Do More Tourists Promote Local Employment?

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Abstract: We analyze the short-term impact of tourist flows on local labour markets. We propose a novel identification strategy that uses shocks to competing international tourist destinations to instrument for tourist inflows across Spanish regions. We show that negative shocks in alternative international destinations have a strong positive effect on tourism flows to Spain. We follow an instrumental variables strategy and find that an exogenous increase in tourist inflows leads to more employment in the tourism industry for prime-age workers in the short term but does not increase total employment in local economies. Total employment actually falls for very young and older workers, as well as for prime-age women. The increase in employment in tourism is compensated by a fall in (low-skilled) employment in other sectors, especially construction and manufacturing.

Keywords: employment, tourism, local labour markets, shift-share, terrorism, Spain
JEL code: J21

1. Introduction

We study the effect of tourist inflows on local labour markets, using data for Spain. Our identification strategy relies on instrumenting for international inflows into Spanish provinces with shocks to the main alternative destinations of the most common tourist source countries in each area. We use terrorist attacks abroad as shocks that increase the relative attractiveness of Spain as a tourist destination. We find that higher tourist inflows into a region, as a result of terrorist attacks abroad, lead to short-term increases in employment in the tourism sector, but do not increase total employment or participation.

According to the World Travel & Tourism Council (WTTC), tourism exceeded 10% of world GDP in 2019, accounting for 330 million jobs.[1] However, the full effect of tourism flows on labour markets is yet to be understood. On the one hand, the type of employment that tourism generates is often short-term and low-skilled. For this reason, the role of the tourism industry as a driver for economic growth has been long questioned (e.g. Parrilla, Font, and Nadal 2007; Sequeira and Maçãs Nunes 2008; Arezki, Cherif and Piotrowski 2009; Brida, Cortes-Jimenez and Pulina 2016, Chen and Ioannides 2020).

On the other hand, tourism is a particularly seasonal industry, generating high levels of economic activity in some months and near stagnation in the others. This pattern of economic activity is likely to lead to very specific labour market structures, with strong capacity to expand and contract as a function of tourism-related demand. For families relying on tourism for income, high seasonality of labour demand means that consumption must be strongly smoothed over the high and low seasons. This also means that families may be strongly susceptible to ill-timed shocks, which may have a lasting impact on their consumption. This issue is ever more relevant in light of the current covid-19 pandemic.

[1] https://wttc.org/Research/Economic-Impact (consulted on October 8, 2020).

All in all, the transforming power of tourism on landscape, retail, real estate and labour markets is undeniable. Local and central governments strongly invest in and promote the tourism industry. Even in the aftermath of the covid-19 pandemic, massive stimulus packages are being devised and travel rules are being negotiated to revive international tourism. Therefore, the need to understand the impact of tourism on labour markets, economies, and families is particularly pressing.

This paper seeks to understand the local labour market consequences of tourism. Our analysis is focused on the empirical context of Spain. Spain has experienced an unprecedented increase in tourism over the last 20 years, and the tourism industry lies at the forefront of its economic agenda. In some regions, tourism-related employment accounts for nearly a third of total employment, and in popular destinations such as Barcelona, tourism is perceived to have had a deep impact on local real estate, hospitality, and other services. The Spanish experience is not unique, and it resonates across other popular tourist destinations.

We start our analysis by showing that higher inflows of tourists are strongly correlated with higher tourism-related employment, labour market participation, and total employment in a province. The main challenge when studying the causal impact of tourism on labour markets is the fact that tourist inflows are likely correlated with other factors, such as local investments, which directly affect labour markets, independently from their tourism-generating effects. To address this endogeneity between tourist inflows and local development, we propose using shocks to the attractiveness of competing tourist destinations.

In particular, we use terrorist attacks in alternative destinations to instrument for tourist inflows to (different regions in) Spain. The relationship between terrorism and tourism is has been picked up in previous economics research (e.g. Enders and Sandler, 1991; Enders, Sandler, and Parise, 1992; Neumayer, 2004; Besley, Fetzer, Mueller, 2019) and in the general press. For instance, Spain experienced an especially strong growth in tourist arrivals in 2016,

a year which was particularly bad in terms of terrorist activity elsewhere in Europe. The press has repeatedly pointed out this link, which we approach in a systematic manner and use to study the impact of tourism on local labour markets.

For this purpose, we combine (i) Spanish FRONTUR data, with information on the inflow of tourist across Spanish provinces by country of origin; (ii) World Tourism Organization (UNWTO) data on bilateral tourist flows for most countries in the world; (iii) data on worldwide terrorist activity from the Global Terrorist Database, and (iv) Spanish Labour Force Survey data, to study the impact of tourism on local labour markets.

The main challenge lies in determining the potential impact of terrorist activity in other countries across specific Spanish regions. Our strategy consists of exploiting local variations in the tourist mix by country of origin across Spain, and the variation in alternative destinations for each source country of tourists.

The first step in our identification strategy is documenting that (negative) shocks in alternative destinations generate increases in tourism to Spain. Our approach then relies on "distributing" those shocks across regions, according to the pre-established regional composition of tourist inflows. This strategy is in the spirit of shift-share instruments, as in Bartik (1991). The exclusion restriction is that terrorist attacks in other countries do not affect Spanish local labour markets except through their impact on tourist inflows to Spain.[2]

We start by documenting the negative impact of terrorist attacks in a specific country on the inflow of tourists to that same country (as in Besley, Fetzer and Mueller 2019), using UNWTO data. We show that a one-standard-deviation increase in terrorist activity reduces the annual inflow of tourists into a country by around 2.5 per cent.

[2] We treat shocks to the attractiveness of the alternative destinations as exogenous to the tourist inflows to Spain. The distribution of the shocks across the regions does not need to be exogenous, for our strategy to produce consistent estimates (Borusyak, Hull and Jaravel, 2020).

We then show that negative shocks in alternative destinations strongly and significantly increase the inflow of tourists to Spain, and we estimate the effect of terrorism in other countries on tourist flows to different Spanish regions. We do this in two steps.

First, we calculate the mix of destination countries across the different tourist-sending countries. Then, we use the information on terrorist shocks across destination countries, to estimate how much these shocks will affect tourists from the different origin countries, using each destination's weight in total tourism outflows from each origin.

Then, we calculate the mix of origin countries among the tourists that visit each Spanish province. Finally, we "assign" shocks to Spanish provinces using the weight of each country of origin in total tourist inflows to a province, and how affected is each origin country by terrorist incidents in their competing destination countries.

We find that a one-standard-deviation increase in a province's exposure to these shocks increases the inflow of tourists by 13 percent in the same month the shock occurs, and the impact persists at around 4 percent during the 6 months following the incidents. Shocks in alternative destinations prove to be a strong instrument for the inflow of tourists to Spanish regions. Hence, we proceed to study the impact of tourism on labour markets, instrumenting tourist inflows with negative shocks to alternative destinations.

We find that higher tourist inflows lead to higher tourism-related employment in a province in the short-term, but do not increase labour market participation or overall employment, and in fact lower employment for women and young workers. The increase in tourism-related employment is more than compensated by a drop in employment in construction and manufacturing.

This paper contributes to several strands of literature. First, it speaks to the literature on the impact of economic shocks on local economies (Autor, Dorn and Hanson 2013, 2016; Mian and Sufi 2009; Topalova 2010; Black, McKinnish and Sanders 2003; Kearney and Wilson

2018). We study the impact of positive shocks to the tourism sector on regional economies in Spain. While others have focused on demand shocks affecting the manufacturing sector, it may well be that shocks to other sectors have different effects. For instance, the services sector has a higher fraction of female employment, thus women may be more affected by shocks to tourism.

Furthermore, by studying the impact of terrorism on tourism, this paper also relates to the literature on the economic impacts of violence (e.g. Abadie and Gardeazabal, 2003, 2008; Besley and Mueller, 2012; Brodeur, 2018; Krueger and Malečkova, 2003; among others). Besley, Fetzer, Mueller (2019) study the impact of terrorism on tourism into the countries directly affected by the terrorist incidents, with a focus on the role of media coverage. This is the starting point of our identification strategy.

Finally, we contribute to a recent literature on the economic impact of tourism. A relevant paper is the one by Faber and Gaubert (2019), who study the long-term impact of tourism on the development of local economies in Mexico, with a specific focus on general equilibrium effects. We instead focus on the short-term impact of tourism shocks on employment, and pay more attention to careful identification of causal effects. To this purpose, we propose a novel identification strategy that relies on the fact that shocks in third countries may divert tourist flows across competing destinations, for reasons unrelated to trends in the local economy.

The paper is structured as follows. In section 2, we outline the empirical strategy. We describe the data in section 3. In section 4, the background and summary statistics are discussed. We present our results in section 5, while section 6 concludes and outlines the next steps.

2. Empirical strategy

2.1. The impact of tourism on local labour markets

The question at the heart of this paper is how tourism affects local labour markets. Specifically, we are interested in whether higher tourist inflows lead to higher employment and labour market participation in a region. We start by analysing the correlation between the inflow of tourists to a province and employment in tourism-related activities, as well as total employment and labour market participation in the receiving province. With this purpose in mind, we regress the outcomes of interest on (log) tourist inflows, including controls for time, province, and individual characteristics, as follows:

$$y_{idq(t)} = \beta_0 + \beta_1 \, log \, flow_{dq(t)} + X'_{iq(t)}\gamma + \mu_d + \mu_{qt} + u_{idq(t)} \quad (1)$$

$y_{idq(t)}$ is an indicator for employment, labour market participation, or tourism-related employment for individual i who lives in province d in quarter q of year t. $log \, flow_{dq(t)}$ is the (log) number of tourists arriving to a province d during a quarter. μ_d and $\mu_{q(t)}$ are province and quarter-year fixed effects. The vector of individual controls $X_{iq(t)}$ includes age, education, and immigrant status.

The coefficient of interest β_1 is the elasticity of employment with respect to tourism inflows. It identifies the within province correlation between tourism and labour market outcomes. However, the development of the tourism industry likely goes hand in hand with overall economic growth in a tourist destination. As regions invest more into the development of tourist facilities, expanding the accommodation offer as well as tourism-related services in general, the associated increase in employment will be accompanied by higher inflows of tourists, attracted by these "pull" factors. To identify the causal impact of tourist inflows on the labour market, therefore we need to address endogeneity issues.

2.2. Security shocks in competing destinations and tourism to Spain

Our strategy relies on shocks that affect the attractiveness of alternative tourist destinations and thus may drive tourist inflows to Spain. The appeal of a given tourist destination is a function of fixed factors, such as geographic characteristics, climate, historical relevance, and cultural prominence, as well as time-varying factors such as prices, political stability, and security. We focus on security shocks that affect countries that compete for tourists with Spain.

Terror attacks have been shown to decrease tourist inflows to a country (e.g. Besley, et al., 2019), as they instead choose to go to alternative destinations. Hence our identification strategy exploits terrorist attacks as shocks that affect the (perceived) safety of alternative tourist destinations.[3]

The challenge lies in linking shocks that occur in other countries to local labour markets in Spain. Our strategy proceeds in two steps. First, we quantify the degree of competition between other countries affected by terrorism shocks and (a region within) Spain. The idea is that not all countries in the world compete to the same degree with Spain, and that the degree of substitutability between any country and Spain depends on the composition of their tourist inflows.

For instance, while Turkey is a popular tourist destination among Germans, few Brits vacation there, so any shock occurring in Turkey will mostly affect Spain through its impact on German tourism. We capture this by each destination country's weight in the total outbound tourism from each country of origin of tourists. The second step that helps us assign shocks across Spanish regions is through the regional composition of tourist inflows. This captures the

[3] We focus on international tourist flows. International tourism is a major part of Spain's exports and we expect it to be especially susceptible to security shocks. Furthermore, their spending and behaviour may differ from domestic tourism. Studying the impact of domestic tourism is part of our research agenda.

fact that tourist inflows to some Spanish regions will be more susceptible to changes in the inflows of German tourists than others, for example.

Formally, the first component of the instrument is the average over the lagged shares of tourism from each country of origin accrued to each destination, given by:

$$\overline{OUT}_{ojt} = \sum_{\tau=(t-3)}^{t-1} \frac{OUT_{oj\tau}}{3} \qquad (2)$$

Where $OUT_{ojt} = outflow_{ojt}/outflow_{ot}$ is the share of the tourist flow from country of origin o to a destination j in year t, $outflow_{ojt}$, over the total tourist outflow from country o in year t, $outflow_{ot}$. We take the average share over the previous 3 years to reduce year-to-year random fluctuations in outbound tourism composition.[4]

The second component of the instrument is the distribution of tourist inflows from different origins across Spanish provinces:

$$IN_{dom(t)} = \frac{inflow_{dom(t-1)}}{inflow_{dm(t-1)}} \qquad (3)$$

Where $inflow_{dom(t)}$ is the inflow of tourists from country o to Spanish province d in month m of year t, while $inflow_{dm(t)}$ is the total tourist inflow to that province in month m in year t. To avoid the reflection problem (Manski, 1993), we take a lagged share of inflows. We use the share corresponding to calendar month m in year $t-1$ to account for the seasonality of tourist inflows.

Finally, we quantify the shocks to security, $Shock_{jm(t)}$, as the number of terrorist attacks (with casualties) occurring in a given month m of year t, in country j.[5] Therefore, we

[4] The particular number of lags chosen is a result of a trade-off between identifying a more stable set of alternative destinations and the power of instrument which is reduced when a larger number of lags is included. Nevertheless, the results are not particularly sensitive to the inclusion of a varying number of lags.

[5] For robustness, we also look at the impact of the number of victims. However, once we account for the fact that there was an attack, the number of victims has a much smaller impact on tourist flow and the power of the instrument is actually reduced if both are used. This

instrument tourist inflows to Spain using $Shock_{jm(t)}$ weighted by $\overline{OUT}_{otj}$ and $IN_{dom(t)}$, where the former reflects the importance of each alternative destination for each country of origin of tourists, and the latter reflects how important each tourist country of origin is for each Spanish province:[6]

$$IV_{dm(t)} = \sum_{j} \sum_{o,m(t)} (IN_{dom(t)} \times \overline{OUT}_{m(t)oj}) \times Shock_{jm(t)} \quad (4)$$

Through this weighting, we can accrue shocks that occur in other countries to specific regions in Spain.

To test whether and how shocks to alternative destinations relate to tourist inflows in each Spanish province, we regress the number of international arrivals to a province on the shocks in alternative destinations assigned to each province in a given month:

$$log\ flow_{dm(t)} = \alpha_0 + \alpha_1\ IV_{dm(t)} + \delta_d + \delta_{m(t)} + e_{dm(t)} \quad (5)$$

$\log flow_{dm(t)}$ is the log number of tourists arriving to province d in month m of year t. We do not distinguish between countries of origin of tourists given that the shocks are already weighted by the importance of each origin for each province. $\text{IV}_{dm(t)}$ is the magnitude of the shock that province d is exposed to in month m and year t. We standardize $\text{IV}_{dm(t)}$ to have a standard deviation equal to 1 to simplify the interpretation of the regression coefficients. To control for aggregate trends in tourist inflows, the regression includes month-year fixed effects $\delta_{m(t)}$. Province fixed effects, δ_d, are also included in the regression to allow for observed and unobserved time invariant differences between provinces that attract more or less tourism.

suggests that as a response to serious terrorist threat people re-assess their perception of a given destination as being secure or not.

[6] The procedure entails double tensor contraction. First, over countries of origin of tourists, o, and month, $m(t)$, to generate a weight that varies by province of destination, d, and alternative origin, j. Second, over alternative origins to assign shocks across destination provinces in any given month. Notice that in order to perform the first contraction we expand $\overline{OUT}_{ojt}$ so that $\overline{OUT}_{ojm(t)} = \sum_t \overline{OUT}_{ojt} \times I_{tm(t)}$.

The labour market data used in the analysis has quarterly frequency. For this reason, we aggregate equation 5 to a quarterly level by summing up the number of tourists a province receives and the number of shocks in alternative destination each province is exposed to in a quarter, instead of month. Equation 6 is the aggregated version:

$$log\ flow_{dq(t)} = \alpha_0 + \alpha_1\ IV_{dq(t)} + \delta_d + \delta_{q(t)} + e_{dm(t)} \quad (6)$$

Where $flow_{dq(t)} = \sum_{m(t)\in q(t)} flow_{dm(t)}$ and, similarly, $IV_{dq(t)} = \sum_{m(t)\in q(t)} IV_{dm(t)}$, $\delta_{q(t)}$ and δ_d are quarter of the year and province fixed effects.

Furthermore, because the shocks the provinces are exposed to come from the same underlying terrorist attacks, there might be cross-province correlation in the residuals. For this reason, we cluster standard errors at the monthly (quarterly) level. Thus, to pin down the impact of tourism on the labour market in the two-stage least square regressions, we run equation 1, where $log\ flow_{dq(t)}$ is instrumented by $IV_{dq(t)}$ as defined above.

3. Data

We combine data from four sources. We use Spanish Labour Force Survey for labour market outcomes. To measure the evolution of tourism to Spain, we use FRONTUR data from the National Statistical Office of Spain. To build the instrument, we combine the FRONTUR data with UNWTO data on outbound tourism from the 21 countries of origin of tourists identified from FRONTUR, and data on worldwide terrorist attacks are from the Global Terrorism Database.

3.1. Labour Force Survey

Our labour market micro-data comes from the quarterly Spanish Labour Force Survey. The survey covers around 65 thousand households across all of Spain in each quarter. We focus on years 2000 to 2018. The survey provides information on individual employment status,

participation, and employment characteristics.[7] It also includes questions on individual demographic characteristics including age, education, migration status, and nationality. Furthermore, household-level information, such as spousal employment status and number of children, can be derived from the survey by linking individuals in the same household.

3.2. Frontur

The information on tourist inflows across Spanish regions is based on the Hotel Occupancy Survey (HOS). HOS is a monthly survey filled by approximately 9,250 and 11,200 establishments in winter and summer, respectively. The sample covers all types of accommodation establishments, stratified by province and category.[8] The survey provides information on the number and origin of travellers arriving to an establishment and staying at least one night, as well as the number of nights, and the average duration of the stay. We use data aggregated by the National Institute of Statistics (INE) that provides information on the number and origin of tourists arriving to each province in each month and focus on the period from year 2000 to 2018. The data covers all major tourist origin countries.[9][10]

[7] The survey does not contain information on earnings.

[8] These include hotel, aparthotel, motel, hostel, boarding house, inn, and guest house. The whole population of 4- and 5-star hotels is surveyed. In larger cities and popular tourist destinations, e.g. Madrid, Barcelona, Valencia, and Granada, among others, between 1/3 and 2/3 of 3- and 2-star hotels are surveyed.

[9] We focus on the subset of 21 countries consistently covered by the survey throughout the period. These are Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Norway, Poland, Portugal, Russia, Sweden, United Kingdom, and United States. Japan is not covered in years 2005 and 2006, and between 2000 and 2004 inflows from Switzerland and Liechtenstein are bundled together. Inflows from the rest of countries are aggregated by region or continent.

[10] The survey does not cover rentals through platforms such as Airbnb, TripAdvisor, or Expedia. Up to this date, the data from these types of platforms has not been incorporated into the official statistics. However, the Tourist Movement at the Border database that runs from year 2015 provides information on the reason for travelling as well as the type of accommodation used, including market and non-market accommodation. Based on this data, we find no evidence of increase in private rentals over the past 5 years, while an overwhelming number of travellers who come to Spain stay in hotels or private rentals, and among these the dominant category is hotel accommodation.

3.3. World Tourism Organization (UNWTO)

To identify tourist destinations that compete with Spain, we use the annual outbound tourism data provided by UNWTO. Specifically, we use data on the bilateral tourism flows from the countries covered by the FRONTUR to 196 possible destinations. The data is supplied by each destination country and information sources may vary between countries.[11] Several series are reported in the data: (a) arrivals of non-resident tourists at national borders, by nationality or residence; (b) arrivals of non-resident visitors at the border, by nationality or residence; (c) arrivals of non-resident tourists in hotels and similar establishments, by nationality or residence; (d) arrivals of non-resident tourists in all types of accommodation establishments, by nationality or residence.

Although the dominant series is the arrivals of tourists at national borders, either by nationality or residence, some destinations report only visitors or arrivals at the hotels. Some of these series are closely related so the differences in reporting are not necessarily problematic. Nevertheless, to avoid possible biases when calculating the composition of outbound tourism and therefore identifying the competing destinations, we convert all the series into arrivals of tourists at national borders by residence. For this purpose, we use as conversion factors the cross-series correlations adjusted for year and origin-destination effects based on the origin-destination pairs that report several series at once (see Appendix A for detail).

3.4. Global Terrorism Database

Information on terrorist attacks in competing destinations is drawn from the Global Terrorism Database (GTD), the most comprehensive unclassified database on terrorist attacks. The GTD defines a terrorist attack as the use of illegal force or violence by a non-state actor to attain a political, economic, religious, or social goal through fear, coercion, or intimidation. For each

[11] For instance, not all countries report the exact breakdown by country of origin, while others report only the most significant countries of origin.

incident recorded, the GTD collects information on date and place, type of attack, weapon used, number of casualties and, if known, perpetrator.

Using the GTD, we build a monthly panel containing the total number of terrorist incidents, the number of incidents with casualties, and the number of casualties, for all the countries covered in the GTD.[12]

4. Background and sample description

4.1. The tourism sector in Spain

Spain is the world's second most popular tourist destination, and tourism-related services account for a large share of the Spanish economy. In 2018, tourism contribution to Spain's GDP was 12.3 per cent (National Statistical Office, 2019), while tourism-related employment oscillated around 12-13 percent over the last two decades, with a definite upward trend over the last ten years, driven strongly by the hospitality industry (see Figure 1). The weight of tourism varies greatly, however, across Spanish regions as can be seen from Figure 2 and Table 1. In 2018, nearly 30 percent of employment in the Canary and Balearic Islands was accounted for by tourism-related services, while in La Rioja the share was less than 8 per cent.

About half of total tourist inflows are international arrivals, although their share has been increasing over the last decade, from just above 40 per cent in 2010 to nearly 52 per cent in 2018 (see Figure 3). The composition of international inflows remained relatively stable over the last two decades, growing slightly more diversified over time due to the emergence of tourism from Russia, China, and other Asian countries. Appendix Table A1 shows the ten main countries/regions of origin of tourists in years 2000, 2009 and 2010. The top three countries of origin are always Germany, United Kingdom, and France. Arrivals from these three countries

[12] We exclude from the count non-armed assaults, assaults on infrastructure, and unknown incidents, focusing on those we define as severe, including assassinations, hijackings, kidnappings, bombings, and armed assaults.

accounted for 53 per cent of total international arrivals in 2000 and 44 per cent in 2018. However, there is a lot of regional variation in tourist composition. For instance, over the last 20 years international tourism accounted for at most 17 percent of all arrivals to Asturias, while at least 61 percent of tourists who come to Barcelona are international arrivals, with the share reaching 74 per cent in 2018 (see Appendix Table A2). Appendix Table A3, using as an example Barcelona, Madrid, and the Balearic Islands in 2018, furthermore shows that the composition of international arrivals also varies to a great extent across provinces.

In sum, tourism-related activities take up a large share of employment in Spain, but there is important variation in tourism-related employment shares across regions. The type of tourists arriving to different regions also changes, with some regions relying strongly on international arrivals while others mostly receive domestic tourists. Finally, the composition of international tourists by country of origin differs by region as well, with some strongly relying on German and British tourists and other more dependent on French ones.

4.2. Alternative destinations

The variation in the regional composition of tourist inflows together with variation in the composition of alternative destination for each country of origin of tourists is what allows us to assign shocks to alternative destinations across provinces in Spain. In the previous subsection, we showed the variation in the composition of tourists arriving to Spanish provinces. In thus subsection, we will document the variation in the alternative destinations for different countries of origin of tourists.

In the Appendix Table A4, we show the composition of outbound tourism for the United Kingdom, Germany and France, three of the principle source countries of tourists to Spain. The composition of outbound tourism varies a lot from one country to another. Although some destinations prove to be generally popular, such as Spain, France, Italy, and Greece, the importance of each particular destination differs by country. For instance, while Italy is a very

popular destination among all three countries, it is twice as popular among German and French tourists compared to Brits. Hence, the impact of any shock to Italy on Spain will be felt more strongly through its impact on French and German tourists compared to British.

Furthermore, within Spain there is large regional variation in the composition of tourist inflows. Appendix Table A5 shows the distribution of tourist inflows from the United Kingdom, Germany and France across Spanish provinces in 2018. It shows that, for instance, nearly 40 percent of German tourists go to the Balearic Islands, while only 8 percent of French tourists do so, going instead mostly to Barcelona and Girona. This composition of tourist inflows by province will determine the degree of exposure of each region to the shocks in alternative destinations.

4.3. Security Shocks

Finally, to measure the security shocks in the alternative destinations, we create a monthly panel of countries and calculate the number of terrorist attacks with fatalities, as well as the number of victims in each country and month. Figure 4 shows the evolution in the number of terrorist incidents, attacks with casualties, and the number of victims worldwide. The figures of global terrorist activity are strongly driven by the developments in the Middle East and Asia. Given that the main alternative destinations are actually in Europe, in panel B, we show the three measures of terrorist incidence in Europe only. There is a considerable amount of terrorist activity. The most salient incidents include the 2004 Madrid (Atocha) train bombings, the 2005 London tube and bus attacks, the 2011 attacks by Breivik in Norway, the Paris attack in 2015, multiple incidents in 2016 in Brussels, Nice, Munich and Berlin, the 2017 Manchester Arena bombing and Barcelona attacks, as well as many other less salient incidents.

All in all, the (weighted) annual number of incidents that Spanish provinces are exposed to varies between 0.1 and 1.1 over the period 2001 to 2018 (see Figure 5). The number of incidents a province is exposed to seems to trace closely the volume of tourists a province

receives, suggesting an aggregate relationship between terrorist incidents in alternative destinations and tourism to Spain. This relationship which will be more thoroughly addressed in the following section. Finally, Figure 6 shows the distribution of shocks across Spanish provinces in 2001 and 2018. The figure shows an important degree of variation in the exposure to the shocks both across regions and in time.

4.4. Sample

Our labour market data come from the Spanish quarterly Labour Force Survey (waves 2001 to 2018). We focus on all individuals aged 16 to 65 as well as the subsample of prime-age individuals, aged 25 to 55. Table 2 shows the descriptive statistics for both samples. About 51 percent of our sample are women, and average age is 41. About half of the people in the sample haven't finished high school, and nearly 20 percent have some university education. The average participation rate is 69 percent in the overall sample and 82 among prime-aged individuals. Finally, about 7 per cent of individuals in the full sample are employed in a tourism-related activity, and this share is slightly higher among prime-age individuals.

5. Tourism and local labour markets

5.1. Tourism and local employment

In Table 3, we report the association between the inflow of international tourists and tourism-related employment, participation and employment in a province.[13] The main regressor is the log number of tourist arrivals (in thousands) obtained from the FRONTUR dataset. In columns 1 and 5, we report the coefficients from a simple regression where we only control for individuals' demographics (age, education, and immigration status). Then, we subsequently

[13] All the outcome variables are indicators for whether an individual works in a tourism-related industry, whether he/she participates in the labour market, or whether he/she is employed. Tourism-related employment includes employment in hospitality, transport (from 2008 onwards only transport of people), or leisure-related industries, such as entertainment and sports.

add year and quarter fixed effects to control for trends and seasonality (or alternatively, year-quarter fixed effects as a more flexible specification), and province fixed effects. In columns 1-4, we report the results for the whole sample, while in columns 5-8, we focus on prime age individuals.

All reported associations are positive, implying that higher tourist inflows are associated with more tourism-related employment, higher overall employment, and higher labour market participation in the province, even when we control flexibly for time effects as well as province fixed effects. The estimates from column 4 of panel A imply that one standard deviation increase in log international arrivals is associated with 1 percentage point (pp) increase in tourism-related employment, i.e. a 14 percent increase over the average. Estimates from panel B and C imply that one standard deviation increase in log tourist inflows is associated with a 2 pp increase in the overall employment and 0.7 pp increase in participation, or 3.6 and 1 percent over the average participation and employment, respectively. Among prime-age individuals, the association between tourism inflows and tourism-related employment is of a similar magnitude, though the association with participation and overall employment is lower in magnitude.

We cannot interpret these estimates causally since there are time-varying factors that may affect both tourist inflows and employment in the province. For instance, local investments may both attract tourism and have direct employment-generating effects. To address this potential endogeneity, we use shocks in alternative destinations that reduce tourist inflows to those destinations, and may lead to more tourists arriving in Spain.

5.2. Shocks to alternative destinations and tourism to Spain

Before we get to the analysis of the labour market impact of tourism, we document the relationship between terrorism and tourism flows into the country directly affected by the violent events. Previous research in economics has documented the negative impact of violence

on the economy, and some research has specifically shown the negative impact of terrorism on tourism (e.g. Enders and Sandler 1991, Enders et. al. 1992, Neumayer 2004, Besley, Fetzer and Mueller 2019).

We confirm this relationship using the data from UNWTO and focusing on tourism from the 21 European countries consistently covered by the FRONTUR data. Our outcome variable is the log of international tourist arrivals to each destination, while the main regressors are the number of terrorist attacks (with casualties) and the number of victims occurring in a year in a given destinations. Because terrorist attacks are a relatively rare phenomenon and to facilitate the interpretation of the regression coefficients, we normalise both the number of attacks and victims to have a standard deviation equal to 1 and average of 0.[14] The results reported in Table 4 imply a clear negative relationship between terrorism and international tourism flows into the country suffering the attacks. In columns 1 to 3, we look at all origin-destination pairs covered by the data, including those that report no tourist inflows. The correlation is negative and statistically significant. In columns 4 to 6, we exclude the pairs with zero tourist inflows, and the relationship remains negative and strongly significant. Results in column 4 suggest that a one standard deviation increase in terrorist activity leads to 5 percent drop in tourist inflows into the affected country.

Therefore, if a competing tourist destination is affected by such a security shock, some of the tourism flows may deviate instead to other countries, including Spain. We test this hypothesis following the strategy described in Section 2. Using equation 5, we regress log inflows of tourists to Spanish provinces on the shocks that occurred in the alternative

[14] The data, as described in Section 2, is annual. The specification we use to document the relationship between terrorism and tourism flows is as follows:

$$\log inflow_{ojt} = \gamma_0 + \gamma_1 Shock_{jt} + \eta_t + \eta_{oj} + Trend_{jt} + \epsilon_{ojt}$$

Where $\log inflow_{ojt}$ is the tourist inflow from country o to destination j in year t. $Shock_{jt}$ quantifies terrorist activity in year t in the destination country j. We control for year and origin-destination pair fixed effects as well as region-specific trends (squared).

destinations, which we accrue to each province based on specification 4. The results are reported in Table 5.

In columns 1 through 3, we report results estimated using a monthly province panel. In columns 4 to 5, we report the same results based on a quarterly province panel (based on equation 6), given that the labour market data are quarterly. In columns 6 and 7, we report the results from the same regressions as in column 4 using the individual-level data from the Labour Force Survey, which is equivalent to reweighting the quarterly panel using population weights. Column 6 reports the results when using the whole sample, while in column 7 we restrict the sample to individuals aged 25 to 55. We control for province fixed effects and year-month or year-quarter fixed effects, depending whether the data is monthly or quarterly. In the individual-level regressions, we also include demographic controls, specifically age, education and immigrant indicator. We report the contemporaneous impact of the shock on tourism inflows in columns 1, 4, 6 and 7, as well as lagged effects in columns 2, 3 and 5. We show the impact of the number of terrorist incidents with fatalities in competing destinations.

We find that shocks to the alternative destinations strongly and significantly increase tourist inflows to Spanish provinces, and the impact lasts for up to two quarters. The coefficients imply that one standard deviation increase in the number of shocks to competing destinations assigned to a province, increases the tourist inflow by 15 percent in the same month (column 1), by 12 percent in the same quarter (column 2), and by 6 percent in the same semester (column 3). The quarterly estimates imply a 16 percent increase in the same quarter and a nearly 10 percent increase in the same semester (see columns 4 and 5). These effects also translate well into individual-level regressions in columns 6 and 7, for the whole and prime-aged samples. All in all, security shocks to competing destinations seem to have a large and highly significant impact on tourism to Spain.

5.3. The impact of tourism shocks on local labour markets

Having established the relationship between terrorist attacks in competing destinations and tourist inflows to Spanish regions, we then analyse the impact of tourist inflows on local labour markets in Spain. We estimate equation 1 and instrument tourist inflows with the measure of regional exposure to terrorist attacks in the alternative destinations as in equation 6. We report the results in Table 6.

First, in columns 1 and 4, we report OLS estimates as in Table 3, for the whole sample and the sample of prime-age individuals. Then in columns 2 and 5, we report the reduced-form estimates of the impact of regional exposure to the shocks in alternative destinations on local labour market outcomes. Finally, in columns 3 and 6, we report 2SLS estimates where log tourist inflow is instrumented by the regional exposure to the shocks in alternative destinations.

The reduced-form results suggest that negative shocks in alternative destinations are associated with more tourism employment in a province. Estimates from the 2SLS regressions in columns 3 and 6 are in line with the OLS estimates although considerably higher in magnitude. Thus, employment in the tourism sector seems to react immediately to short-term fluctuations in the volume of inflows.[15]

Results for the overall employment and participation go in the opposite direction. Coefficient in column 6 of panel B implies that one-standard-deviation increase in the log number of tourists arriving into a region leads to 2.5 pp lower employment among prime-age population, although this effect is only marginally significant. Estimates in column 3 and 6 of

[15] The negative bias in the OLS estimates for the impact on tourism-related employment is not surprising. The concern discussed throughout the paper is that developmental investment in the region which eventually leads to tourist inflows can have employment-generating effects. However, employment generated through such investments will not be only concentrated in tourism-related industries, but also in construction and commerce, among others, thus generating higher employment overall but relatively lower employment in tourism-related activity specifically.

panel C show no evidence of systematic impact of tourist inflows on the labour market participation.

5.4. Channels and Mechanisms

Heterogeneity – While the positive bias in the OLS estimates for employment and participation is not unexpected, the negative impact on the overall employment is surprising. One potential explanation may be an income effect derived from higher earnings in tourism-related employment. If that is the case, then we would expect the negative impact on employment and participation to be concentrated among groups who are traditionally secondary earners. Indeed, the negative impact is considerably weaker among prime-aged individuals. In Tables 7 and 8, we further analyse the heterogeneity of the impact across age groups, gender and education.

Results from panel A of tables 7 and 8 show that the impact of tourism on tourism-related employment is concentrated among the prime-aged individuals, but within this group there exists no strong heterogeneity by gender or education. When it comes to the impact on the overall employment, the negative impact is considerably stronger among both younger and older workers (see panel B of Table 7), and within prime-aged group it is concentrated among women and low- and middle-skilled individuals (see panel B of Table 8). Regarding the impact on participation, there exists much heterogeneity across demographic groups (see panel C of tables 7 and 8). First of all, while participation seems to drop as a result of higher tourist inflows among young workers, although not significantly so, it goes up among older workers (see columns 2 and 4 of panel C in Table 7). One-standard-deviation increase in the international tourist inflows leads to about 4 pp increase in participation among workers aged 56 and older. Furthermore, while the impact on participation of the prime-aged population is small and not significant overall, the impact is positive and significant among prime-aged men and low-skilled workers (see panel C of Table 8).

All in all, the heterogeneity analysis suggests that the negative impact of tourism on employment is concentrated among young and old individuals, women and lower skilled groups, i.e. demographic groups who are more likely to be secondary earners.

Contracts and hours of work – Another potential reason why we observe a negative impact on the overall employment may be the fact that as workers move into tourism-related employment, they move into less stable contracts and become more likely find themselves without a job. To test this hypothesis, in columns 1 through 4 of Table 9, we show the impact of tourism on temporary and permanent contracts, overall and within tourism-related industries. Results in columns 2 and 4 of panel A show that indeed within tourism-related employment an increase in temporary contracts was much stronger compared to the increase in the permanent ones, while overall the drop in the permanent contracts far exceeded that of the temporary (see columns 2 and 4 of panel B).

On the other hand, results in columns 6 and 8 of panel B suggest that the drop in the overall employment is driven mostly by a decrease in the part-time jobs, while the increase in the tourism-related employment is mostly explained by an increase in full-time jobs (see panel A). This is also reflected in results in column 10. While overall number of hours is not affected by the increase in tourist inflows, number of hours worked in a tourism-related employment raises substantially.

To summarize, results in Table 9 suggest that positive demand shocks to tourism industry lead some workers to switch to full-time jobs in tourism from part-time ones elsewhere. However, this switch also implies a change into mostly temporary contracts in tourism-related industries and therefore less employment stability.

Cross-industry sorting – Finally, the fact that we observe an increase in tourism-related employment together with no change in participation and at most zero effect in the overall employment suggests that some other industries must be losing employment shares. We

examine this cross-industry employment reshuffling in Table 10, where look at the impact of tourism inflows on employment in manufacturing, construction, commerce, transport, agriculture, and energy. OLS estimates suggest that an increase in tourist inflows is associated with an employment increase in construction, commerce and agriculture, and relatively small decrease in manufacturing employment. Nonetheless, 2SLS estimates again imply an upward bias in the OLS estimates. Once the endogeneity is addressed by exploiting the variation in tourism associated with the shocks in alternative destinations, we find that an increase in tourism comes with a considerable fall in a manufacturing and construction employment.

In conclusion, increase in the international tourist arrivals unsurprisingly leads to an increase in a tourism-related employment and drop in manufacturing and construction employment as workers shift towards the industry experiencing a positive demand shock. The increase in the tourism-related employment, however, is not strong enough to compensate for a fall in manufacturing and construction, hence the overall employment decreases as a result of a raise in tourism. This occurs mostly because workers switch from part-time employment elsewhere into full-time tourism-related employment. Furthermore, the shift towards tourism-related employment implies a shift toward fewer permanent and more temporary contracts, resulting in lower employment stability.

6. Preliminary conclusions

The main goal of this paper is to identify the causal effect of tourism on local labour markets. Our focus is on Spain, one of the most popular tourist destinations worldwide, and where the tourism sector accounts for a large share of total employment, especially in some regions. We propose a novel empirical methodology to address the endogeneity underlying tourist inflows and local development. Our strategy exploits shocks that affect the attractiveness of alternative tourist destinations and thus impact tourist inflows to Spain.

In the spirit of shift-share instruments, we assign the intensity of terrorist activity in competing destination countries across Spanish provinces. Terrorist attacks in other tourist destinations strongly and significantly increase the inflow of international tourists to Spain, and this proves to be a strong instrument in our quest to pin down a causal impact of tourism on local employment and labour market participation.

Using this identification strategy, we show that higher tourist inflows indeed increase tourism-related employment in the receiving region. However, higher tourism flows do not increase total employment in local economies, and in fact reduce it for some demographic groups (low-skilled workers, women, very young workers, and workers close to retirement). This reduction comes from lower employment in the construction and manufacturing sectors.

Our findings challenge the common belief that increasing tourist inflows leads to employment creation in a region. If the effects that we document are symmetric, they would suggest that the decline in tourist flows driven by covid-19, although destroying jobs in the tourism sector, may not in and of itself have negative direct effects on total employment, instead diverting investment and jobs to other sectors.

We next outline further steps in the analysis. First, we intend to exploit alternative shocks to the attractiveness of competing destinations, such as volatility in exchange rates or political instability. To supplement our analysis of the impact of tourism on employment, we plan to examine its impact on earnings using Social Security records. Finally, our analysis so far focuses on the identification of the short-term impact of tourism. We believe, however, that tourism has a deep-rooted impact on the labour market structure of the destination regions. Therefore, we intend to incorporate an analysis of the long-term consequences of tourism development on the regional industrial and labour market structure.

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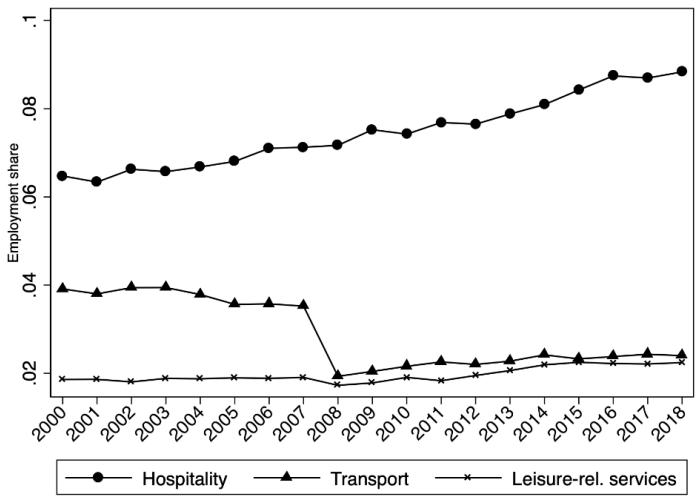
Tables and Figures

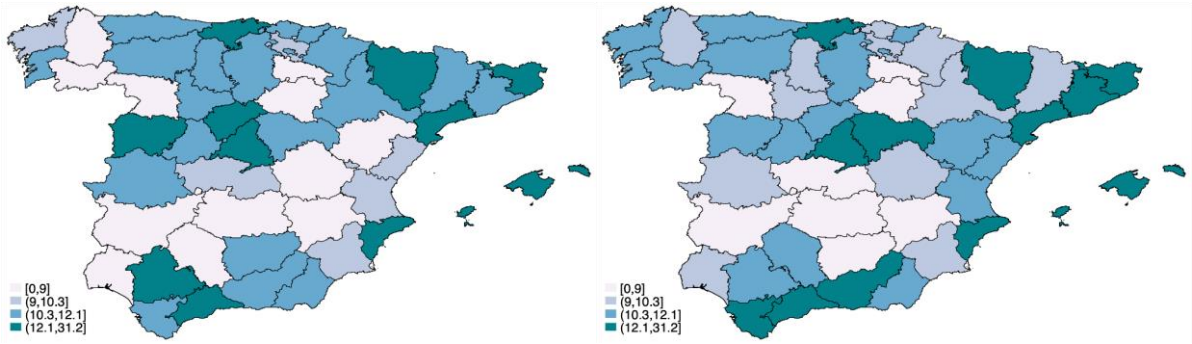
Figure 1: Tourism-related employment share between 2000 and 2018 by industry



Notes: The tourism sector is defined as a combination of hospitality, transport and leisure-related services (including sports, culture, and entertainment). In 2008, the transport industry, as defined in the LFS, was reclassified, such that it was possible to exclude transport of goods from the classification, hence the pronounced drop in the employment share in tourism-related transport.

Figure 2: Tourism employment shares across Spanish provinces

Panel A: 2000 Panel B: 2018



Notes: maps show the distribution of employment in tourism-related activities across Spanish provinces in 2000 and 2018. Tourism-related employment is captured as shares over the total province-level employment. Canary Islands are excluded from the map.

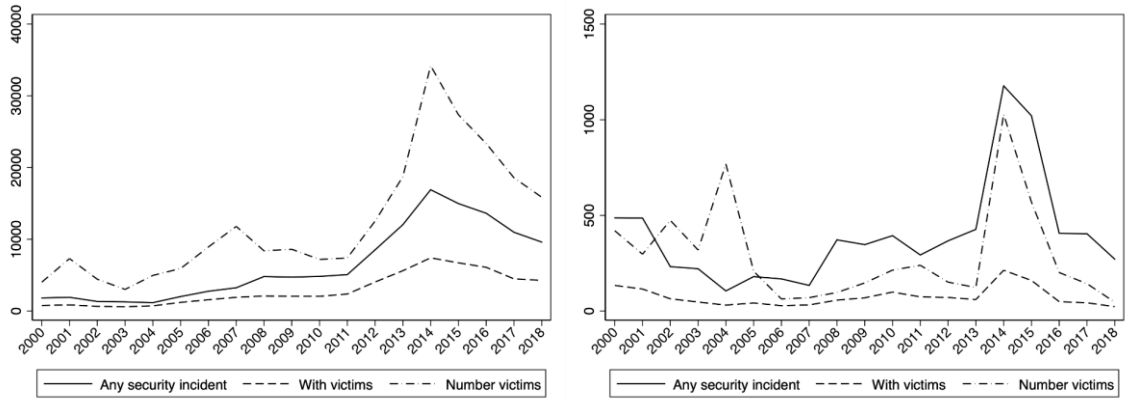
Figure 3: Tourist arrivals between 2000 and 2018 and the share of international tourism

Notes: the figure plots the total number of tourist arrivals based on the estimates from the Hotel Occupancy Survey. It also displays the share of international arrivals over the total.

Figure 4: The evolution of terrorist incidents between 2000 and 2018

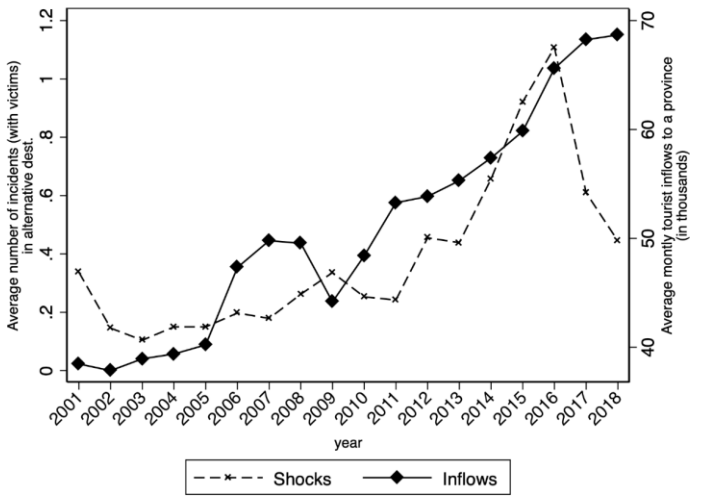
Panel A: Worldwide

Panel B: Europe



Notes: The figure displays the annual number of any terrorist attacks, number of incidents with casualties and the number of victims worldwide (panel A) and European continent (panel B) between 2000 and 2018. Based on the data from the Global Terrorist Database.

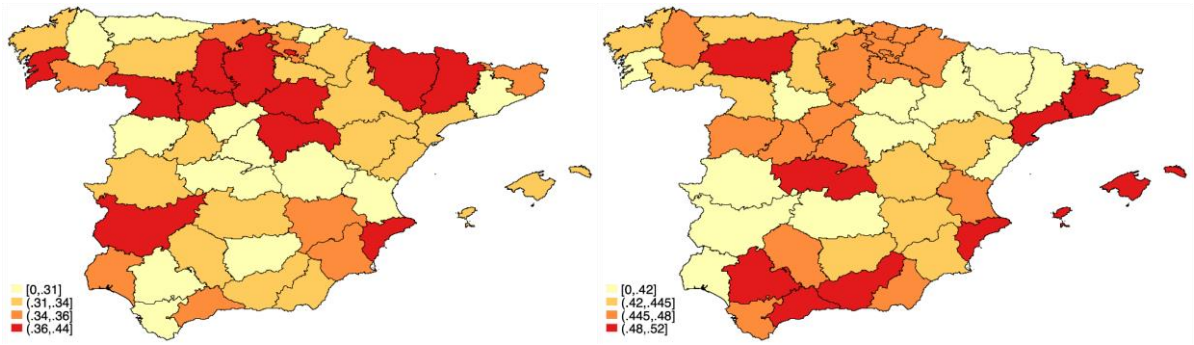
Figure 5: Province-level exposurure to shocks in competing destinations and tourist inflows



Notes: The figure plots the annual average of the number of incidents assigned to a province in a given month (solid line) and the average inflow of international tourists to a province.

Figure 6: Distribution of shocks across Spain

Panel A: 2000 Panel B: 2018



Notes: Maps show the distribution across Spanish provinces of exposure to shocks in competing tourist destinations in years 2000 and 2018. Canary Islands are excluded from the map.

Table 1: Employment shares in tourism-related activity across Spanish provinces

	2000		2018	
1	Balearic Islands	27.76	Las Palmas	31.03
2	Las Palmas	22.27	Balearic Islands	27.35
3	Tenerife	19.81	Tenerife	26.55
4	Málaga	17.58	Guadalajara	19.89
5	Girona	16.36	Málaga	19.85
⋮	⋮	⋮	⋮	⋮
48	Ourense	8.31	Albacete	8.29
49	La Rioja	8.28	Zamora	7.95
50	Zamora	8.10	Ciudad Real	7.92
51	Lugo	7.44	La Rioja	7.69
52	Soria	6.54	Melilla	7.52
	Average	11.52	Average	12.14
	SD	3.69	SD	4.89

Note: the table displays province-level employment shares in tourism-related activities, which include hospitality, transport and entertainment and culture industries. The employment share is computed over the total number of people employed in each year and province. The data source is the Spanish Labour Force Survey (LFS). The shares were computed using sampling weights from the survey.

Table 2: Socio-demigraphic characteristics of the LFS sample

	Whole sample (1)	Prime-age sample (2)
Age	41.00	40.62
	(13.80)	(8.68)
Female	0.508	0.510
High-school dropouts	0.510	0.454
High-school graduates	0.306	0.320
University education	0.184	0.226
Immigrant	0.080	0.094
Participation	0.689	0.822
Inactive	0.311	0.178
Employed	0.578	0.701
Unemployed	0.111	0.121
Tourism-rel. employment	0.065	0.077
Full-time employed	0.507	0.620
Permanent contract	0.340	0.428
Temporary contract	0.129	0.146
Usual hours of work	16.21	19.93
	(20.22)	(20.70)
Obs.	7,894,097	5,180,108

Note: sample used in the labour market analysis comes from the Labour Force Survey years 2001 to 2018 and includes individuals aged 16 to 65 in column 1 and individuals aged 25 to 55 in column 2. Standard deviations are reported in parentheses.

Table 3: Association between the inflow of international tourists and local employment outcomes

	Whole sample				Prime-age sample			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Panel A: Tourism-related employment							
Log inflow	0.0079***	0.0079***	0.0060***	0.0060***	0.0093***	0.0094***	0.0065***	0.0064***
	(0.0002)	(0.0002)	(0.0005)	(0.0005)	(0.0002)	(0.0002)	(0.0006)	(0.0006)
Avg. DV	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08
	Panel B: Employment							
Log inflow	0.0036***	0.0035***	0.0129***	0.0124***	0.0028***	0.0027***	0.0121***	0.0113***
	(0.0006)	(0.0004)	(0.0015)	(0.0015)	(0.0006)	(0.0004)	(0.0015)	(0.0015)
Avg. DV	0.58	0.58	0.58	0.58	0.70	0.70	0.70	0.70
	Panel C: Participation							
Log inflow	0.0070***	0.0063***	0.0038***	0.0040***	0.0058***	0.0049***	0.0018	0.0021*
	(0.0005)	(0.0003)	(0.0008)	(0.0009)	(0.0005)	(0.0002)	(0.0011)	(0.0012)
Avg. DV	0.69	0.69	0.69	0.69	0.82	0.82	0.82	0.82
Avg. log inflow	4.19	4.19	4.19	4.19	4.20	4.20	4.20	4.20
SD of log inflow	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
Observations	7,891,145	7,891,145	7,891,145	7,891,145	5,178,144	5,178,144	5,178,144	5,178,144
Demographics	yes	yes	yes	yes	yes	yes	yes	yes
Year FE		yes	yes			yes	yes	
Quarter FE		yes	yes			yes	yes	
Province FE			yes	yes			yes	yes
Quarter-Year FE				yes				yes

Note: Table displays correlations between the log number of international arrivals and tourism-related employment, labour market participation and any employment, estimated using ordinary least squares. The estimation is based on the data from Spanish LFS and FRONTUR data on tourist arrivals. In columns 1-4 the whole sample is included, in columns 5-8 the sample is reduced to the prime-age individuals, aged 25 to 55. Robust standard errors clustered on quarter-year level in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 4: The impact of terrorist attacks on international tourist inflows

	Log inflow					
	All origin-destination pairs			Origin-destination pairs with positive flows		
	(1)	(2)	(3)	(4)	(5)	(6)
Number fatal incidents	-0.3238***		-0.3348***	-0.0520***		-0.0387***
	(0.0266)		(0.0374)	(0.0044)		(0.0049)
Number victims		-0.2011***	0.0124		-0.0393***	-0.0157***
		(0.0278)	(0.0369)		(0.0047)	(0.0054)
Avg. DV	7.07	7.07	7.07	9.57	9.57	9.57
Observations	72,138	72,138	72,138	61,168	61,168	61,168
R-squared	0.70	0.70	0.70	0.97	0.97	0.97
Region-Year FE	yes	yes	yes	yes	yes	yes
Origin-Destination FE	yes	yes	yes	yes	yes	yes

Notes: Table shows the impact of terrorist incidence on tourist inflows to a destination affected by the terrorist activity. The regressions are based on the GTD data on terrorist incidents and the UNWTO data that covers the composition of the outbound tourism from the 21most important countries of origin of tourists to Spain. In columns 1-3 all origin-destination pair are included, which comprises origin-destination pairs with zero flows. In columns 4-6, we ignore origin-destination pair with no flows. Heteroskedasticity-robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 5: The impact of exposure to terrorist incidents in alternative destinations on local international arrivals

D.V.	Log international tourist inflows						
Data level	Province-Monthly			Province-Quarterly		Individual-Quarterly	
Time horizon	Same month	Same quarter	Two quarters	Same quarter	Two quarters	Same quarter	
Sample						Whole	Prime age
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Number fatal incidents	0.1515***	0.1168***	0.0581***	0.1573***	0.0957***	0.1505***	0.1521***
	(0.0275)	(0.0224)	(0.0121)	(0.0387)	(0.0270)	(0.0468)	(0.0476)
F-stat.	30.28	27.22	22.9	16.51	12.58	10.34	10.2
SD Regressor	1	1	1	1	1	1	1
Observations	11,208	11,108	10,958	3,664	3,615	7,891,145	5,178,144
R-squared	0.96	0.97	0.98	0.97	0.98	0.97	0.97
Province FE	yes	yes	yes	yes	yes	yes	yes
Year-month FE	yes	yes	yes				
Year-quarter FE				yes	yes	yes	yes
Demographic controls						yes	yes

Notes: table displays province- and individual-level first stage regressions. In columns 1-3, the regressions are based on a monthly panel; in columns 4 and 5, the data is aggregated to quarterly level, and results in columns 6 and 7 replicate those from column 4 but using individual data from the LFS. The F-statistic on the excluded instruments is displayed at the bottom. Result in columns 1 looks at the impact of exposure to shocks in alternative destinations on tourist inflow in the same month. In columns 2, 4, 6 and 7, we look at the impact on tourism in the same quarter, and in columns 3 and 5, we look at the same impact but in the same semester. Standard errors clustered on year-month level in parentheses in columns 1-3 and year-quarter in columns 4-7. *** p<0.01, ** p<0.05, * p<0.1

Table 6: Impact of international tourism on local labour markets

	Whole sample			Prime-age sample		
	OLS	RF	2SLS	OLS	RF	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)
			Panel A: Tourism-related employment			
Log inflow	0.0060***		0.0115**	0.0064***		0.0183***
	(0.0005)		(0.0050)	(0.0006)		(0.0058)
Number fatal incidents		0.0017**			0.0028**	
		(0.0008)			(0.0012)	
Avg. D.V.	0.07	0.07	0.07	0.08	0.08	0.08
			Panel B: Employment			
Log inflow	0.0124***		-0.0309***	0.0113***		-0.0147*
	(0.0015)		(0.0097)	(0.0015)		(0.0081)
Number fatal incidents		-0.0046**			-0.0022	
		(0.0022)			(0.0016)	
Avg. D.V.	0.58	0.58	0.58	0.70	0.70	0.70
			Panel C: Participation			
Log inflow	0.0040***		-0.0039	0.0021*		0.0062
	(0.0009)		(0.0045)	(0.0012)		(0.0052)
Number fatal incidents		-0.0006			0.0009	
		(0.0007)			(0.0010)	
Avg. D.V.	0.69	0.69	0.69	0.82	0.82	0.82
F-stat on excluded instruments			10.34			10.2
Observations	7,891,145	7,894,097	7,894,097	5,178,144	5,180,108	5,178,144
Demographics	yes	yes	yes	yes	yes	yes
Province FE	yes	yes	yes	yes	yes	yes
Quarter-Year FE	yes	yes	yes	yes	yes	yes

Note: table shows estimates of tourism on employment and participation using the least-square, reduced-form and two-stage-least-square regressions, where tourist inflows are instrumented by the number of terrorist attacks in alternative destinations accrued to a province. In columns 1-3, the whole sample is included, while in columns 4-6 the focus is on the prime-age individuals, 25 to 55 years old. Standard deviation in log inflow is 1.70 for the overall sample as well as prime-age sample. Robust standard errors clustered on quarter-year level in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 7: The impact of tourism shocks by age group

	Young		Old	
	OLS	2SLS	OLS	2SLS
	(1)	(2)	(3)	(4)
	Panel A: Tourism-related employment			
Log inflow	0.0076***	0.0089	0.0046***	-0.0111**
	(0.0008)	(0.0069)	(0.0008)	(0.0051)
Avg. D.V.	0.048	0.048	0.043	0.043
	Panel B: Employment			
Log inflow	0.0209***	-0.0552***	0.0077***	-0.0229**
	(0.0020)	(0.0175)	(0.0015)	(0.0102)
Avg. D.V.	0.288	0.288	0.424	0.424
	Panel C: Participation			
Log inflow	0.0138***	-0.0138	0.0029*	0.0240***
	(0.0016)	(0.0176)	(0.0016)	(0.0071)
Avg. D.V.	0.426	0.426	0.482	0.482
F-stat on excluded instruments		12.21		9.48
SD of log inflow	1.70	1.70	1.70	1.70
Observations	1,253,428	1,253,428	1,459,573	1,459,573
Demographics	yes	yes	yes	yes
Province FE	yes	yes	yes	yes
Quarter-Year FE	yes	yes	yes	yes

Notes: Table shows the OLS and 2SLS estimates of the effect of international tourism on employment and participation as in columns 1, 3, 4 and 6 of table 6. In columns 1-2, the effects for workers aged 16 to 24 are shown, in columns 3-4 the sample is restricted to individuals aged 56 to 65. Robust standard errors clustered on quarter-year level in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 8: Heterogeneous impact of tourism on labour market outcomes by gender and education

	Men		Women		Low skilled		Middle skilled		High skilled	
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
					Panel A: Tourism-related employment					
Log inflow	0.0051***	0.0198***	0.0074***	0.0162**	0.0085***	0.0208***	0.0060***	0.0181***	0.0017***	0.0203***
	(0.0007)	(0.0065)	(0.0006)	(0.0061)	(0.0008)	(0.0072)	(0.0010)	(0.0063)	(0.0006)	(0.0057)
Avg. D.V.	0.09	0.09	0.07	0.07	0.08	0.08	0.09	0.09	0.05	0.05
					Panel B: Employment					
Log inflow	0.0108***	-0.0146	0.0104***	-0.0213**	0.0147***	-0.0192**	0.0093***	-0.0196*	0.0069***	-0.0007
	(0.0019)	(0.0090)	(0.0014)	(0.0092)	(0.0019)	(0.0091)	(0.0019)	(0.0107)	(0.0015)	(0.0092)
Avg. D.V.	0.80	0.80	0.60	0.60	0.60	0.60	0.75	0.75	0.83	0.83
					Panel C: Participation					
Log inflow	0.0038***	0.0084***	-0.0008	-0.0009	0.0043**	0.0177***	0.0026**	-0.0000	0.0020**	-0.0010
	(0.0006)	(0.0031)	(0.0020)	(0.0088)	(0.0018)	(0.0066)	(0.0010)	(0.0064)	(0.0009)	(0.0058)
Avg. D.V.	0.91	0.91	0.73	0.73	0.75	0.75	0.86	0.86	0.91	0.91
F-stat on excluded instruments		10.26		10.15		11.69		9.34		8.76
SD of log inflow	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
Observations	2,539,395	2,539,395	2,638,749	2,638,749	2,352,100	2,352,100	1,656,585	1,656,585	1,169,459	1,169,459
Demographics	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Province FE	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Quarter-Year FE	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes

Notes: Table shows the OLS and 2SLS estimates of the effect of international tourism on employment and participation as in columns 1, 3, 4 and 6 of table 6. The sample is restricted to individuals of prime age, 25 to 55. The effects are estimated separately for men in columns 1-2 and women in columns 3-4. In columns 5-10, the heterogeneity by education is explored. Robust standard errors clustered on quarter-year level in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 9: Impact of tourism on the employment characteristics

D.V.	Permanent contract		Temporary contract		Full-time		Part-time		Log hours work	
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Panel A: Tourism industry									
Log inflow	0.0030***	0.0045*	0.0030***	0.0070**	0.0058***	0.0155***	0.0006***	0.0028**	0.0227***	0.0650***
	(0.0003)	(0.0026)	(0.0003)	(0.0027)	(0.0005)	(0.0053)	(0.0002)	(0.0011)	(0.0023)	(0.0188)
Avg. D.V.	0.040	0.040	0.017	0.017	0.06	0.06	0.01	0.01	0.26	0.26
	Panel B: Any industry									
Log inflow	0.0038***	-0.0282***	0.0057***	-0.0080	0.0107***	-0.0041	0.0006	-0.0106***	0.0447***	-0.0019
	(0.0010)	(0.0060)	(0.0016)	(0.0071)	(0.0015)	(0.0078)	(0.0004)	(0.0034)	(0.0050)	(0.0251)
Avg. D.V.	0.428	0.428	0.146	0.146	0.62	0.62	0.08	0.08	2.44	2.44
F-stat on excluded instruments		10.2		10.2		10.2		10.2		10.2
Observations	5,178,144	5,178,144	5,178,144	5,178,144	5,178,144	5,178,144	5,178,144	5,178,144	5,178,144	5,178,144
Demographics	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Province FE	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Quarter-Year FE	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes

Note: table shows estimates of tourism on permanent and temporary, full- and part-time employment, and usual hours of work using the least-square and two-stage-least-square regressions, where tourist inflows are instrumented by the number of terrorist attacks in alternative destinations accrued to a province. Sample includes individuals aged 25 to 55. In panel A, we analyse the impact on tourism employment characeristics, while in panel B we look at the characteristics of the overall employment. Standard deviation log tourist inflow is 1.70. Robust standard errors clustered on quarter-year level in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 10: Impact of tourism on employment in other sectors

D.V.	Employment in an industry					
	OLS	2SLS	OLS	2SLS	OLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A:	*Manufacturing*		*Construction*		*Commerce*	
Log inflow	-0.0020***	-0.0134***	0.0018***	-0.0247***	0.0015***	-0.0028
	(0.0007)	(0.0037)	(0.0006)	(0.0040)	(0.0005)	(0.0024)
Avg. D.V.	0.104	0.104	0.063	0.063	0.109	0.109
Panel B:	*Transport*		*Agriculture*		*Energy*	
Log inflow	0.0001	-0.0006	0.0019***	0.0069***	0.0001	0.0016*
	(0.0002)	(0.0019)	(0.0004)	(0.0019)	(0.0001)	(0.0008)
Avg. D.V.	0.012	0.012	0.035	0.035	0.007	0.007
F-stat on excluded instruments		10.2		10.2		10.2
Observations	5,178,144	5,178,144	5,178,144	5,178,144	5,178,144	5,178,144
Demographics	yes	yes	yes	yes	yes	yes
Province FE	yes	yes	yes	yes	yes	yes
Quarter-Year FE	yes	yes	yes	yes	yes	yes

Notes: Table shows the OLS and 2SLS estimates of the effect of international tourism on employment in manufacturing, construction, commerce, transport, agriculture, and energy. Sample includes individuals aged 25 to 55. Robust standard errors clustered on quarter-year level in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Appendix A: Adjusting the reported arrivals of tourists by origin and destination

UNWTO data contains information on tourist flows to 196 destinations from the 21 countries of origin of tourists reported in the FRONTUR data. The number of tourists and their origin is reported by each country of destination individually, hence some differences in reporting occur. Specifically, there are eight different series reporting arrivals across destinations. These are:

- TFN: Arrivals of non-resident tourists at national borders, by nationality
- TFR: Arrivals of non-resident tourists at national borders, by country of residence
- VFN: Arrivals of non-resident visitors at national borders, by nationality
- VFR: Arrivals of non-resident visitors at national borders, by country of residence
- THSN: Arrivals of non-resident tourists in hotels and similar establishments, by nationality
- THSR: Arrivals of non-resident tourists in hotels and similar establishments, by country of residence
- TCEN: Arrivals of non-resident tourists in all types of accommodation establishments, by nationality
- TCER: Arrivals of non-resident tourists in all types of accommodation establishments, by country of residence

The predominant series are arrivals of non-resident tourists at national borders by nationality (TFN) or residence (TFR), about 40 per cent of all reported flows are reported using one of these series. Other frequently used series are arrivals of visitors at national borders by nationality (VFN) or residence (VFR) accounting together for 24 per cent of reports; and arrivals of tourists in hotels and similar establishments by country of residence (THSR) with nearly 14 per cent of reports.

Some of the series are closely related, others are not, so it would be misleading calculating the shares using the mix of series. To homogenise the reported flow numbers, we exploit the fact that at least two series are reported simultaneously for 55 per cent of origin-destination pairs in a given year. Therefore, we can estimate the correlations across series based on these observations. Destinations tend to report arrivals either by country of residence or nationality, so in the table below we report correlations between arrivals of tourists by residence, i.e. the most common measure, versus other series reported by residence in columns 2 to 4; in columns 5 to 7 we report correlation between arrivals of tourists by nationality versus other measures reported by nationality, and finally in column 1 we report the correlation between tourist arrivals by residence and nationality. All correlations are conditioned on origin-destination and year fixed effects.

We then use the reported correlations to adjust all the reported measures to make them more comparable to arrivals of tourists by country of residence. For instance, we multiply the arrivals of tourists to the hotels by 1.125. For measures reported by nationality, we first "convert" them into arrivals of tourists by nationality and then adjust that using the correlation reported in column 1. For instance, we multiply the arrivals of tourists to the hotels by nationality by 0.9 and then by 0.966. After making these adjustments, the reported number of tourist arrivals and the adjusted series remain very close, with correlation of 98.6.

Conditinal correlations across reported tourist inflows

D.V.	Arrivals of tourists by country of residence				Arrivals of tourists by nationality		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Arrivals of tourists by nat.	0.966***						
	(0.001)						
Arrivals of visitors by res.		0.121***					
		(0.001)					
Arrivals tourists to hotels by res.			1.125***				
			(0.026)				
Arrivals tourists to all accommodation by res.				0.848***			
				(0.019)			
Arrivals of visitors by nat.					0.573***		
					(0.137)		
Arrivals tourists to hotels by nat.						0.900***	
						(0.099)	
Arrivals tourists to all accommodation by nat.							0.771***
							(0.098)
R-squared	0.99	0.99	0.98	0.99	0.98	0.97	0.97
Observations	1,248	1,992	2,930	1,960	2,701	2,663	1,233
Origin-Destination FE	yes	yes	yes	yes	yes	yes	yes
Year FE	yes	yes	yes	yes	yes	yes	yes

Standard errors clustered on destination country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Appendix Tables and Figures

Table A1: International tourist arrivals to Spain by origin

2000		*2009*		*2018*	
Germany	0.234	United Kingdom	0.201	United Kingdom	0.188
United Kingdom	0.207	Germany	0.190	Germany	0.141
France	0.092	France	0.109	France	0.109
United States	0.063	Italy	0.070	United States	0.055
Italy	0.062	United States	0.048	Italy	0.055
Netherlands	0.038	Netherlands	0.040	Netherlands	0.039
Belgium	0.035	Portugal	0.035	Portugal	0.028
Portugal	0.035	Belgium	0.030	Belgium	0.026
Japan	0.029	Sweden	0.017	Sweden	0.022
Switzerland	0.018	Ireland	0.017	Switzerland	0.018
Cumulative	0.812		0.757		0.680

Note: The table displays the compostion of international tourist inflows in 2000, 2009 and 2018. Only ten countries/regions with largest tourist inflows are displayed. The data source is FRONTUR data on international arrivals to Spain.

Table A2: Share of international tourists over the total arrivals to a province

		Average	Minimum	Maximum
1	Balearic Islands	0.838	0.798	0.878
2	Las Palmas	0.751	0.687	0.836
3	Santa Cruz de Tenerife	0.669	0.580	0.768
4	Barcelona	0.668	0.615	0.738
5	Girona	0.572	0.530	0.601
6	Málaga	0.557	0.487	0.641
7	Sevilla	0.476	0.411	0.556
8	Madrid	0.436	0.395	0.478
9	Granada	0.428	0.367	0.488
10	Tarragona	0.423	0.384	0.473
⋮	⋮	⋮	⋮	⋮
43	Guadalajara	0.132	0.106	0.156
44	Cáceres	0.130	0.105	0.158
45	Asturias	0.123	0.097	0.172
46	Ciudad Real	0.115	0.101	0.132
47	Cuenca	0.114	0.086	0.154
48	Zamora	0.106	0.086	0.121
49	Teruel	0.091	0.065	0.125
50	Ourense	0.087	0.065	0.129
51	Soria	0.076	0.061	0.095
52	Albacete	0.076	0.059	0.090

Note: table shows the share of international inflows over the total tourist inflows to a province between 2000 and 2018. Annual average over the period is displayed for provinces with highest and lowest share of international arrivals, as well as minimums and maximums. Source data is FRONTUR, 2000-2018.

Table A3: Composition by origin of international tourist inflows to provinces of Barcelona, Balearic Islands and Madrid

Barcelona		*Balearic Islands*		*Madrid*	
France	0.113	Germany	0.337	United States	0.116
United States	0.109	United Kingdom	0.276	France	0.069
United Kingdom	0.104	France	0.052	United Kingdom	0.066
Germany	0.074	Italy	0.046	Italy	0.065
Italy	0.070	Sweden	0.040	Germany	0.048
Netherlands	0.036	Netherlands	0.034	Portugal	0.042
Russia	0.029	Switzerland	0.026	Netherlands	0.023
Belgium	0.021	Denmark	0.017	Japan	0.019
Switzerland	0.019	Austria	0.016	Switzerland	0.015
Japan	0.019	Norway	0.016	Belgium	0.015
Cumulative	0.595		0.861		0.478

Note: Table displays the compostion of international tourist inflows in 2018. Only ten countries/regions with largest tourist inflows to each province are displayed. The data source is FRONTUR data on international arrivals to Spainish provinces in 2018

Table A4: Composition of outbound tourism from the United Kingdom, Germany and France

United Kingdom		*Germany*		*France*	
Spain	0.252	Italy	0.150	Spain	0.256
France	0.084	France	0.141	Italy	0.167
Italy	0.075	Spain	0.131	Germany	0.041
Ireland	0.065	Austria	0.122	Morocco	0.040
United States	0.063	Greece	0.050	United States	0.040
Greece	0.040	Turkey	0.050	Greece	0.034
Germany	0.037	Netherlands	0.039	Portugal	0.033
Netherlands	0.032	Hungary	0.026	Belgium	0.026
Turkey	0.029	United States	0.024	Netherlands	0.021
Portugal	0.028	Switzerland	0.022	Switzerland	0.018
Cumulative	0.707		0.755		0.676

Note: Table displays the compostion of outbound tourist flows in 2018 from UK, Germany and France. Only ten destinations with largest tourist inflows are displayed. The source of the data is outbound tourism series from UNWTO data.

Table A5: Top Spanish destination provinces for tourists from the United Kingdom, Germany and France

United Kingdom		*Germany*		*France*	
Balearic Islands	0.244	Balearic Islands	0.397	Barcelona	0.174
Las Palmas	0.142	Las Palmas	0.179	Girona	0.156
Tenerife	0.113	Barcelona	0.088	Balearic Islands	0.079
Alicante	0.102	Tenerife	0.071	Madrid	0.069
Málaga	0.094	Madrid	0.037	Tarragona	0.065
Barcelona	0.093	Málaga	0.036	Málaga	0.054
Madrid	0.038	Cádiz	0.036	Las Palmas	0.047
Tarragona	0.028	Girona	0.021	Sevilla	0.038
Girona	0.020	Sevilla	0.015	Tenerife	0.024
Sevilla	0.016	Granada	0.012	Gipuzkoa	0.024
Cumulative	0.890		0.893		0.732

Note: Table displays the distribution of British, German and French tourists across Spanish provinces in 2018. Only ten destinations with largest tourist inflows are displayed. The data source is FRONTUR data on international arrivals to Spainish provinces.

Table A6: Impact of international tourism on the local labour markets, alternative instrument specification

D.V.	Tourism-rel. empl.		Employment		Participation	
	IV1	IV2	IV1	IV2	IV1	IV2
	(1)	(2)	(3)	(4)	(5)	(6)
Log inflow	0.0171***	0.0181***	-0.0144*	-0.0015	0.0064	0.0012
	(0.0058)	(0.0039)	(0.0073)	(0.0107)	(0.0048)	(0.0042)
F-stat on excluded instruments	7.74	37.02	7.74	37.02	7.74	37.02
Observations	5,178,144	5,178,144	5,178,144	5,178,144	5,178,144	5,178,144
Demographics	yes	yes	yes	yes	yes	yes
Province FE	yes	yes	yes	yes	yes	yes
Quarter-Year FE	yes		yes		yes	
Year FE		yes		yes		yes
Quarter FE		yes		yes		yes

Note: table shows estimates of tourist on employment and participation using two alternative specifications of the two-stage-least-square regressions. In columns 1, 3 and 5, (i.e. IV1) in addition to the number of terrorist attacks in alternative destinations, we also use a number of victims. In columns 2, 4 and 6, (IV2) we instrument the international tourist inflows by the number of attacks only, but instead of controlling for the year-quarter fixed effects, we control for year and quarter separately. Sample consists of prime-age individuals, 25 to 55 years old. Robust standard errors clustered on quarter-year level in parentheses. *** p<0.01, ** p<0.05, * p<0.1