax will generate positive fiscal impacts by supporting regional budgets, financing infrastructure projects and advancing sustainability efforts.

Hypotheses 1 and 2 are directly evaluated through the regression model, while Hypothesis 3 is explored in Chapter 4.2 through an analysis of realised projects and budgetary data.

Table 1: Results of the Difference-in-Differences Fixed-Effects Regression Analysis

Variable	Coefficient	Std. Error	p-value	95% Lower CI	95% Upper CI
interaction	163394.7	12072.88	0.047**	9994.22	316795.0
posttax	-10999.5	250241.0	0.980	-36298.3	360693.0
lagged_spending_12	3257.268	127.5568	0.025**	1636.083	4878.453
lagged_occupancy_12	47522.11	195.046	0.043**	25464.3	69579.92
CPI_Base_2021	-7761.478	27836.34	0.820	-33612.8	18089.85
Exchange_Rate_Pound_to_Euro	-63999.82	291.638	0.710	-173847	45947.6
Average_Length_Stay	8131.048	25467.29	0.320	-315461	331273
Model Statistics					
Observations		124			
Within R^2		0.3940			
Overall R^2		0.8910			

Notes: *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.10$. Standard errors are robust and clustered by island ID.

While this finding highlights the complexity of real-world decision-making in tourism markets, it suggests that the Balearic case deviates from the literature. One plausible explanation is the Balearic government's reinvestment of tax revenue into sustainability initiatives, which may have enhanced the region's appeal and capacity. Further, other factors, such as destination loyalty or the relative insignificance of the tax compared to total trip costs may mitigate the expected deterrent effect. Indeed, both lagged spending and lagged occupancy rates (lagged by 12 months in order to investigate year on year changes) are statistically significant ($p = 0.025$ and $p = 0.043$, respectively) and positively associated with current tourist arrivals. These findings suggest that tourists are influenced by their previous experiences, which act as drivers of loyalty and repeat visits, a result supported by Garín-Muñoz and Montero-Martín (2007). This loyalty dynamic and economic strength may also explain why spending patterns were unaffected by the tax, as higher-spending tourists are often less price-sensitive and willing to absorb minor cost increases (Williamson 2021; Adedoyin et al. 2023). The Balearic Islands, with their established reputation and infrastructure especially designed for individuals from the German and UK market, may benefit from this stickiness in demand. That the post-tax dummy variable, representing the overall effect of the tax across both island groups, is negative but

statistically insignificant (p = 0.980) confirms the suspicion that the tax did not independently drive changes in tourist numbers. Consequently, Hypothesis 1 is not supported by the data, as no evidence suggests a decline in tourist numbers following the tax's implementation.

In terms of Hypothesis 2, the regression results show no evidence that the tax led to significant reductions in the average duration of stay. The coefficient for the average length of stay variable is positive but statistically insignificant (p = 0.320), indicating that tourists did not shorten their visits in response to the tax. This finding further challenges conventional assumptions about price sensitivity and behavioural adjustments in tourism markets. While economic theory suggests that higher costs might prompt changes in vacation time, such as shorter stays to save on the per day tax, the modest magnitude of the tax appears insufficient to influence decision-making on this dimension. Instead, tourists may perceive the additional cost as negligible relative to the overall cost of their trip. The average daily spending on the Balearic Islands was around 131 Euro per day from 2016 to 2020 (IBESTAT - Institut d'Estadística de les Illes Balears 2024a). Using calculations by Roselló and Sansó (Rosselló and Sansó 2017, 166) and extrapolated to the increased tax in 2018, *ceteris paribus*, the weighted average tax burden during the high season is 2.50€ compared to 1.25€ before. This equals roughly a 1.9% cost increase per day, suggesting that this amount was not sufficient to impact holiday decisions.

Economic indicators, including the Consumer Price Index (CPI) and the exchange rate (Pound to Euro), were not significant determinants of tourist arrivals during the study period. Both variables had negative coefficients (CPI: p = 0.820; exchange rate: p = 0.710), suggesting that inflation or unfavourable exchange rates may have marginal impacts on arrivals. However, their high p-values indicate that other factors play a more prominent role in shaping demand. This aligns with the observation that tourism in the Balearic Islands appears somewhat resilient to short-term economic fluctuations, particularly during periods of relative economic stability in key origin markets such as Germany and the UK.

The model's within R^2 of 0.394 indicates that the independent variables explain approximately 39.4% of the variation in tourist arrivals within the two islands over time. In contrast, the overall R^2 of 0.891 captures the variation across all observations, both within and between islands. The discrepancy between these R^2 values reflect differences between the treatment and control groups, such as seasonality patterns and unique economic conditions, which are controlled for using fixed-effects.

Finally, although Hypothesis 3 is not directly tested in this section, the results provide indirect support for its claims. The stability in tourist arrivals, combined with significant lagged spending and occupancy rates, suggests that the tax has not disrupted tourism demand and may have positively contributed to regional fiscal health. By sustaining tourist flows, the tax likely bolstered revenue streams earmarked for sustainability initiatives and infrastructure investments. From a policy perspective, the findings challenge the assumption that tourist taxes inherently deter demand. Instead, they suggest that modest, well-designed taxes can serve as effective tools for generating fiscal revenue without adversely affecting tourism markets, particularly in destinations with a loyal visitor basis. The results show that the introduction of the Sustainable Tourism Tax did not reduce tourist numbers (contrary to Hypothesis 1) or shorten the average duration of stay (contrary to Hypothesis 2). These results reflect the resilience of tourism demand in the Balearic Islands and highlight the potential for modest fiscal measures to support regional sustainability efforts without deterring visitors.

4.2 Fiscal Impact and Revenue Allocation

Hypothesis 3 states that the Sustainable Tourism Tax generates positive fiscal impacts by supporting regional budgets and financing infrastructure and sustainability efforts. This section evaluates the hypothesis by analysing the Balearic Islands' fiscal limitations, examining the tax's contributions, and addressing criticisms of its allocation.

Spain's centralized taxation system limits the fiscal autonomy of its regions, including the Balearic Islands. Major taxes, such as VAT and income tax, are collected federally and redistributed through a funding mechanism (Zárate Marco and Vallés Giménez 2019; Foremny 2024). Consequently, the region relies heavily on federal support, with over 75% of its €5.64 billion budget in 2019 from shared national taxes and EU transfers ((Consell de Govern de les Illes Balears 2019). Complementing this fixed tax regime, the tourism tax has emerged as a critical tool for increasing fiscal flexibility. While it contributed only 2.3% to the overall budget in 2019, it represented approximately 45% of the region's own revenue sources such as administrative related fees, giving control over its collection and allocation (Consell de Govern de les Illes Balears 2019).

This thesis examines the impact of the tourist tax from its introduction in July 2016 to February 2020. Statistical data from the tourism agency for 2016–2019 indicate that €133 million in tax revenue was allocated to and executed through 345 projects (Agència d´Estratègia Turística de les Illes Balears 2019). These included investments in coastal restoration, renewable energy, and water management infrastructure, aligning with the tax's original objectives to address the environmental externalities of tourism (Agència d´Estratègia Turística de les Illes Balears 2019). Transparency was an important pillar of the tax, with project descriptions publicly accessible online. However, advocacy groups such as Amics de la Terra Mallorca and GOB Mallorca have raised concerns about resource allocation. They argue that the fund occasionally supports projects that deviate from the tax's sustainability focus, including a metro line extension in Palma and tourism promotion campaigns (Amics de la Terra Mallorca 2017; GOB Mallorca 2021). These criticisms are intensified by an imbalance in project priorities: only 20 initiatives were directed toward heritage conservation and land preservation, areas central to sustainable tourism (Majorca Daily Bulletin reporter 2019). The government received more criticism in 2022 when it approved a proposal requiring at least 25% of the tax revenue to be

allocated to housing policies (Ede 2022). While housing investments address pressing social issues, such as rising rents exacerbated by tourism (see chapter 1.3), this expansion could get in conflict with the tax's original purpose, advocacy groups argued. Adding to these challenges, transparency in reporting has diminished over time. While comprehensive data on funded projects was published until 2019, subsequent statistical updates in the statistical database have been sparse, raising concerns about accountability (Agència d´Estratègia Turística de les Illes Balears 2024). This lack of clarity may erode public trust, particularly as the scope of tax-funded projects expands beyond environmental and infrastructure initiatives (Majorca Daily Bulletin reporter 2024).

In conclusion, the tourism tax has proven significant for the Balearic Islands' fiscal autonomy and sustainability objectives, supporting projects that directly address tourism-related externalities. However, criticisms regarding fund dilution and transparency highlight the need for robust governance frameworks.

While Hypothesis 3 finds support in the tax's contributions to regional budgets and investments, future efforts must ensure that allocations remain aligned with the tax's core purpose. Balancing socio-economic and environmental priorities will be crucial to maintaining the tax's credibility and effectiveness long-term.

Chapter 5: Discussion and Policy Implications

5.1 Evaluating the Success of the Policy

The findings of this thesis reveal that the Balearic Sustainable Tourism Tax had no effect on tourist arrivals and the average duration of stays. This indicates that the tax successfully avoided significant economic distortions, countering concerns from the hotel and tour operators' industries that it might drastically reduce tourist numbers or hinder economic development. From an economic perspective, this demonstrates that the tax was modest enough not to deter

demand, a positive outcome for policymakers seeking to balance fiscal needs with tourism sector growth.

However, while the tax generates consistent revenue for the regional government, its corrective function, internalising the negative externalities of overtourism, seems less effective. The revenue, while earmarked for infrastructure and environmental projects, is likely insufficient to fully offset the social costs of overtourism, such as congestion, pollution, and overuse of public goods. This underscores a common challenge with Pigouvian taxes: determining the optimal tax level that fully internalises externalities without creating equity concerns.

5.2 Rethinking Tourism Frameworks

A further complication lies in potential equity concerns. Budget travellers, for whom the tax represents a relatively higher share of their expenses, may be disproportionately affected and discouraged, potentially crowding them out in favour of more affluent tourists. This, paradoxically, could exacerbate environmental pressures, as higher-spending tourists often consume more resources, such as water and imported goods. Additionally, the tax focuses on local externalities, leaving global issues such as aviation and cruise ship emissions unaddressed. Addressing these broader impacts requires innovative solutions, such as new technologies that help decarbonize travel or reassessing the socially optimal level of tourism activity.

Given the limitations of the Pigouvian tax to counteract overtourism, emerging frameworks like **regenerative tourism** offer an intriguing alternative. Unlike sustainable tourism, which aims to minimise harm, regenerative tourism generally seeks to create net positive impacts by enhancing the "regenerative capacity of ecosystems and communities" (Bellato, Frantzeskaki, and Nygaard 2023, 1043). For destinations like the Balearic Islands, where resources and ecosystems are already under significant strain, this paradigm shift could represent a more viable long-term approach. This new paradigm challenges the conventional pursuit of endless tourism growth, recognising that finite resources and increasingly stressed ecosystems require

more than incremental solutions. By reimagining tourism not just as an economic driver but as a contributor to the well-being of local communities and ecosystems, policymakers and stakeholders could create a path that balances economic development with environmental and societal resilience.

One example of regenerative policies are the Faroe Islands that demonstrate the potential of how innovative, community-led initiatives can foster regenerative tourism. Their "Closed for Maintenance, Open for Voluntourism" program dedicates one weekend per year to environmental restoration projects, closing popular sites on the islands for tourists. By inviting foreign volunteers to participate alongside local residents (Sharpley and Telfer 2023; Visit Faroe 2024), this initiative not only mitigates the environmental footprint of tourism and implements restoration projects, but also fosters a sense of shared responsibility and connection between visitors and the local community. While these two measures only scratch the surface of potential options for policymakers, they exemplify a potential future pathway for destinations grappling with overtourism.

5.3 Policy Implications for the Balearic Islands

For the Balearic Islands, elements of these approaches could inform future policies. While a direct replication of the regenerative tourism approach or vastly increasing the tax may not fully align with the region's tourism profile and economic dependence, implementing higher, progressive tax rates, particularly for luxury accommodations in which customers tend to be price inelastic, could help balance revenue generation with equity concerns. Similarly, community-led initiatives inspired by the Faroe Islands could enhance local engagement and environmental education and preservation, ensuring that tourism directly benefits residents.

By reimagining tourism not just as an economic driver but as a force for ecological and social resilience, policymakers can move towards a model that harmonises growth with sustainability. While the Balearic Sustainable Tourism Tax represents a step in the right direction, it also

highlights the potential need to shift from incremental changes to more holistic approaches. Expanding the framework to incorporate regenerative principles could position the Balearic Islands as a leader in sustainable tourism innovation, offering a blueprint for other destinations grappling with similar challenges.

5.4 Limitations and Further Research

This study acknowledges several limitations that arise from the chosen methodology, control group, and specific circumstances. First, the application of a Difference-in-Differences (DiD) approach, while widely used, is vulnerable to omitted variable bias. Although the research was informed by existing tourism studies and relevant control variables were included, some unobserved factors, such as region-specific shocks, marketing activities, or shifts in travel patterns, remain. Additionally, the validity of the findings relies on the parallel trends assumption, which assumes that the Canary Islands provide an appropriate counterfactual for the Balearic Islands. While robustness checks were conducted, the possibility of unique circumstances affecting the control group that were not fully accounted for cannot be ruled out, potentially affecting internal validity. Another limitation is the focus on short- to medium-term effects. The timeframe from 2014 to 2020 may not adequately capture the cumulative, long-term impacts of the Sustainable Tourism Tax, such as changes in tourist loyalty. Extending the timeframe of the analysis could provide valuable insights into whether the observed effect persists over time. The findings are also context-specific and may not be fully generalisable to other regions or types of tourist taxes. The unique characteristics of the Balearic Islands, such as their heavy reliance on two countries (Germany and the UK) and their established reputation, may limit the external validity of the results. Destinations with a different tourism base or higher degree of substitutability may show different responses to similar tax policies. Future research could address these gaps by replicating the analysis in other destinations or exploring heterogeneity among different tourist groups.

Despite these limitations, the methodology employed in this study provides robust insights into short-term effects of the policy in the Balearic Islands, providing actionable insights into a relevant and heavily debated topic. It contributes to the growing body of research on tourism taxation, providing a foundation for further investigations into long-term dynamics and broader policy implications.

Conclusion

This research has shown that the Sustainable Tourism Tax in the Balearic Islands, contrary to initial fears, did not significantly reduce tourist arrivals or the average length of stay. Instead, the levy successfully generated revenue earmarked for environmental and infrastructure projects, demonstrating how a modest, transparent, and well-structured tax can internalize the negative externalities of overtourism. These findings underscore the resilience of established tourism markets and highlight the potential for similar destinations to balance economic growth with sustainability objectives. Nevertheless, certain limitations, such as relying on the Canary Islands as a counterfactual and a relatively short observation period, suggest the need for further investigation. Future research could extend the timeframe, compare multiple destinations, and explore more heterogeneous tourist segments at the micro level.

Looking ahead, a broader range of strategies may be necessary to address overtourism's systemic challenges. Approaches grounded in regenerative tourism, as seen in the Faroe Islands, offer promising ways to enrich the policy toolkit. By combining fiscal tools with regenerative practices, tourism can positively support host communities and ecosystems over the long term. Ultimately, while visitors might not need to "go home," policymakers should ensure that tourism acts as a sustainable, equitable force for good.

References

Adedoyin, Festus Fatai, Neelu Seetaram, Marta Disegna, and George Filis. 2023. “The Effect of Tourism Taxation on International Arrivals to a Small Tourism-Dependent Economy.” *Journal of Travel Research* 62 (1): 135–53. https://doi.org/10.1177/00472875211053658.

Agència d´Estratègia Turística de les Illes Balears. 2019. “Illes Sostenibles Statistics: Sustainable Tourism Tax Statistics.” Accessed December 16, 2024. https://illessostenibles.travel/en/statistic-en.

Agència d´Estratègia Turística de les Illes Balears. 2024. “Sustainable Balearic Islands: Financial Projects.” Accessed December 13, 2024. https://illessostenibles.travel/en/financed-projects/search.

Aguiló, Eugeni, Antoni Riera, and Jaume Rosselló. 2005. “The Short-Term Price Effect of a Tourist Tax Through a Dynamic Demand Model.” *Tourism Management* 26 (3): 359–65. https://doi.org/10.1016/j.tourman.2003.07.005.

Amics de la Terra Mallorca. 2017. “Ecology Organisations Vote Against the Proposed Distribution of Proceeds from the ‘Tourism Tax’.” *Amics de la Terra*, October 18, 2017. https://www.amicsdelaterra.org/en/ecology-organisations-vote-against-the-proposed-distribution-of-proceeds-from-the-tourism-tax/.

Angrist, Joshua David, and Jörn-Steffen Pischke. 2009. *Mostly Harmless Econometrics: An Empiricist's Companion.* Princeton: Princeton University Press. http://www.jstor.org/stable/j.ctvcm4j72.

BBC News. 2024a. “Spanish Anti-Tourism Sentiment Shows No Sign of Flagging.” October 26, 2024. https://www.bbc.com/news/articles/cwy19egx47eo.

Bellato, Loretta, Niki Frantzeskaki, and Christian A. Nygaard. 2023. “Regenerative Tourism: A Conceptual Framework Leveraging Theory and Practice.” *Tourism Geographies* 25 (4): 1026–46. https://doi.org/10.1080/14616688.2022.2044376.

Ben Westwood. 2003. “Spanish Islands Drop Eco-Tax.” *The Telegraph*, June 7, 2003. https://www.telegraph.co.uk/travel/727626/Spanish-islands-drop-eco-tax.html.

Biagi, Bianca, Maria Brandano, and Manuela Pulina. 2021. “Tourism Taxation: Good or Bad for Cities?” https://econpapers.repec.org/bookchap/spradspcp/978-3-030-61274-0_5f23.htm.

Borges, Ana Pinto, Elvira Vieira, and Sofia Gomes. 2020. “The Evaluation of Municipal Tourist Tax Awareness:The Case of the City of Porto.” *Tourism and Hospitality Management* 26 (2): 381–98. https://ideas.repec.org/a/tho/journl/v26y2020n2p381-398.html.

CABI News. 2003. “Balearic Ecotax.” Accessed November 13, 2024. https://www.cabidigitallibrary.org/do/10.5555/collection-news-5312.

CaixaBank Research. 2024. “Autonomous Community Outlook Balearic Islands.” https://www.caixabankresearch.com/sites/default/files/content/file/2024/02/01/34454/f-ccaa-islas_baleares-en.pdf. Accessed May 11, 2024.

Cetin, Gurel, Zaid Alrawadieh, Mithat Dincer, Fusun Istanbullu Dincer, and Dimitri Ioannides. 2017. “Willingness to Pay for Tourist Tax in Destinations: Empirical Evidence from Istanbul.” *Economies* 5 (2): 21. https://doi.org/10.3390/economies5020021.

CNN. 2024b. “Mass Protest on Spanish Island Mallorca Calls for ‘Limits on Tourism’.” July 22, 2024. https://edition.cnn.com/2024/07/22/travel/mass-protest-on-spanish-island-mallorca-calls-for-limits-on-tourism/index.html.

Consell de Govern de les Illes Balears. 2019. “Estat D’execució Del Pressupost D’ingressos: Exercici 2019: General Account, Fiscal Year 2019.” Accessed December 13, 2024. https://interven.caib.es/www/compte_general_2019/archivos/caib_tom4_1_1_2.html.

Deutsche Welle. 2015. “Mallorca May Limit Number of Tourists.” July 15, 2015. https://www.dw.com/en/mallorca-may-limit-number-of-tourists/a-18585622.

do Valle, Patrícia Oom, Pedro Pintassilgo, António Matias, and Filipe André. 2012. “Tourist Attitudes Towards an Accommodation Tax Earmarked for Environmental Protection: A Survey in the Algarve.” *Tourism Management* 33 (6): 1408–16. https://doi.org/10.1016/j.tourman.2012.01.003.

Durán-Román, José Luis, Pablo Juan Cárdenas-García, and Juan Ignacio Pulido-Fernández. 2021. “Tourist Tax to Improve Sustainability and the Experience in Mass Tourism Destinations: The Case of Andalusia (Spain).” *Sustainability* 13 (1): 42. https://doi.org/10.3390/su13010042.

Durán-Román et al. 2021. “Tourists' Willingness to Pay to Improve Sustainability and Experience at Destination.” *Journal of Destination Marketing & Management* 19:100540. https://doi.org/10.1016/j.jdmm.2020.100540.

Durbarry, Ramesh. 2008. “Tourism Taxes: Implications for Tourism Demand in the UK.” *Review Development Economics* 12 (1): 21–36. https://doi.org/10.1111/j.1467-9361.2008.00432.x.

Ede, Andrew. 2022. “Twenty-Five Per Cent of Tourist Tax Revenue Will Go on Housing Policies.” *majorca daily bulletin*, December 10, 2022. https://www.majorcadailybulletin.com/news/local/2022/10/12/106763/balearic-tourist-tax-revenue-will-housing-policies.html.

European Commission. 2017. *The Impact of Taxes on the Competitiveness of European Tourism*. With the assistance of Directorate General for Internal Market, Industry, Entrepreneurship and SMEs. and PwC. Publications Office. Accessed November 13, 2024.

Foremny, Dirk. 2024. *Tax Decentralization, Preferences for Redistribution, and Regional Identities*.

FRONTUR (IET and ISTAC). 2024. “Tourist Arrivals (FRONTUR). Historical Data: 1997 - 2023. | Portal De Investigación.” Accessed December 14, 2024. https://investigacion.turismodeislascanarias.com/en/report/tourist-arrivals-frontur-historical-data-1997-2023.

Gago, Alberto, Xavier Labandeira, Fidel Picos, and Miguel Rodríguez. 2009. “Specific and General Taxation of Tourism Activities. Evidence from Spain.” *Tourism Management* 30 (3): 381–92. https://doi.org/10.1016/j.tourman.2008.08.004.

Garau Taberner, Jaume, and Carles Manera. 2006. *The Recent Evolution and Impact of Tourism in the Mediterranean: The Case of Island Regions, 1990-2002*.

Garín-Muñoz, Teresa, and Luís F. Montero-Martín. 2007. “Tourism in the Balearic Islands: A Dynamic Model for International Demand Using Panel Data.” *Tourism Management* 28 (5): 1224–35. https://doi.org/10.1016/j.tourman.2006.09.024.

GOB Mallorca. 2021. “ARCA, GOB I Amics De La Terra Denuncien Que Les Modificacions De Les Finalitats De L’impost De Turisme Sostenible De Forma Unilateral Per Part Del Govern Desvirtuen I Perverteixen Els Objectius D’uns Fons, Ara, Més Necessaris Que Mai – GOB Mallorca.” Accessed December 13, 2024. https://www.gobmallorca.com/2021/11/24/arca-gob-i-amics-de-la-terra-denuncien-que-les-modificacions-de-les-finalitats-de-l-impost-de-turisme-sostenible-de-forma-unilateral-per-part-del-govern-desvirtuen-i-perverteixen-els-objectius-d-uns-f/.

Goodman-Bacon, Andrew. 2021. “Difference-in-Differences with Variation in Treatment Timing.” *Journal of Econometrics* 225 (2): 254–77. https://doi.org/10.1016/j.jeconom.2021.03.014.

Government of the Balearic Islands, ed. 2016a. *Law 2/2016, of March 30, on the Tax on Tourist Stays in the Balearic Islands: Llei 2/2016, De 30 De Març, De L'impost Sobre Estades Turístiques a Les Illes Balears.* Official Gazette of the Balearic Islands (BOIB), no. 45. Accessed November 15, 2024. https://intranet.caib.es/sites/institutestudisautonomics/f/407324.

Government of the Balearic Islands. 2016b. “Llei 2/2016, De 30 De Març, De L’impost Sobre Estades Turístiques a Les Illes Balears I De Mesures D’impuls Del Turisme Sostenible. Boletín Oficial De Las Islas Baleares, No. 42 (April 2).” https://intranet.caib.es/sites/institutestudisautonomics/ca/n/llei_22016_de_30_de_marc_de_limpost_sobre_estades_turistiques_a_les_illes_balears_i_de_mesures_dimpuls_del_turisme_sostenible-90144/. Accessed November 13, 2024.

Government of the Balearic Islands, ed. 2017. *Law 13/2017, of December 29, Amending the Tax on Tourist Stays in the Balearic Islands: Ley 13/2017, De 29 De Diciembre, De Presupuestos Generales De La Comunidad Autónoma De Las Illes Balears Para El Año 2018.* Official Gazette of the Balearic Islands (BOIB), no. 160. Accessed November 15, 2024. https://www.caib.es/eboibfront/eli/es-ib/l/2017/12/29/13/dof/spa/pdf.

IBESTAT. 2024. “IBESTAT | Turistas Con Destino Principal Las Illes Balears Por Lugar De Residencia. Illes Balears Y Mes. | Banco De Datos.” Accessed November 05, 2024. https://ibestat.es/edatos/apps/statistical-visualizer/visualizer/data.html?resourceType=dataset&agencyId=IBESTAT&resourceId=000058A_000001&version=~latest#visualization/table.

IBESTAT - Institut d'Estadística de les Illes Balears. 2024. “Turistas Con Destino Principal Las Illes Balears Por Lugar De Residencia. Illes Balears Y Mes. | Banco De Datos.” Accessed December 14, 2024. https://ibestat.es/edatos/apps/statistical-visualizer/visualizer/data.html?resourceType=dataset&agencyId=IBESTAT&resourceId=000058A_000001&version=1.9&geo=CCAA_ILLES_BALEARS#visualization/table.

Ihalanayake, Ranjith. 2012. “Economic Effects of Tourism Tax Changes in Australia: Empirical Evidence from a Computable General Equilibrium Model.” *Tourism Economics* 18 (1): 181–202. https://doi.org/10.5367/te.2012.0105.

Institute of Statistics of the Balearic Islands. 2024. “Number of Monthly Tourists with Main Destination Balearic Islands.” Accessed November 16, 2024. https://ibestat.es/edatos/apps/statistical-visualizer/visualizer/data.html?resourceType=dataset&agencyId=IBESTAT&resourceId=000058A_000002&version=1.8&geo=CCAA_ILLES_BALEARS#visualization/table.

Instituto Canario de Estadística. 2024. “Number of Tourists Arrived by Air, Except Those Residing in Canary Islands.” Accessed November 16, 2024.

https://www3.gobiernodecanarias.org/istac/statistical-visualizer/visualizer/data.html?resourceId=be85e239-12f1-46c9-b42f-3533d27d03ce&indicatorSystem=C00075B&resourceType=indicatorInstance#visualization/table.

Instituto Nacional de Estadistica. 2023. “Resident Population by Date, Sex and Age: Resultados Definitivos Results by Autonomous Community.” Accessed November 20, 2024. https://www.ine.es/jaxiT3/Datos.htm?t=56940.

Juvan, Emil, and Sara Dolnicar. 2014. “The Attitude–behaviour Gap in Sustainable Tourism.” *Annals of Tourism Research* 48:76–95. https://doi.org/10.1016/j.annals.2014.05.012.

Loomis, John B. 2014. “2013 WAEA Keynote Address: Strategies for Overcoming Hypothetical Bias in Stated Preference Surveys.” *Journal of Agricultural and Resource Economics* 39 (1): 34–46. http://www.jstor.org/stable/44131313.

Majorca Daily Bulletin reporter. 2019. “Government Slammed over Tourist Tax Spending Decisions.” *daily,* October 31, 2019. https://www.majorcadailybulletin.com/news/local/2019/10/31/59179/government-slammed-over-tourist-tax-spending-decisions.html.

Majorca Daily Bulletin reporter. 2024. “Every Tourist Should Know Where Their Eco-Tax Goes.” *majorca daily bulletin,* March 17, 2024. https://www.majorcadailybulletin.com/news/local/2024/03/17/122141/card-being-explored-that-every-tourist-knows-where-the-eco-tax-goes.html.

Mak, James, and Edward Nishimura. 1979. “The Economics of a Hotel Room Tax.” *Journal of Travel Research* 17 (4): 2–6. https://doi.org/10.1177/004728757901700401.

mallorcadiario. 2015. “Biel Barceló Anuncia Que En Turismo "Los Próximos Años Serán Buenos".” *mallorcadiario.com,* April 10, 2015. https://www.mallorcadiario.com/barcelo-dura-oposicion-a-la-ecotasa-las-cosas-han-cambiado-mucho.

Miller, Graham. 2001. “The Development of Indicators for Sustainable Tourism: Results of a Delphi Survey of Tourism Researchers.” *Tourism Management* 22 (4): 351–62. https://doi.org/10.1016/S0261-5177(00)00067-4.

Mills, Brian M., Mark S. Rosentraub, and Gidon Jakar. 2019. “Tourist Tax Elasticity in Florida: Spatial Effects of County-Level Room Tax Rate Variation.” *Tourism Management Perspectives* 31:174–83. https://doi.org/10.1016/j.tmp.2019.05.003.

Mohd Asri Mohd Ali et al. 2018. *The Determinants of Perceive Impact on Tourism Tax Implementation Among Foreign Tourist in Pahang.* Vol. 10, Iss. 3: Global Business and Management Research. Accessed December 11, 2024. https://search.proquest.com/openview/deab7978103e13504e543f5250a58bbf/1?pq-origsite=gscholar&cbl=696409.

Mora Villarrubia, Ricardo, and Iliana Reggio. 2019. “Alternative Diff-in-Diffs Estimators with Several Pretreatment Periods.” *Econometric Reviews* 38 (5): 465–86. https://econpapers.repec.org/article/tafemetrv/v_3a38_3ay_3a2019_3ai_3a5_3ap_3a465-486.htm.

Ondina, Pedro ÁLvarez. 2024. “Spain’s Tourism Sector Will Continue to Grow Rapidly in 2024-2025.” *CaixabankResearch,* July 18, 2024. https://www.caixabankresearch.com/en/sectoral-analysis/tourism/spains-tourism-sector-will-continue-grow-rapidly-2024-2025.

Patricia Pinto. 2015. *Environmental Awareness of Surf Tourists: A Case Study in the Algarve* III. https://www.researchgate.net/publication/300470449_Environmental_Awareness_of_Surf_Tourists_A_Case_Study_in_the_Algarve.

Pigou, Arthur. 1920. *The Economics of Welfare.* First edition. London: Taylor and Francis. https://www.taylorfrancis.com/books/mono/10.4324/9781351304368/economics-welfare-arthur-pigou.

Rosselló, Jaume, and Andreu Sansó. 2017. "Taxing Tourism: The Effects of an Accommodation Tax on Turism Demand in the Balearic Island (Spain)." *CICE*, no. 93. https://doi.org/10.32796/cice.2017.93.6152.

Sharpley, Richard, and David J. Telfer. 2023. *Rethinking Tourism and Development:* Edward Elgar Publishing.

Villegas, Paula, María Del Carmen Delgado, and Manuel Alejandro Cardenete. 2024. "The Economic Impact of a Tourist Tax in Andalusia Examined Through a Price Effect Model." *Applied Economics Letters* 31 (2): 96–101. https://doi.org/10.1080/13504851.2022.2128167.

Visit Faroe. 2024. "Close for Maintenance and Open for Voluntourism Initiative: Come and Experience What Voluntourism Has to Offer." Accessed December 08, 2024. https://visitfaroeislands.com/en/closed.

Williamson, Lorraine. 2021. "Balearic Islands Want More Sustainable and Quality Tourism." *In Spain News*, April 10, 2021. https://inspain.news/balearic-islands-want-more-sustainable-and-quality-tourism/.

World Tourism Organization. 2018. *'Overtourism'? - Understanding and Managing Urban Tourism Growth Beyond Perceptions, Executive Summary.* Madrid, Spain: World Tourism Organization (UNWTO). Accessed May 11, 2024. https://www.drv.de/public/Downloads_2019/2019_Studie_UNWTO_Overtourism_Urban_Tourism_Growth.pdf.

World Travel and Tourism Council. 2024. "Travel and Tourims: Economic Impact 2024." https://cdn.prod.website-files.com/6329bc97af73223b575983ac/66d869ff84129afb2ea48678_EIR2024-Global-Factsheet-040924.pdf.

Zárate Marco, Anabel, and Jaime Vallés Giménez. 2019. "Regional Tax Effort in Spain." *Economics - The Open-Access, Open-Assessment E-Journal (2007-2020)* 13: 1–32. https://ideas.repec.org/a/zbw/ifweej/201931.html.

Appendix

Table 1: Tourism Tax Rates in the Balearic Islands July 2016- December 2017

Category	High Season	Low Season
Five-star, luxury hotels	2 €	1 €
Four-star hotels	1.50 €	0.75 €
Three-star hotels	1 €	0.50 €
One, two-star hotels	0.50 €	0.25 €
Tourist apartments (luxury)	2 €	1 €
Other tourist apartments	1 €	0.50 €
Holiday homes	1 €	0.50 €
Rural hotels	1 €	0.50 €
Hostels and similar accommodation	0.50 €	0.25 €
Cruise ship passengers	1 €	0.50 €

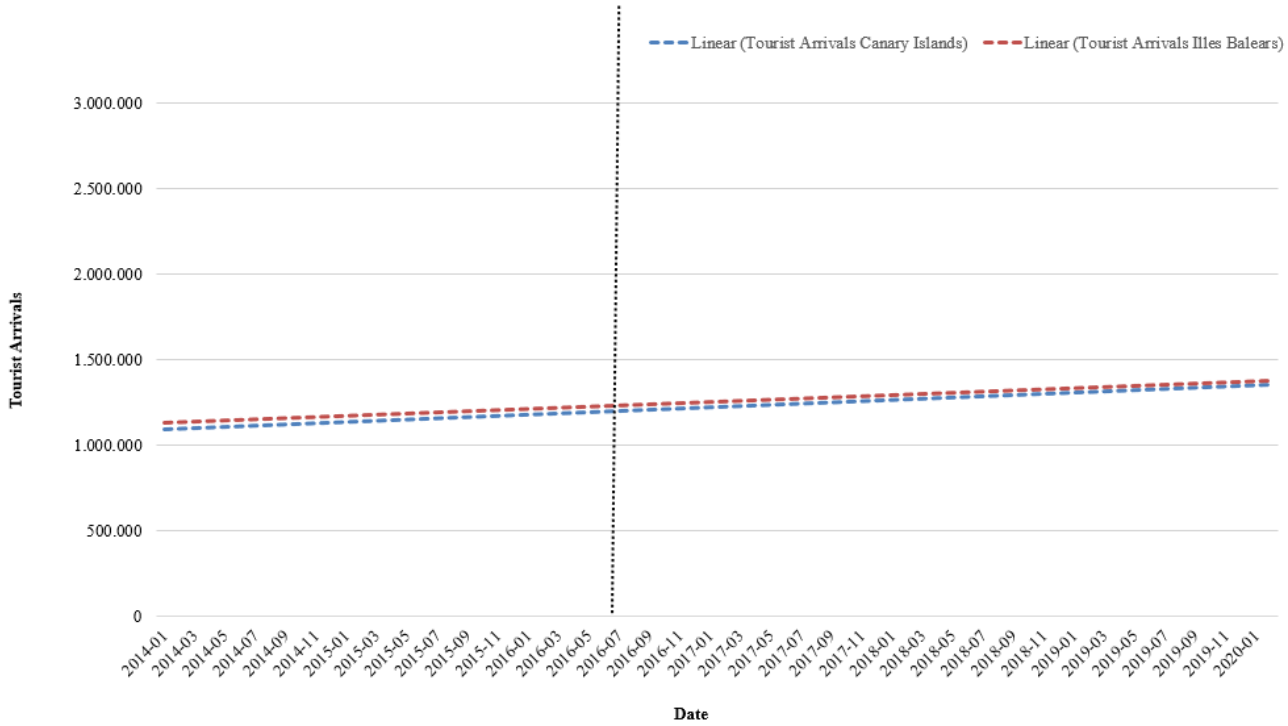
Source: Law 2/2016 (Balearic Islands Tourism Tax) (Government of the Balearic Islands 2016a),
High Season = May 1st - October 31st; Low Season = November 1st - April 30th
Children under the age of 16 are exempt from the tax.
Long term holiday makers will have a 50 % discount on the tax starting from the ninth day of their stay at the same accommodation. Cruise passengers whose ships have their base port in the Balearic Islands are exempt from paying the tax.

Table 2: Tourism Tax Rates in the Balearic Islands January 2018 – December 2024

Category	High Season	Low Season
Five-star, luxury hotels	4 €	1 €
Four-star hotels	3 €	0.75 €
Three-star hotels	2 €	0.50 €
One, two-star hotels	2 €	0.50 €
Tourist apartments (luxury)	4 €	1 €
Other tourist apartments	3 €	0.75 €
Holiday homes	2 €	0.50 €
Rural hotels	2 €	0.50 €
Hostels and similar accommodation	1 €	0.25 €
Cruise ship passengers	2 €	0.50 €

Source: Law 13/2017 (Amendments to Tourism Tax; (Government of the Balearic Islands 2017)
High Season = May 1st - October 31st; Low Season = November 1st - April 30th
Children under the age of 16 are exempt from the tax.
Long term holiday makers will have a 50 % discount on the tax starting from the ninth day of their stay at the same accommodation. Cruise passengers whose ships have their base port in the Balearic Islands are exempt from paying the tax.

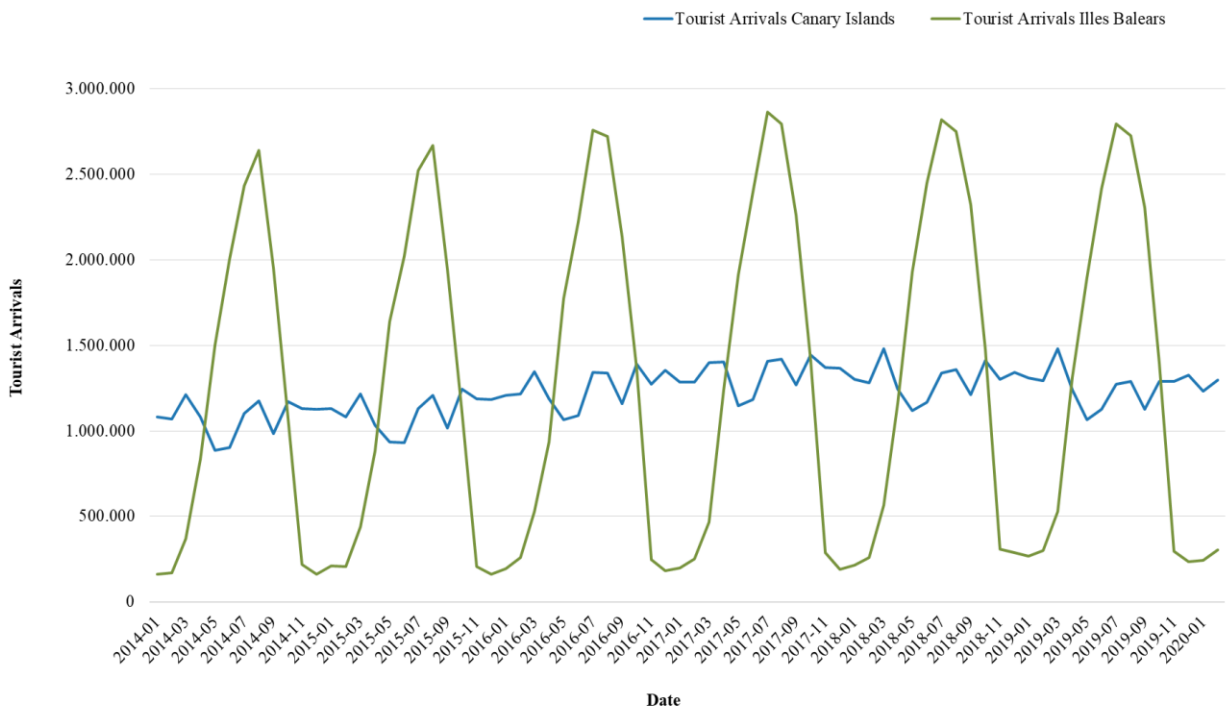
Graph 1: Trends in Monthly Tourist Arrivals to the Canary Islands and Balearic Islands (2014–2020)



Source: (Institute of Statistics of the Balearic Islands 2024; Instituto Canario de Estadística 2024)

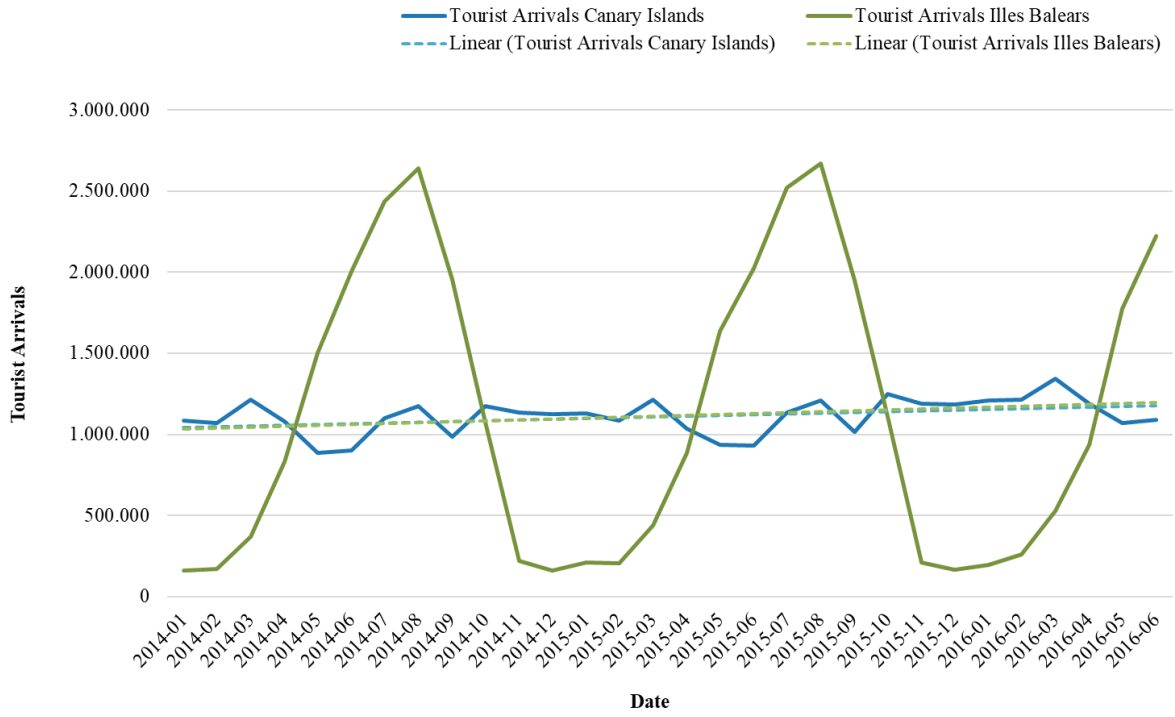
The vertical line marks the introduction of the Balearic Islands' tourist tax in July 2016. Linear trend lines illustrate a steady increase in tourist arrivals for both regions, with **no divergence in trends pre- or post-tax implementation**, confirming visually the parallel trends assumption as well as a limited short- to medium-term impact of the tourist tax.

Graph 2: Tourist Arrivals in the Canary Islands and Balearic Islands by Month (2014-2020)



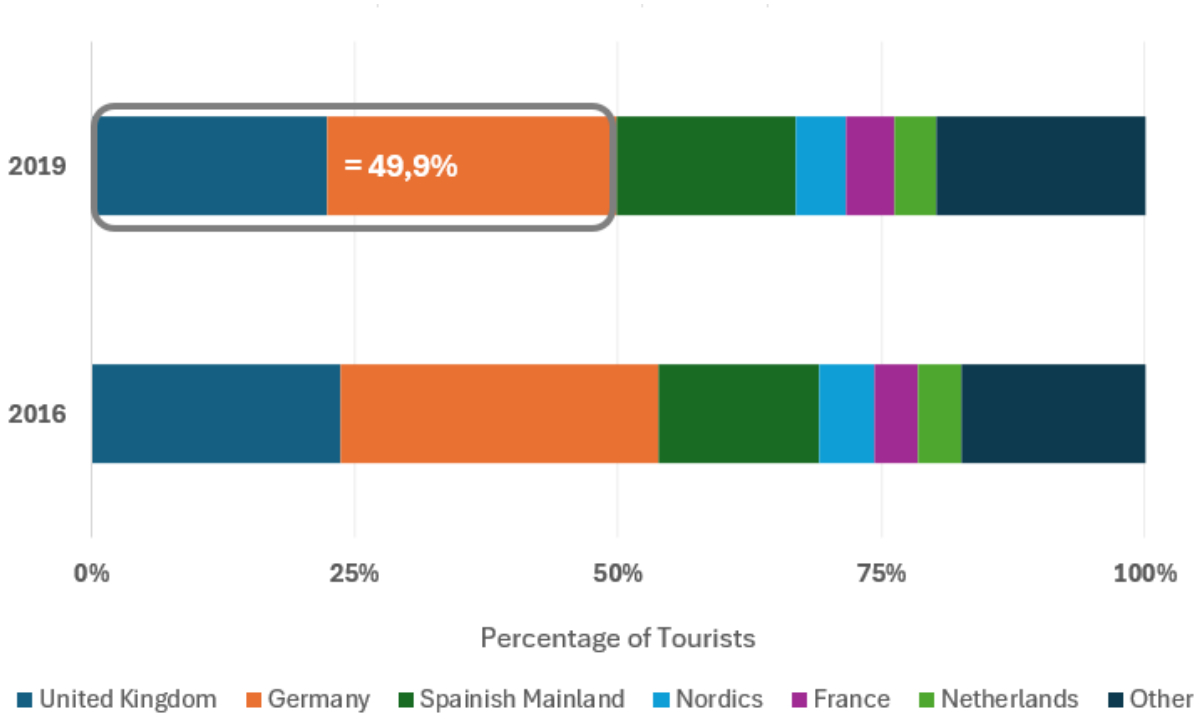
Source: (Institute of Statistics of the Balearic Islands 2024; Instituto Canario de Estadística 2024).
Seasonal fluctuations in monthly tourist arrivals for the Canary Islands and Balearic Islands from January 2014 to February 2020. The Balearic Islands exhibit stark seasonal peaks during summer months, while the Canary Islands maintain more stable arrivals due to their climate.

Graph 3: Tourist Arrivals in the Canary Islands and Balearic Islands by Month, including Trendline (Jan 2014-June 2016)



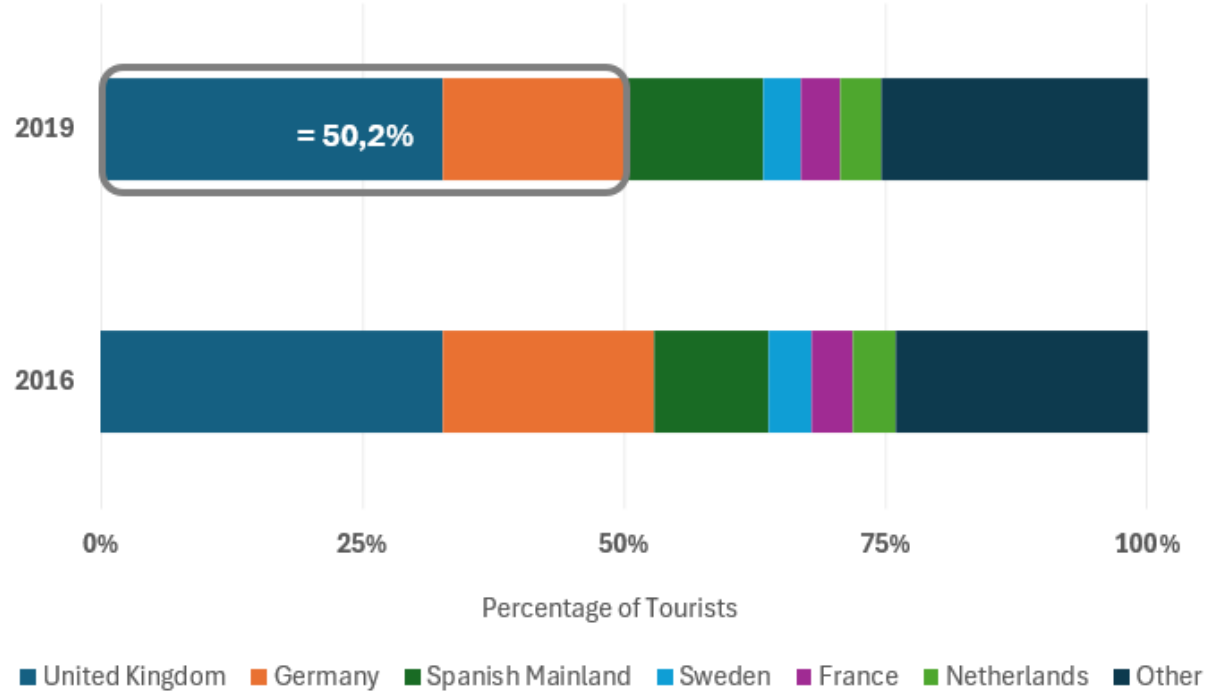
Source: (Institute of Statistics of the Balearic Islands 2024; Instituto Canario de Estadística 2024).
As before, one can see the pronounced seasonality in the Balearic Islands. However, trendlines indicate similar growth trajectories during the pre-tourist tax period by overlapping.

Graph 4: Tourist Shares by Country of Origin in the Balearic Islands (2016 vs. 2019)



Source: (IBESTAT - Institut d'Estadística de les Illes Balears 2024), Tourist shares by country of origin in the Balearic Islands for 2016 and 2019. The combined share of tourists from the **United Kingdom and Germany** is 49,9%, reflecting a high dependency on these two key markets, but down from 53,8% in 2019.

Graph 5: Tourist Shares by Country of Origin in the Canary Islands (2016 vs. 2019)



Source (FRONTUR (IET and ISTAC). 2024)
The **United Kingdom and Germany** consistently accounted for approximately 50% of total tourists in the Canary Islands, reflecting their similar critical role in the region's tourism market compared to the Balearics.

Placebo Test: Validating the Parallel Trends Assumption

A placebo test was conducted to validate the parallel trends assumption and ensure that the model does not falsely attribute changes in tourist arrivals to the introduction of the tourist tax. This analysis simulated a pseudo-treatment period by assuming that the tourist tax was introduced in January 2014 instead of the actual introduction in July 2016. This test aimed to determine whether the model detected any significant "treatment effect" during this pseudo-treatment period when no such policy intervention occurred. A significant treatment effect in this scenario would suggest that the model might falsely attribute differences in trends to the treatment.

The data was reshaped to include tourist arrivals for both the Balearic Islands (treatment group) and the Canary Islands (control group) in a combined dataset. The following variables were constructed for the Difference-in-Differences (DiD) regression:

Treatment Group (D): A binary variable equal to 1 for the Balearic Islands and 0 for the Canary Islands.

Post Period (Post): A binary variable equal to 1 for the period from January 2014 onward and 0 otherwise.

Interaction Term (D × Post): The product of the Treatment and Post variables, capturing the placebo treatment effect.

The coefficient for the interaction term was negative (−47,320) but statistically insignificant ($p=0.571$). This indicates no significant difference in tourist arrival trends between the Balearic and Canary Islands during the pseudo-treatment period (2014 onwards). The insignificance of this term suggests that the model does not falsely detect a treatment effect when no such intervention occurs.

Other key findings from the regression include that the Balearic Islands consistently recorded higher tourist arrivals than the Canary Islands, as evidenced by the significant and positive

coefficient for the Treatment variable (584,700, $p<0.001$). Also, a significant increase in tourist arrivals was observed across both regions in the post-2014 period, as shown by the positive coefficient for the Post variable (302,200 $p<0.001p$). These findings confirm that the placebo treatment effect was insignificant, reinforcing the parallel trends assumption required for a valid DiD analysis.

The placebo test demonstrates that the model does not falsely detect treatment effects without intervention. This reinforces the reliability of the Difference-in-Differences approach used in this analysis. By confirming that the parallel trends assumption holds, this test strengthens the interpretation of the effects of the tourist tax when the actual treatment period (July 2016 onwards) is analysed. It adds robustness to the analysis by showing no spurious effects. This increases confidence in the findings and ensures that observed differences in tourist arrivals during the actual treatment period can be attributed to the introduction of the tourist tax.