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Abstract

We employ unconditional quantile regression with region of origin fixed effects, whereby we find that attending live football matches significantly increases expenditures by inbound tourist in the UK, and surprisingly we find that such effects are strongest for those who overall spend the least. Higher spending individuals spend significantly more than those who do not attend football matches, even when such individuals are otherwise similar. We analyse the impact of football attendance across the tourism expenditure distribution which is a relatively neglected aspect within previous research.

Keywords: tourist expenditure, football attendance, unconditional quantile regression
JEL Classifications: C5, D1, F61

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I Introduction

The English Premier League (EPL) for football (soccer) has a global television audience of about 730 million in more than 185 countries (Javid, 2015). Inbound tourism fosters growth and generates revenue for the host economy (De Vita and Kyaw, 2016), such that nations seek to exploit all of their comparative advantages in its promotion. For the UK turning this overseas interest in football into stadium visits has obvious value. With games taking place through the traditionally low season of tourist demand an opportunity to exploit spare capacity in the travel sector is presented. To evaluate the potential of football additional questions were added to the annual International Passenger Survey (IPS) in 2014, respondent being asked which stadia they had attended, if any, during their visit. Using weighted data from the IPS, the UK Office for National Statistics (ONS) estimate there were eight hundred thousand trips that included one football match, or 1 in 43 of all visits (Visit Britain, 2015). Applying this data for economic research for, to the best of our knowledge, the first time gives our results key relevance to this global industry. Whilst aggregate comparisons show those who attended matches spent more than those who did not (Visit Britain, 2015) we demonstrate that across the spending distribution football attendance promotes higher spending, amongst lower aggregate spenders in particular. Though the marginal effect is smaller for higher aggregate spenders, there is significance from attendance.

Studies of mega-events such as the Olympics or football World Cup dominate the literature on sports tourism (Rose and Spiegel, 2011; Billings and Holladay, 2012; Djaballah et al., 2015; Holtzhausen and Fullerton, 2015). However, works on regular leagues with fixtures spread across the year, are significantly limited with ours the first contribution on the United Kingdom and football. Our primary empirical departure lies in the application of the fixed effects unconditional quantile regression mode (Fortin et al., 2009; Borgen et al., 2016). This yields the conclusions that football brings the greatest marginal benefits from lower spenders, far above the reported ordinary least squares (OLS) level, but that there is still significant extra spending by attendees at the top of the distribution. Drilling into this effect we construct a unique expenditure variable which utilises the BBC Cost of Football Survey (BBC, 2014) to subtract ticket prices and leave only the extra spending in the local economy. Under this measure we show stadium visits continue to promote greater expenditure at the higher spending quantiles, an effect missed by OLS. Through inclusion of common covariates as controls and permitting heterogeneity by region of origin, we demonstrate how football's global popularity can be leveraged by UK policy and industry practitioners alike. Whilst our empirical work relates to Britain, we believe our analysis is applicable to other global brands such as the United States National Football League (NFL) and the Indian Premier (cricket) League, in terms of relevance of sporting events in promoting tourism expenditures overall.

Research interest in UK football comes from its global reach, value to the UK economy and its resulting ability to be a catalyst for growth across the UK (Javid, 2015; Visit Britain, 2015; Webster and Ivanov, 2014). Results matter and there is a positive relationship between success and local economic spillovers; happy attendees go on to spend in the bars, restaurants and shops in the locality (Davis and End, 2010; **?**). Enjoyment can come from event uncertainty as argued by Nalbantis et al. (2017) and Pawlowski et al. (2017), or how actual results differ from what was expected Coates et al. (2014). Leicester City's EPL unexpected victory in 2016 is symbolic of the unpredictability of the EPL, and is therefore something that can be incorporated within overall efforts aimed at promotion of football match attendance in the UK. We analyse the monetisation of this happiness through analysis of the observed spending levels, acknowledging the constraints

of the IPS in appraising happiness opposite budgets and the lack of information about the matches our tourists watched. To exploit these specific insights from studies of sport and translate them into a successful marketing message is an obvious challenge; demographic considerations of age, gender, nationality and trip characteristics such as length of stay, group size and trip purpose must all be integral in the targeting process.

A premise of match attendance is that there is an interest in football prior to the match; an emerging literature reviews the impact of broadcasting rights and sports events on tourism intent (Peng et al., 2016; Cave and Crandall, 2001; Cox, 2016; Sondaal, 2013; Webster and Ivanov, 2014; Weeds, 2016; Pawlowski et al., 2017). Conflicting evidence emerges for broadcast matches and uncertainty; Buraimo and Simmons (2015) and Pawlowski et al. (2017) focus on the relevance of uncertainty and increased viewership, respectively. Irrespective of the uncertainty argument the global reach of the game continues to grow and there exists significant potential for successfully targeting non-UK residents to attend UK football matches.

Within this context of expanding media coverage, regular sporting contests receive a growing global awareness. Sondaal (2013) charts the impact this growth has had on football, noting an internationalisation and homogenisation of the product alongside a redefinition of what is meant by the football club's community. For example, this sense of identity is one of the main reasons Chinese internet users provide for wanting to travel to view matches (Peng et al., 2016) but its' present form is threatened by the very interest it attracts. Examples where the attempt to generate relevance to international audiences have drawn disillusionment from long-standing supporters include the attempts to rename Hull City as Hull Tigers (**?**), and the change of kit colour from traditional blue to "lucky "at Cardiff City (Bi, 2015). Nevertheless, encouraging the globalisation of the game is contentious. Within the literature on large scale events, issues relating to social cohesion have emerged alongside economic, financial and developmental aspects(Kim et al., 2015). Regular sports events have significant economic and non-economic impacts. We need to be cautious in interpreting positive effects associated with both football match attendance and increased tourist expenditures, given the trade-offs with societal negatives that must be made.

[****] Because of the economic importance highlighted, and the link between tourism expenditure and growth (De Vita and Kyaw, 2016), there is a large volume of studies exploring inward tourists spending; Brida and Scuderi (2013) and Thrane (2014) offer a comprehensive reviews. Analyses of expenditure were traditionally OLS driven , but in recent years further methodologies have been introduced to make use of panel data and distribution techniques in particular. Conditional Quantile Regression (QR) after Koenker and Bassett Jr (1978) has found favour precisely because it allows researchers to study the impact of covariates away from the mean. Marrocu et al. (2015), Almeida and Garrod (2016) and Lv and Xu (2016) are amongst those to adopt QR, the latter also adding panel considerations to study corruption as an additional determinant. Santos and Cabral Vieira (2012) compares OLS and quantile regressions to underline the benefits moving away from the mean can bring. In all cases length of stay, gender, purpose of visit and group size are key determinants and each is adopted here. In UQR this paper brings a relatively new technique with a focus on a particular explanatory variable which is as yet unstudied to any depth.

Recognising the strong perception that revenues from soccer leave the UK (Bi, 2015) we propose a second measure of impact which removes ticket prices from stated expenditure to better reflect inflows for the local economy, as recognised by Whitehead et al. (2013). Consequently we have distributions of expenditure for two measures and this paper seeks to assess the factors influencing their shape. Within the extant literature on inbound tourism expenditure, simple sta-

tistical methodologies are usually employed (Brida and Scuderi, 2013; Thrane, 2014) with only very few studies utilising conditional quantile regression (Koenker and Bassett Jr, 1978). Different factors influence expenditure by lower spenders than those with higher disposable incomes with quantile regression methods being particularly suitable to this context [Chen and Chang (2012) and Marrocu et al. (2015)]. Our analysis makes a contibution by showing clearly that conventional use of ordinary least squares (OLS) and standard quantile regressions (QR) can lead to both incorrect inferences and suboptimal decisions in relation to efforts aimed at promotion of tourism expenditure. The UQR approach we employ (Fortin et al., 2009), we construct quantiles of expenditure which are independent of covariates, thus enabling us to better assess underlying parameter distributions. This enables our analysis of key explanatory variables to become clearer especially across the entire spending range rather than simply focusing on the mean as is usual when OLS is employed. This empirical strategy maintains benefits of UQR over OLS, as noted by Brida and Scuderi (2013), and we also obtain specified parameters though our use of UQR. Inferences arising from more robust analysis employing UQR should lead to more effective policy decisions.

This study thus seeks to evaluate the positive impact of football clubs on their local environment and the UK in general, employing innovative expenditure measures and making use of the IPS data for the first time. Recognising the potential clashes with local supporters we demonstrate how this valuable dataset monetises the interest in, and demand for, the EPL. Building on the variations in national cultures, and channels of influence a prescription for game promotion and expenditure encouragement emerges.

II Data and Methodology

A Measures of Expenditure

Expenditure covers all contributions to the UK economy, and represents the total spend of the respondent on the trip excluding air fares and duty free purchases. It is then this data upon which the aggregate statistics reported by the ONS for tourism are based. Specific use of the 2014 IPS dataset follows from it being the most recent occasion on which this large cohort survey has included questions on attendance at live football matches. Respondents are asked whether they attended any football matches and, if so, which stadia they attended. This is supplementary to the normal questions about trip characteristics and respondent demographics. With detailed information on football match attendance, and a clearly defined base expenditure measure, we are able to evaluate the impact of in stadia match viewing using both the total expenditure and economic contribution excluding estimated match ticket expenditure.

Total trip expenditures deliver the best estimate of the impact of an individual tourist on the UK economy. Table 1 details the prices of tickets and the number of attendees at each stadium option based upon those observations which feature in our estimation sample. Ticker prices are taken from the BBC cost of football survey (BBC, 2014), and ignore corporate options. We recognise that many of those who travel on business will be treated to entertainment packages, but equally many travellers will be cunning to buy tickets at the lowest prices possible amongst the many alternatives. With no data on ticket types purchased we consider these counterveiling effects to self-balance and use an average of the minimum and maximum price to calculate expenditure. The most visited stadia were those clubs with the greatest history of success (Manchester United,

Liverpool and Arsenal) and those who have recently experienced important successes (Chelsea and Manchester City). Many smaller teams received lower visitor numbers, and Scotland had very few attendees. Comparing prices and attendances it is clear that there is no real correlation between the two; major drivers being geography, the sense of community and desire to witness victory (Coates et al., 2014; Peng et al., 2016; Pawlowski et al., 2017). Such non-price elements of competition are implicit in the sports league literature [****]. Without knowing precise details of the games attended it is impossible to incorporate factors such as the unpredictability of a particular match outcome. Further, as typically successful teams win more, and do not struggle to sell out their tickets, this capacity constraint will drive prices up and instil a stronger link with predictability. Focusing on a single price for each club thus recognises as many of the variants as can be done with the available data. Incorporation of ticket prices is then our main departure from the IPS.

To construct adjusted expenditure we deduct the representative price of one ticket for each of the grounds an individual attended and then deduct this from the reported spend. Football seasons run from August until May such that 2014 saw the end of the 2013/14 season and the commencement of the 2014/15 campaign. This, together with the presence of larger clubs such as former European champions Nottingham Forest, outside the EPL means that many visitors listed other in the IPS; we use £25 for these prices as an average for the division below the EPL taken from BBC (2014).

We do not suggest that those who spend more on football would otherwise have come to the UK and used their money to buy other items, nor that all other items would bring equal benefit to the UK economy. Football is a unique product for the high levels of brand loyalty and demand inelasticity relative to the income of its primary consumer groups, it has the power to draw spectators from around the world who would otherwise not come to the UK. Our adjusted measure thus goes some way to assuming no substitution of other goods for football. Indeed many come solely for the football (Peng et al., 2016) but we can not identify these respondents from the data; the analysis that follows is conditional on coming to the UK, attending matches and the observed set of visitors.

B Data

Table 2 summarizes the full set of variables we employ. We have two continuous variables and each is reported in logs to mediate impacts of extreme large values. From the expenditure information the additional revenue mentioned in Visit Britain (2015) is very clear, and this is also picked up by the two-sample t-test of mean equality that we report in the final column of Table 2. Average expenditure is 5.918 (£372) dropping to 5.914 (£370) when ticket prices are removed, which is a very small change. Football attendees spend more on average than non-attendees, whilst post-adjustment this increase is still significant. Stay durations are almost identical implying football is seldom a reason to extend a trip, it is simply an activity undertaken when in the UK. In the tourism expenditure literature it has been argued that length of stay could be endogenous [CITATION], but we do not find any meaningful impact on the conclusions of the model from the inclusion of this important variable in a non-instrumented form. Length of stay remains in our chosen specification.

Unsurprisingly, the biggest difference comes in the gender make up of the two samples. The proportion of males in the attending group is 77.7% whilst the overall sample is only slightly unequal at 53.9% male. Visitors going to matches are also younger than the general population of tourists, with a higher proportion being under 25 (16.2% in the non-attending group versus 22.3%

Table 1: Minimum, Maximum and Average Prices of Football

Stadium	Club	City	Region	Respondent Count	Price Information		
					Minimum (£)	Maximum (£)	Average (£)
Wembley	National	London	South East	73	50	50	50
Millenium Stadium	National	Cardiff	Wales	7	40	40	40
Hampden Park	National	Glasgow	Scotland	6	40	40	40
Windsor Park	National	Belfast	N. Ireland	3	40	40	40
Emirates Stadium	Arsenal	London	South East	140	27	97	62
Villa Park	Aston Villa	Birmingham	Midlands	18	22	45	35.5
Cardiff City Stadium	Cardiff City	Cardiff	Wales	9	18	40	29
Stamford Bridge	Chelsea	London	South East	118	50	87	68.5
Selhurst Park	Crystal Palace	London	South East	16	30	40	35
Goodison Park	Everton	Liverpool	North West	30	33	47	40
Craven Cottage	Fulham	London	South East	37	25	45	35
KC Stadium	Hull City	Hull	North East	5	16	50	33
Anfield	Liverpool	Liverpool	North West	153	37	59	48
Etihad Stadium	Manchester City	Manchester	North West	54	37	58	47.5
Old Trafford	Manchester United	Manchester	North West	165	36	58	47
St James Park	Newcastle United	Newcastle	North East	20	15	52	33.5
Carrow Road	Norwich City	Norwich	East Anglia	11	25	40	32.5
St Mary's Stadium	Southampton	Southampton	South	12	32	52	42
Britannia Stadium	Stoke City	Stoke	Midlands	3	25	50	37.5
Stadium of Light	Sunderland	Sunderland	North East	9	25	40	32.5
Liberty Stadium	Swansea City	Swansea	Wales	4	35	45	40
White Hart Lane	Tottenham	London	South East	11	32	81	56.5
The Hawthorns	West Brom	West Bromwich	Midlands	3	25	39	42
Boelyn Ground	West Ham	London	South East	27	20	75	47.5
Pittodrie	Aberdeen	Aberdeen	Scotland	5	24	30	27
Celtic Park	Celtic	Glasgow	Scotland	11	23	34	28.5
Tannadice	Dundee United	Dundee	Scotland	0	19	25	22
Tynecastle	Hearts	Edinburgh	Scotland	0	17	30	23.5
Easter Road	Hibernian	Edinburgh	Scotland	0	22	28	25
Caledonian Stadium	Caley Thistle	Inverness	Scotland	1	16	30	23
Rugby Park	Kilmarnock	Kilmarnock	Scotland	0	17	26	21.5
Fir Park	Partick Thistle	Glasgow	Scotland	0	22	25	23.5
Fir Hill	Motherwell	Motherwell	Scotland	2	22	25	23.5
Global Energy Stadium	Ross County	Dingwall	Scotland	1	20	26	23
McDairmid Park	St Johnstone	Perth	Scotland	1	22	23	22.5
St Mirren Stadium	St Mirren	Glasgow	Scotland	23	20	22	21
Other				185	25	25	25

Notes: All data is sourced from the BBC Cost of Football Survey 2014 (BBC, 2014), whilst averages are computed using own calculations. Maximums are for standard seats and do not include corporate hospitality. Where a team changed divisions the price used remains that given in the survey. In the case of the national stadia there is large variation in prices and so the numbers used are averaged based on prices at a typical game at the venue. West Brom is used as shorthand for West Bromwich Albion and Caley Thistle is used in place of Inverness Caledonian Thistle

Table 2: Summary statistics

Variable	Mean	Std Dev	Min	Max	Attend Football?		
					No	Yes	Difference
Log expenditure	5.918	1.264	0	11.80	5.911	6.167	0.257^{***}
Log expenditure (Adjusted)	5.914	1.268	-4.605	11.801	5.911	6.006	0.095^{*}
Length of stay (log)	1.573	0.982	0	5.892	1.572	1.600	0.029
Attend live football	0.028	0.166	0	1	-	-	-
Air departures	0.832	0.374	0	1	0.829	0.932	0.103^{***}
Male	0.546	0.498	0	1	0.539	0.777	0.238^{***}
Aged under 25	0.164	0.370	0	1	0.162	0.223	0.061^{***}
Aged 25 to 64	0.760	0.427	0	1	0.760	0.740	-0.020
Aged 65 and over	0.075	0.264	0	1	0.076	0.036	-0.040^{***}
Purpose: Holiday	0.382	0.486	0	1	0.385	0.282	-0.103^{***}
Purpose: Business	0.180	0.384	0	1	0.184	0.039	-0.145^{***}
Purpose: Visit	0.438	0.496	0	1	0.431	0.679	0.248^{***}
Require visa	0.220	0.414	0	1	0.220	0.215	-0.005
Group size: 1	0.564	0.496	0	1	0.566	0.486	-0.080^{***}
Group size: 2	0.271	0.444	0	1	0.270	0.300	0.030^{*}
Group size: 3	0.166	0.372	0	1	0.164	0.214	0.049^{***}
Influence: Friends	0.380	0.485	0	1	0.379	0.395	0.016
Influence: Guidebook	0.078	0.267	0	1	0.078	0.076	-0.002
Influence: Review Sites	0.071	0.256	0	1	0.070	0.088	0.018^{*}
Influence: Tourist Board	0.029	0.169	0	1	0.030	0.024	-0.006
Influence: Media	0.018	0.134	0	1	0.018	0.029	0.011^{**}
Influence: Social Media	0.031	0.173	0	1	0.031	0.033	0.002

Notes: Summary statistics are reported for the 39,515 observations for which a complete set of information was available. We additionally report means for those who do not attend live football, "No", and those who did attend one or more matches, "Yes". The difference between means and significance from a two-sample t-test of mean equality are reported. For the latter significance is denoted by $^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$. Data from Office for National Satistics, Social Survey Division (2014).

Table 3: Region of Origin and Football Attendance

Region	Attend?		Total	Region	Attend?		Total
	No	Yes			No	Yes	
North America	5437	112	5549	Europe: Non-EU	4992	210	5202
Central America	112	3	115	Indian Subcontinent	1026	6	1032
South America	694	11	705	East Asia and China	1854	48	1799
Africa	953	16	969	Australasia	1742	57	1799
Middle East	955	40	995	Other	4554	170	4724
European Union	16087	446	16533				

Regions are calculated by first generating dummies for each of the nation codes that are included within the data. There are also a number of respondents for whom residence is an overseas British territory and these fall within the other category.

in the attending set). For age we use the over 65s as a reference category to highlight the effects of working age and being younger. Requiring a visa does not have a large differential impact. 21.5% of match attendees travelled from countries for which a visa is needed, compared to 22.0% in the full sample.

Purpose of visit has been seen as an important factor in determining expenditure within many past papers (Brida and Scuderi, 2013; Thrane, 2014; Marrocu et al., 2015). Within the IPS there are 28 different purposes for travel which have been reported. We combine these into three categories, holidaying, business travel and longer or family inspired visits. Almost half of tourists (47.2%) come to the UK as visitors, rather than holidaymakers or business travellers; this group is our reference category. When looking at the football sample it is clear that fewer tourists who are in the UK on business attend football than the general population, and that also holds for those on holiday. Longer stayers, or family visitors, watch significantly more football. 68.5% of attendees fall into this category and are more likely to have affiliations to a team. Though there are a number of suggested relationships anecdotally autocorrelation in this dataset is not a concern and factors such as team support do not require us to remove any of the widely used variables from our estimations. For both expenditure measures the highest variance inflation factor is 2.77 and the highest correlation between two explanatory variables, outwith a set of dummies, is 0.3.

Lone travellers are the group size reference category given they are the most common respondent type comprising 56.4% of the whole sample, but such tourists account for only 49.2% of football attendees. Dummies on larger groups highlight the community effect identified by Cox (2016) and Peng et al. (2016). Six factors which influence where people visit are included with football attendees more likely to be influenced by review websites and the traditional media, picking up themes of virtual community and broadcast sport interest creation discussed in Cave and Crandall (2001), Peng et al. (2016), Pawlowski et al. (2017) and others.

C Empirical Strategy

Because of dataset limitations and possible presence of unobserved heterogeneity, we introduce fixed effects for the region from which the visitor travels. Table 3 lists the areas employed and shows the proportion from each region watching live football in the UK. A similar strategy is em-

ployed by Belenkiy and Riker (2012) and Eugenio-Martin and Campos-Soria (2014) to capture differences in cultural background, using regions as a proxy for income. Whilst nationality is described as an important control low attendance numbers mean there is insufficient data to disaggregate the fixed effects to this level. These fixed effects are accommodated within the UQR method of Fortin et al. (2009) following Borgen et al. (2016). Our UQR regression can be considered as the fitting of a model for a set of covariates, X, on a recentered influence function (RIF) that is particular to the quantile of interest. For quantile τ, $\tau \in (0,1)$, the RIF is given by equation (1)

$$\theta\left(Y, q_\tau, F_Y\right) = q_\tau + \frac{\tau - \mathbb{1}\left(Y_i \leq q_\tau\right)}{f_Y\left(q_\tau\right)} \tag{1}$$

In equation (1) Y_i is used to denote the value of the outcome variable which in our case is the level of expenditure in either adjusted or unadjusted form. q_τ is the value of the τ^{th} quantile of the observed outcome variable. $\mathbb{1}\left(Y_i \leq q_\tau\right)$ is an indicator function that takes the value one when the observed value for an individual is lower than the corresponding quantile of interest q_τ. F_Y is the cumulative distribution of Y and hence the marginal distribution is denoted by f_Y, taking the value $f_Y\left(q_\tau\right)$ at q_τ. The absence of any covariates from this expression is what gives UQR its strength as compared to conditional quantile regression methods.

Using the $\theta\left(Y_i, q_\tau, F_Y\right)$ evaluated for individual i, and the associated collection of explanatory variables X_i, we are able to estimate the model. Following Borgen et al. (2016) fixed effects γ_j are also included for region of origin j giving a second stage regression as follows:

$$\theta\left(Y_i, q_\tau, F_Y\right) = \alpha + \beta_\tau X_i + \gamma_j + \varepsilon_j \tag{2}$$

Our interest is in the vector of coefficients β and the intercepts α. Error terms ε_j are assumed to be identically independently distributed with mean zero and constant variance within region j. Model estimation using cluster-robust standard errors has been shown to be advantageous given the assumption of unobserved heterogeneity amongst regions (Cameron and Miller, 2015). Utilising a two-step process in this way means that it is easier to perform tests on the resulting coefficients. Essentially we have multiple models on the same dataset with different explanatory variables. Our test for parameter equality across two quantiles, τ_1 and τ_2, is simply a test that the β_τ coefficients are the same in a regression of $\theta\left(Y_i, q_{\tau,1}, F_Y\right)$ and $\theta\left(Y_i, q_{\tau,2}, F_Y\right)$ on the respective X variables. Because the distribution is the same, the first stage is not altered and the test can be carried out using seemingly unrelated regressions with appropriate centreing to account for the fixed effects.

Our strategy is implemented through the running of ninety-one models for each dependent variable and covariate set combination. These cover the varying percentiles of the expenditure distribution from the lowest decile $(\tau = 0.1)$ through to the 90th percentile $(\tau = 0.9)$ at the top end with an increment of 1%. In so doing we can highlight the marginal effects of each of our covariates on the lowest spenders all the way through to the highest. Tourism GB and policy agencies can see where to target promotion, practitioners can identify markets for their clubs and travel agencies can design tours with appropriate travel mediums, hotel amenities etc. For brevity the tables that follow only report the 10th, 25th, 50th, 75th and 90th percentiles.

We are thus able to address the important questions surrounding football attendance by overseas residents and the economic benefits delivered; we do so across the overall expenditure distribution.

A series of robustness checks with alternative specifications are undertaken but no meaningful impact of the coefficients on football attendance is noted. The ability of the IPS dataset to assess football's influence on spending remains strong and we have sufficient covariates to provide a meaningful analysis of drivers of expenditure.

III Results

Both adjusted and unadjusted expenditure are used as dependent variables to exposit the impact on the clubs host community and the aggregate UK economy. In Tables 4 and 5 we present the coefficients and associated robust standard errors for both OLS estimation and UQR regression at the 10th, 25th, 50th, 75th and 90th percentiles. In so doing we are able to clearly assess what is happening at the extremes of the distribution whilst still being able to split out the information from around the median. A test for the equality of coefficients at all five quantiles is provided in the final column, and confirms significance in almost all cases. We provide tests between each pair of coefficients in an appendix to this paper. The differentials across quantiles are highly noticeable as are striking differences between the UQR coefficients and their OLS counterparts.

Our primary focus is on attendance at live football events on the expenditure of inbound tourist expenditure. The fixed effect OLS models show significant increases in expenditure, but when adjusting for ticket prices this becomes smaller and insignificant at the 5% level. Table 4 shows that there are significant impacts at $\tau = 0.75$ and $\tau = 0.9$ with variations across quantiles. When using the unadjusted figures all of the quantiles are significant with the highest value at $\tau = 0.1$ being more than twice the OLS value. Plotting these coefficients alongside the other τ values enables us to identify variation in the expenditure increasing effect as shown in Figure 1. For adjusted expenditure, significance is clear for almost all $\tau > 0.6$ but the coefficients consistently move around the OLS value. A smoother plot appears with greater than average impacts for lower τ values. Some evidence of variation from the OLS confidence interval is also noted. In both cases the significant differentials between quantiles underline the value of employing distributional techniques such as UQR.

Attendance at live football is shown by the OLS regression to increase expenditure significantly, in keeping with the report of the Great British tourist board (Visit Britain, 2015). However, when the price of tickets is taken out this becomes insignificant suggesting that much of the extra benefits of football watching visitors are felt entirely by the clubs and not driven by higher spending in the wider economy. Amongst the UQR coefficients we find, ignoring the effects at the mean, that actually there are significant increases amongst normally high spenders even when football ticket prices are accounted for. When the dependent variable is all expenditure the live football attendance dummy is significant at each of the τ levels, but is larger at the lower end of the expenditure distribution. This seemingly counter-intuitive finding warrants further investigation from an individual perspective but is likely to relate to the income inelasticity of football demand and the desire of lower spenders to see their team play.

Within the existing literature length of stay is a common predictor of increased expenditure and our results are consistent with this finding (Brida and Scuderi, 2013; Marrocu et al., 2015). However, the strength of this relationship is proportional to the quantile within the UQR, with OLS coefficients overstating the importance of duration for the majority of respondents. Across both dependent specifications there are few differentials, with the OLS effects being 0.522 and 0.519

Table 4: Unconditional Quantile Regression Estimates for Inbound Expenditure in the United Kingdom: Adjusted Expenditure

Variable	Football ticket adjusted expenditure						Equality
	OLS	$\tau = 0.10$	$\tau = 0.25$	$\tau = 0.50$	$\tau = 0.75$	$\tau = 0.90$	
Length of stay (log)	0.522***	0.664***	0.424***	0.496***	0.602***	0.673***	102.82***
	(0.028)	(0.050)	(0.026)	(0.043)	(0.041)	(0.084)	
Attend live football	0.162	0.299	0.116	0.120	0.183**	0.215**	29.506***
	(0.103)	(0.207)	(0.102)	(0.123)	(0.063)	(0.091)	
Air departure	0.556**	1.565*	0.582**	0.536***	0.332**	0.170**	560.08***
	(0.214)	(0.779)	(0.188)	(0.114)	(0.130)	(0.054)	
Male	0.100**	0.099	0.084**	0.117***	0.153***	0.122**	12.974*
	(0.032)	(0.068)	(0.030)	(0.022)	(0.042)	(0.045)	
Aged under 25	-0.023	0.065	-0.071	-0.182***	-0.152*	0.009	69.189***
	(0.059)	(0.139)	(0.041)	(0.044)	(0.071)	(0.065)	
Aged 25 to 64	0.226***	0.564***	0.208***	0.149***	0.134**	0.142**	53.424***
	(0.056)	(0.160)	(0.050)	(0.035)	(0.053)	(0.050)	
Purpose: Holiday	0.474***	1.346***	0.644***	0.472***	0.247*	0.061	103.54***
	(0.042)	(0.144)	(0.078)	(0.035)	(0.120)	(0.098)	
Purpose: Business	0.332**	0.189	0.336**	0.455***	0.536**	0.371**	25.213***
	(0.147)	(0.455)	(0.117)	(0.091)	(0.171)	(0.119)	
Require visa	0.428**	0.361	0.205	0.351**	0.707***	0.808**	155.93***
	(0.136)	(0.320)	(0.121)	(0.117)	(0.144)	(0.278)	
Group size: 2	-0.220***	-0.252**	-0.229***	-0.224***	-0.287***	-0.370***	31.098***
	(0.020)	(0.086)	(0.027)	(0.019)	(0.036)	(0.075)	
Group size: 3 or more	-0.382***	-0.380***	-0.445***	-0.440***	-0.514***	-0.525***	9.472
	(0.026)	(0.091)	(0.059)	(0.040)	(0.050)	(0.118)	
Influence: Friends	-0.181***	-0.004	-0.153*	-0.213***	-0.237***	-0.277***	79.960***
	(0.049)	(0.129)	(0.081)	(0.058)	(0.045)	(0.079)	
Influence: Guidebook	0.108***	0.255***	0.162***	0.131***	0.080	0.067	22.768***
	(0.032)	(0.034)	(0.020)	(0.030)	(0.052)	(0.090)	
Influence: Review sites	0.133***	0.181***	0.146***	0.137***	0.118***	0.135*	1.783
	(0.022)	(0.054)	(0.026)	(0.019)	(0.026)	(0.062)	
Influence: Tourist board	0.183***	0.189*	0.122***	0.259***	0.281***	0.036	45.098***
	(0.033)	(0.096)	(0.031)	(0.064)	(0.056)	(0.125)	
Influence: Media	0.050	-0.016	0.039	0.042	0.112	0.145*	5.890
	(0.059)	(0.148)	(0.043)	(0.069)	(0.070)	(0.072)	
Influence: Social media	0.155***	0.331***	0.105**	0.096***	0.168***	0.277***	47.704***
	(0.018)	(0.095)	(0.034)	(0.019)	(0.037)	(0.086)	
Observations	39,525	39,525	39,525	39,525	39,525	39,525	
R-squared	0.233	0.068	0.144	0.189	0.173	0.120	

Notes: *OLS* provides coefficients for Ordinary Least Squares regression with robust standard errors. τ denotes the regression quantile at which the unconditional model is estimated. UQR models fitted with cluster robust standard errors at the region of origin level. Significance denoted by $^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$.

Table 5: Unconditional Quantile Regression Estimates for Inbound Expenditure in the United Kingdom: Total Expenditure

Variable	Total expenditure						Equality
	OLS	$\tau = 0.10$	$\tau = 0.25$	$\tau = 0.50$	$\tau = 0.75$	$\tau = 0.90$	
Length of stay (log)	0.519***	0.664***	0.420***	0.491***	0.600***	0.675***	55.414
	(0.028)	(0.052)	(0.026)	(0.043)	(0.041)	(0.084)	
Attend live football	0.324**	0.796***	0.366***	0.269*	0.257***	0.257**	55.516***
	(0.107)	(0.229)	(0.105)	(0.127)	(0.068)	(0.090)	
Air departure	0.555**	1.589*	0.585**	0.533***	0.331**	0.167**	3696.6***
	(0.214)	(0.789)	(0.188)	(0.114)	(0.130)	(0.054)	
Male	0.099**	0.101	0.084**	0.118***	0.155***	0.119**	11.376*
	(0.032)	(0.066)	(0.030)	(0.022)	(0.042)	(0.044)	
Aged under 25	-0.022	0.086	-0.072	-0.184***	-0.150*	0.011	33.015***
	(0.060)	(0.142)	(0.040)	(0.046)	(0.072)	(0.066)	
Aged 25 to 64	0.226***	0.570***	0.207***	0.146***	0.134**	0.143**	65.553***
	(0.056)	(0.161)	(0.051)	(0.036)	(0.053)	(0.051)	
Purpose: Holiday	0.471***	1.353***	0.642***	0.464***	0.246*	0.060	262.11***
	(0.043)	(0.145)	(0.078)	(0.034)	(0.118)	(0.099)	
Purpose: Business	0.330**	0.191	0.331**	0.450***	0.533**	0.375**	147.60
	(0.147)	(0.459)	(0.116)	(0.091)	(0.170)	(0.121)	
Require visa	0.428**	0.370	0.202	0.344**	0.706***	0.810**	133.18***
	(0.136)	(0.327)	(0.126)	(0.115)	(0.142)	(0.282)	
Group size: 2	-0.218***	-0.244**	-0.226***	-0.223***	-0.289***	-0.370***	18.106**
	(0.020)	(0.089)	(0.026)	(0.020)	(0.036)	(0.074)	
Group size: 3 or more	-0.378***	-0.379***	-0.447***	-0.437***	-0.514***	-0.529***	9.015
	(0.026)	(0.093)	(0.060)	(0.043)	(0.049)	(0.118)	
Influence: Friends	-0.181***	0.000	-0.152*	-0.210***	-0.235***	-0.278***	140.27***
	(0.049)	(0.130)	(0.080)	(0.058)	(0.045)	(0.079)	
Influence: Guidebook	0.108***	0.265***	0.157***	0.131***	0.080	0.065	8.481
	(0.032)	(0.033)	(0.019)	(0.029)	(0.053)	(0.090)	
Influence: Review sites	0.133***	0.179***	0.144***	0.137***	0.117***	0.135*	10.537*
	(0.022)	(0.054)	(0.028)	(0.018)	(0.025)	(0.062)	
Influence: Tourist board	0.182***	0.200*	0.124***	0.253***	0.279***	0.040	44.412***
	(0.033)	(0.103)	(0.030)	(0.064)	(0.055)	(0.126)	
Influence: Media	0.048	-0.015	0.029	0.047	0.109	0.138*	1.540
	(0.058)	(0.157)	(0.043)	(0.075)	(0.070)	(0.073)	
Influence: Social media	0.155***	0.334***	0.106**	0.100***	0.165***	0.275***	3.397
	(0.018)	(0.099)	(0.035)	(0.018)	(0.038)	(0.086)	
Constant	4.236***	0.954	3.779***	4.505***	5.210***	6.023***	
	(0.202)	(0.674)	(0.147)	(0.101)	(0.214)	(0.201)	
Observations	39,525	39,525	39,525	39,525	39,525	39,525	
R-squared	0.233	0.068	0.144	0.190	0.173	0.121	

Notes: *OLS* provides coefficients for Ordinary Least Squares regression with robust standard errors. τ denotes the regression quantile at which the unconditional model is estimated. UQR models fitted with cluster robust standard errors at the region of origin level. Significance denoted by $^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$.

for football adjusted and unadjusted expenditures, respectively. This pattern of limited differential is observed across all other explanatory variables and is intuitive given the low proportion of observations which are affected by the adjustment. We have considered possible endogeneity of this variable, but in our models there is little to suggest endogeneity is an issue and so it is included to maintain comparability with other tourism expenditure studies.

Age of the respondent has a stronger impact on lower spenders. For the middle category a coefficient of 0.564 for the adjusted expenditure at the 10th percentile, $\tau = 0.10$, compared with just 0.149 at the median and 0.142 at the 90th percentile. There is little significance in the difference between under 25s and the over 65s as might be expected. The number of members in the group is significant in reducing expenditure, and again this applies across the distribution. The primary intuition for this result comes from economies of scale in group travel e.g. hotel room sharing. Holidaymakers spend more money, particularly at the lower end of the distribution, compared to longer stayers; business travellers behave likewise. This is as anticipated given those staying longer, or staying with British family, would be more familiar with ways of saving money. Requiring a visa is a new variable constructed for this paper and it does have a significant role on both of dependent variables when OLS regression is applied. Under UQR we find that it is the upper end that is driving the result; highly significant increases above 0.5 are found at $\tau = 0.75$ and $\tau = 0.9$. That there are limited impacts at the lower end of the distribution is linked to the cost of visas and the proportion of income represented by visa costs.

Our primary focus is the effect of attending live football matches on the expenditure of inbound visitors and we use the full set of regression results to plot a pair of graphs, one for adjusted and the other for unadjusted expenditures. When ticket prices are adjusted for there is a greater volatility in coefficients estimated, which can move across the distribution, but the values remain roughly similar to the OLS throughout. However, areas of significance are identified in the lower end, around $\tau = 0.2$ and for almost all τ satisfying $\tau > 0.6$. In the unadjusted case the impact of tickets is strongest for the lowest spenders, with some significant variation from the OLS coefficient evident in the lowest quintile. For higher spenders the coefficient is lower than OLS suggests and indeed there are some cases where the reduced impact is significantly different. From the two graphs the significant effect on unadjusted expenditure versus insignificance once football ticket prices are accounted for is clear, particularly at and below the median expenditure level.

The OLS conclusions apply to a limited subset of the overall UQRs, particularly for the adjusted case. One of the main criticisms of using OLS is that it reports only average effects, which appears to hold true for our data when looking at the unadjusted panel. In our analysis the standard errors used are to maintain robustness to unobserved heterogeneity, implying confidence intervals are larger, but nonetheless the parameter equality tests confirm that the variations observed in both graphs are significant. Once again, this confirms the value of applying UQR to obtain a more accurate assessment of drivers of tourist expenditure.

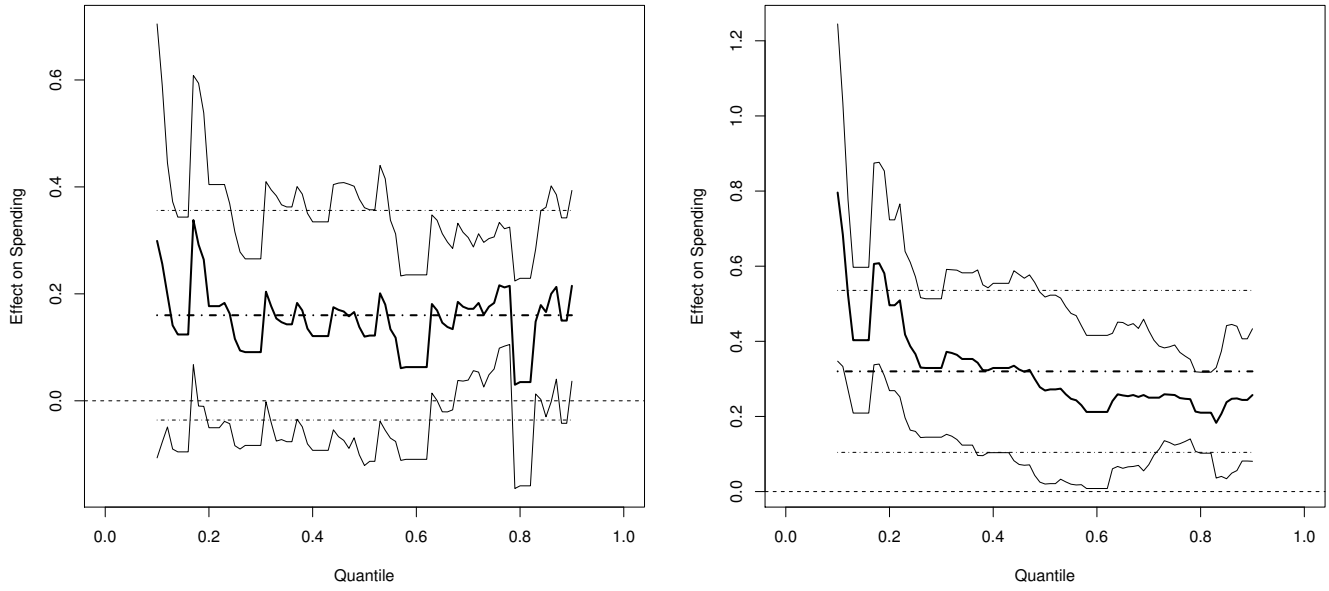
Football clearly attracts visitors to the United Kingdom and those visitors spend money on other goods and services whilst within the UK. However, what we have shown with our use of UQR is that this broad observation oversimplifies a more complex picture of distributional impact and the role played by ticket prices in explaining differences in tourist expenditures. Whilst our UQR results are significant with the same sign as the average inferences shown by OLS and in Visit Britain (2015), there is significant and strong evidence presented by our analysis that it would be naive to treat the promotion of football attendance equally amongst high and low spenders.

Accounting for ticket prices is an important element of determining impact, because as we

Figure 1: Impact of Live Football Attendance on Inbound Visitor Expenditure in the United Kingdom

(a) Adjusted Expenditure

(b) Unadjusted Expenditure



Notes: Left panel displays ticket price adjusted expenditure. Right panel shows the total expenditure recorded for each visitor. 95% confidence intervals are plotted as dotted lines for the Unconditional Quantile Regression (UQR). OLS coefficients are plotted using a dot-dash line, with corresponding 95% confidence intervals drawn as dotted lines

have shown the conclusions for lower spenders hinge quite significantly upon this. Club revenue is captured within national income estimates and they are subject to taxation. Though the magnitude of the effect is larger for low spenders, encouraging attendance is broadly good for the economy. Visit GB use the Football is Great campaign to promote football tourism (Visit Britain, 2015) and our results lend further support to this strategy. However, concerns over club ownership and links to local economies (Sondaal, 2013) suggest we should move beyond ticket pricing and consider the amount that visitors spend on other items. Our adjusted expenditure measure shows that those at the lower end of the distribution spend significantly less than otherwise identical individuals who do not attend football games. Only at the top end of the spending range is there a continued significant positive impact for football attendees that can be seen as something worthwhile to be promoted.

[****] THE FOLLOWING PARAGRAPH NEEDS CITATIONS FROM THE MEDIA PAPER

While it is established that mega events can bring positive spillovers for the host economy (**?**Billings and Holladay, 2012), our analysis shows that the same approach can be applied to regular domestic league games. Because of the large expense involved in hosting the biggest fixtures of the sporting calendar, being able to build on regular league encounters is of great benefit both for tourism promotion and wider positive spillovers for the general UK economy. Significant roles for social media and review websites in guiding visitors on what to do in the UK are noted, making these good platforms for promotion generally. More established methods of informing tourists, guidebooks and tourist board publications, are also significant in delivering greater expenditure. However, traditional media such as newspapers and television, are found to be insignificant. For football the value of these media is their spreading of the game's reach and consequentially the creation of a new markets; the success of the EPL in this regard is recognised in Javid (2015).

We adopt broad age categories due to the low numbers of football attendees within the sample, and so to test the robustness of our results to the use of narrower age bands ee estimate our model again using seven categories for age. These age categories are 0-15, 16-24, 25-34, 35-44, 45-54, 55-64 and 65 plus. In the base model the first two are combined into a youth grouping, whilst the next four become the middle aged group. The final category, those aged over 65 is used as the reference category in both instances. Table 6 reports the estimates for the ticket price adjusted expenditure in panel (a) and the unadjusted expenditure in panel (b). In both cases there is very little effect on the impact of live football attendance attributable to the number of age categories that are included. Following the endogeneity concerns of [****] we estimate the model without trip duration demonstrating again that there is little effect on the football coefficient. It is this lack of effect from specification that allows inclusion of this common explanatory variable in our reported results of Table 6. We run the model under various combinations of control variables, using both age specifications, and with or without length of stay. Consequently the inferences drawn from the specification presented here are robust and can be used to inform policy.

Daily expenditure can inform us about the rate at which football encourages spending. As noted the expense of football tickets is high and relates to just a small part of the total visit time for any given respondent. It does not however relate to the expenditure at other times on other days; some will avoid spending on other items to afford the ticket whilst others will be equally free spending on their other purchases. In Appendix B we present the full results for per-day spending in comparison to the total transfer of monies to the UK economy. Football leads to respondents moving significantly up the quantiles of spend-per-day and hence the impact of live soccer attendance at the lowest quantiles is much reduced. There is also lower variation in coefficients than

Table 6: Live Football Attendance Coefficient Sensitivity to Age Specification and Inclusion of Stay Duration

	OLS	$\tau = 0.10$	$\tau = 0.25$	$\tau = 0.50$	$\tau = 0.75$	$\tau = 0.90$	Age	Stay
Panel (a): Football Adjusted Expenditure								
Attend live football	0.162	0.299	0.116	0.120	0.183**	0.215**	3	Yes
	(0.103)	(0.207)	(0.102)	(0.123)	(0.063)	(0.091)		
Attend live football	0.156	0.291	0.111	0.114	0.176**	0.207*	3	No
	(0.097)	(0.188)	(0.093)	(0.122)	(0.073)	(0.104)		
Attend live football	0.169	0.314	0.127	0.130	0.190**	0.214**	7	Yes
	(0.102)	(0.207)	(0.102)	(0.121)	(0.062)	(0.089)		
Attend live football	0.166	0.310	0.124	0.128	0.186**	0.210*	7	No
	(0.096)	(0.189)	(0.091)	(0.119)	(0.073)	(0.106)		
Panel (b): Unadjusted Expenditure								
Attend live football	0.324**	0.796***	0.366***	0.269*	0.257***	0.257**	3	Yes
	(0.107)	(0.229)	(0.105)	(0.127)	(0.068)	(0.090)		
Attend live football	0.317***	0.788***	0.361***	0.263**	0.250**	0.249**	3	No
	(0.086)	(0.174)	(0.080)	(0.112)	(0.085)	(0.111)		
Attend live football	0.330**	0.810***	0.376***	0.278*	0.264***	0.256**	7	Yes
	(0.106)	(0.229)	(0.105)	(0.126)	(0.067)	(0.088)		
Attend live football	0.327***	0.806***	0.374***	0.275**	0.260**	0.252**	7	No
	(0.085)	(0.174)	(0.079)	(0.109)	(0.085)	(0.112)		

Notes: Coefficients taken from Ordinary Least Squares (OLS) and Unconditional Quantile Regression (UQR) analyses of expenditure by inbound visitors to the United Kingdom. Age categories are either 3 (under 25, 25 to 64, 65 and over) as used in the main results, or 7 (0-15, 16-24, 25-34, 35-44, 45-54, 55-64 and 65 upwards). Robust standard errors, clustered on the region of origin level are reported in parantheses. Significance denoted by $^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$.

Table 7: Unconditional Quantile Regression Estimates for Inbound Expenditure in the United Kingdom: Adjusted Expenditure

Expenditure	Region	Total expenditure						Equality
		OLS	$\tau = 0.10$	$\tau = 0.25$	$\tau = 0.50$	$\tau = 0.75$	$\tau = 0.90$	
Adjusted Expenditure	EU	0.181***	0.238**	0.178***	0.115***	0.151***	0.358***	12.52*
		(0.049)	(0.104)	(0.060)	(0.043)	(0.042)	(0.082)	
	Non-EU	0.459***	0.317*	0.609***	0.590***	0.360***	0.405***	7.542
		(0.069)	(0.185)	(0.122)	(0.092)	(0.100)	(0.125)	
	North America	0.181	0.326*	0.170	0.081	0.157	0.113	1.818
		(0.111)	(0.191)	(0.164)	(0.126)	(0.114)	(0.161)	
Unadjusted Expenditure	EU	0.394***	0.642***	0.385***	0.366***	0.227***	0.383***	36.80***
		(0.039)	(0.070)	(0.054)	(0.042)	(0.044)	(0.083)	
	Non-EU	0.607***	0.561***	0.837***	0.678***	0.570***	0.404***	9.661*
		(0.061)	(0.124)	(0.102)	(0.091)	(0.104)	(0.125)	
	North America	0.305***	0.480***	0.364**	0.185	0.184	0.378**	5.411
		(0.099)	(0.161)	(0.151)	(0.123)	(0.113)	(0.175)	

Notes: *OLS* provides coefficients for Ordinary Least Squares regression with robust standard errors. τ denotes the regression quantile at which the unconditional model is estimated. Significance denoted by $^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$.

in Figure 1, but differences across quantiles remain significant. Many other explanatory variables, such as gender and age, have similar effects for daily and total measures. Discussion of influences outside of football is left to the appendix.

IV Region of Origin

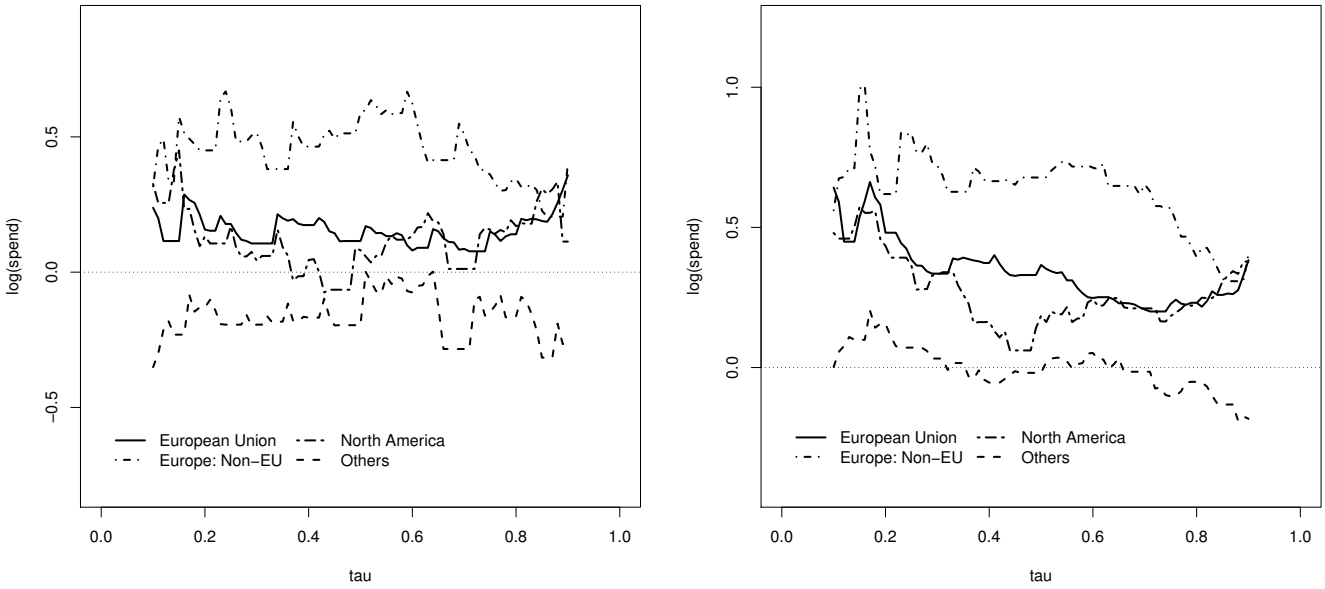
Effective targeting of promotional materials to stimulate football attendance must recognise different characteristics within the intended audience nationalities. By considering regions separately better understanding of the effect of attendance can be achieved. Because of the comparatively low number of attendees from some regions only those with more than one hundred attendees are included in our analysis viz. European Union, Europe but not in the EU (non-EU) and North America. Table 7 summarises the coefficients on attendance at live football dummy. We offer a full discussion of the results in the accompanying appendix C.

Differences between regions are clear with North American coefficients being the smallest amongst the three highlighted regions. In the unadjusted figures the differential is not as large, meaning that visitors from North America who attended football spent less additional money in the local economy than Europeans. Using UQR we find significant differentials between coefficients across the five estimated τs in three of the six cases. Only for North America is no significant variation in the impact of attendance noted. To highlight these variations we plot all four sets of UQR coefficients onto the same axes, leaving off OLS results for clarity. As for the full dataset case $\tau \in [0.1, 0.9]$ is used. Figure 2 demonstrates the greater impact of football on visitors who come from countries such as Norway which are not in the European Union. At the median this differential is at its most pronounced, but it disappears as $\tau = 0.9$ is approached. North American visitors behave very similarly to the European Union inflows both in the adjusted and unadjusted plots. However, there is a clear split between the two coefficient series just below the median.

Figure 2: Impact of Live Football Attendance on Inbound Visitor Expenditure in the United Kingdom

(a) Adjusted Expenditure

(b) Unadjusted Expenditure



Notes: Left panel displays ticket price adjusted expenditure. Right panel shows the total expenditure recorded for each visitor. Confidence intervals and OLS coefficients are omitted for clarity.

	Region 1	Region 2	OLS	$\tau = 0.10$	$\tau = 0.25$	$\tau = 0.50$	$\tau = 0.75$	$\tau = 0.90$
Adjusted Expenditure	Europe (EU)	Europe: Non-EU	0.278^{***}	0.079	0.178^{**}	0.475^{***}	0.209^{*}	0.048
	EU	North America	-0.000	0.088	-0.009	-0.034	0.006	-0.245
	Non-EU	North America	-0.278^{*}	0.009	-0.439^{*}	-0.509^{**}	-0.202	-0.292
Unadjusted Expenditure	EU	Non-EU	0.213^{**}	-0.081	0.452^{***}	0.313^{***}	0.343^{***}	0.021
	EU	North America	-0.089	-0.162	-0.021	-0.181	-0.043	-0.005
	Non-Eu	North America	-0.302^{*}	-0.081	-0.473^{*}	-0.493^{**}	-0.386^{**}	-0.026

Notes: *OLS* provides tests based upon Ordinary Least Squares regression with robust standard errors. τ denotes the regression quantile at which the coefficient equality is tested. Significance denoted by $^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$.

Testing the significance of the difference between the impact of live football on expenditure for the three single region model-pairs we can see that there are significant differences between those European countries which are not members of the European Union, and the EU and North America. No significant differentials are detected between the European Union and North American coefficients, although as Figure 2 demonstrates there are some larger gaps between the values just below the median.

As the dataset has a limited cohort of attendees it is left for bigger datasets to further assess impact of football attendance from regions like Asia and South America, both of which have large television audiences for games and are identified by the literature as areas of large potential (Peng et al., 2016).

V Conclusions

Using unconditional quantile regression with region of origin fixed effects we quantify the benefits of live football for inbound visitor expenditure in the United Kingdom for the first time. Football's importance is well established by the size of its broadcast deals, and its interest as a commodity with high loyalty. Understanding how these translate to revenue from inbound tourists is an important next step. Whilst headline observations pointing to football generating income, as promoted by Visit Britain (2015) remain valid, these vary across the distribution of total amounts spent and are strongest for those who in total spend the least. High ticket prices, international ownership and a desire to understand the wider local impact suggest consideration of ticket price adjusted expenditure as a better economic impact measure. Consequently our unique expenditure variable provides essential new perspectives that both extend the discussion of football as a tourism driver and better quantify its impact at a local level.

Those interested in promoting tourism expenditure can see a clear value in football as an attraction force. We demonstrate that these benefits spread beyond the stadium walls into local communities; particularly at the top end of the spending distribution. For clubs the universal appeal of the game is proven; that the biggest effect on total expenditure comes amongst those who spend the least reaffirms the position that it is worthwhile selling interest in your team to all. However, capacity constraints and perceived threats to the very identity that draws overseas attendees remain important considerations against the blind advocacy of the game. Spillovers to the local economy are real, as positive coefficients in the adjusted expenditure attest, but these spread over the entire course of a season. The very benefit of creating demand in low-season for the tourism industry means the benefits lack the intensity of those from mega events like the olympics. Football is its own legacy and long-term consideration of its ability to generate future income must temper policy to exploit its appeal short-term. Understanding and quantifying the microeconomic forces at play here represents a fruitful avenue for further work. Likewise, whilst there is no reason to believe otherwise, the generalisability of our conclusions to other sports, and other years can all be tested with further work.

Our conclusions are drawn from those who have already made the decision to come to the UK. However, to be able to better formulate policies aimed at promoting football attendance it would be beneficial to study the choice to travel in the first instance. Attendance at football matches has much to offer in terms of tourism and tourist expenditure promotion. Through more insightful econometric modelling we have quantified this in a way that signposts policies and promotion

opportunities that can help realise the game's potential in enhancing tourist flows, expenditures and positive spillover effects.

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A Full Results of Coefficient Tests

In this appendix we present the full set of parameter equality tests for both the adjusted and total expenditure cases. Table A1 provides all of the chi-squared values for each pairwise combination of τ values in the main paper; $\tau \in \{0.1, 0.25, 0.5, 0.75, 0.9\}$. The final column, *All*, reports the joint hypothesis that all of the coefficients for that variable are equal for the five τ levels. As noted in the main paper there is clear significance in almost all of the aggregate tests.

For the adjusted case the length of stay, being in the under 25 age group and travelling to the UK as a holidaymaker have significant differentials between many of the pairs of τ levels. Being influenced in the places visited by the guidebook makes a big difference at the lower expenditure quantiles with a much stronger similarity noted further up the distribution. When we do not adjust for the football ticket component similar patterns emerge but critically the live football variable is now showing significant difference between the lower τ levels and the higher outcomes. The influence of friends, relatives or colleagues creates bigger differentials between the coefficients amongst lower spending visitors, and the influence of the guidebook does likewise. Apart from these two differences there are few other significant pairings to be seen in Table A1.

Benefits from using a distributional approach are clear from these results, with a large number of these tests revealing significance. However, the majority of pairings do not produce significant change meaning that there is still a stability to the relationships between the explanatory variables and inbound tourist expenditure. Graphical representations, like those of Figure 1 in the main paper demonstrate this well. From this we conclude that it remains desirable to continue with a quantile approach rather than a mean based method like OLS.

Variable	$\tau = 0.1$				$\tau = 0.25$			$\tau = 0.5$		$\tau = 0.75$	All τ
Against	$\tau = 0.25$	$\tau = 0.5$	$\tau = 0.75$	$\tau = 0.9$	$\tau = 0.5$	$\tau = 0.75$	$\tau = 0.9$	$\tau = 0.75$	$\tau = 0.9$	$\tau = 0.9$	
Adjusted Expenditure:											
Length of stay	29.538***	7.583**	1.930	0.010	9.572**	18.482***	6.922**	3.822	2.719	1.549	102.82***
Attend live soccer	2.554	2.023	0.586	0.380	0.010	1.708	1.936	0.600	0.809	0.407	29.506***
Purpose: Holiday	64.303***	51.608***	25.833***	41.081***	5.281*	4.576	12.760***	4.064	18.578***	13.420***	103.54***
Purpose: Business	0.183	0.454	0.784	0.193	3.881*	2.608	0.106	0.800	1.507	5.483*	25.313***
Male	0.147	0.122	1.358	0.115	4.850*	5.194*	0.625	2.139	0.017	1.005	12.974*
Aged under 25	1.255	4.635*	8.764**	0.216	14.909***	1.573	1.619	0.342	14.314***	8.172**	69.196***
Aged 25 to 65	7.592**	8.472**	15.103***	8.286**	6.488**	3.751	1.767	0.147	0.044	0.026	53.424***
Air departure	2.761	2.369	3.143	3.502	0.321	3.337	6.724**	7.536**	21.123***	4.057*	560.08***
Group size: 2	0.096	0.124	0.173	0.838	0.083	1.048	1.960	1.731	2.672	2.829	31.098***
Group size: 3 or more	1.189	0.854	1.136	0.605	0.051	0.419	0.217	0.734	0.320	0.024	9.472
Require visa	0.597	0.002	1.792	1.050	18.880***	17.468***	3.737	10.249**	2.318	0.263	155.930***
Influence: Friends	5.934*	8.331**	3.208	2.598	4.117*	0.709	0.771	0.109	0.308	0.716	79.960***
Influence: Guidebook	11.774***	15.618***	12.864***	5.563*	0.956	2.305	1.144	3.220	0.951	0.084	22.768***
Influence: Review sites	0.580	0.840	1.459	0.438	0.291	0.725	0.019	0.478	0.001	0.089	1.783
Influence: Tourist board	0.800	1.183	0.555	0.586	10.690**	4.762*	0.352	0.056	1.807	8.150**	45.098***
Influence: Media	0.222	0.366	1.176	1.103	0.006	3.874*	2.383	2.394	1.206	0.200	5.890
Influence: Social media	10.777**	7.609**	3.040	0.102	0.176	1.292	2.311	2.386	3.624	1.290	47.704***
Total Expenditure:											
Length of stay	26.578***	7.370**	1.913	0.016	10.019***	19.386***	7.269**	4.165*	2.945	1.679	103.81***
Attend live football	11.437***	17.851***	9.616**	9.699**	5.922*	4.760*	2.889	0.029	0.020	0.000	42.713***
Male	0.184	0.121	1.354	0.076	4.315*	5.053*	0.530	2.045	0.000	1.360	12.635*
Aged under 25	1.587	5.033*	9.540**	0.365	13.705***	1.522	1.726	0.428	13.958***	7.537**	67.197***
Aged between 25 and 65	7.942**	8.845**	15.262***	8.275**	6.697**	3.764	1.531	0.091	0.008	0.027	46.627***
Air departure	2.789	2.421	3.178	3.541	0.408	3.444	6.894**	7.312**	21.237***	4.148*	530.42***
Purpose: Holiday	61.620***	53.218***	27.278***	42.742***	5.769*	4.648*	12.718***	3.902*	17.664***	13.348***	98.978***
Purpose: Business	0.164	0.424	0.762	0.195	3.898*	2.742	0.155	0.879	1.152	5.250*	25.146***
Group Size: 2	0.051	0.061	0.279	0.943	0.037	1.262	2.120	1.743	2.687	2.716	25.638***
Group Size: 3 or more	1.155	0.760	1.134	0.641	0.204	0.396	0.230	0.745	0.363	0.046	10.470***
Require visa	0.682	0.013	1.595	0.957	14.056***	16.915***	3.564	10.308**	2.288	0.261	164.92***
Influence: Friends	5.845*	7.975**	3.289	2.706	3.714	0.711	0.799	0.131	0.355	0.779	63.656***
Influence: Guidebook	17.943***	17.904***	13.935***	6.305*	0.797	2.019	1.114	3.037	0.991	0.115	33.379***
Influence: Review sites	0.477	0.689	1.343	0.410	0.151	0.659	0.011	0.540	0.001	0.105	1.857
Influence: Tourist board	0.884	0.616	0.373	0.588	8.944	4.676*	0.330	0.084	1.603	7.536**	40.034***
Influence: Media	0.127	0.394	0.976	0.921	0.138	4.389*	2.400	1.607	0.853	0.144	6.763
Influence: Social media	10.510**	6.797**	3.083	0.122	0.059	1.172	2.200	1.995	3.314	1.308	44.043***

Table A1: Chi-squared tests of parameter equality

Notes: Coefficients tests are generated in STATA using seemingly unrelated regressions on the respective recentered influence functions ($\theta(Y, q_\tau, F_Y)$). Significance denoted by $^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$.

B Daily Spending Results

In this appendix we utilise spending per day rather than the total spend to form the dependent variable. Few papers adopt this approach in the tourism expenditure literature, but it is nevertheless beneficial to confirm the robustness of the results from the main paper to the change to daily spending. As before the price of football tickets is deducted from the total expenditure reported to create the new adjusted expenditure and is then subsequently divided by the length of stay. Tables A2 and A7 report the new estimates for the variables. For brevity only five τ levels are reported and the test of parameter equality provides the test for these five values.

From the two tables it is clear that there are many similarities with the results of the main paper, particularly in terms of the significance of the effect. However, there is also a notable change in the lower quantiles where the impact of football is much reduced. An immediate point is the similarity between the two sets of coefficients, something which was not seen in the total expenditure modelling of the main paper. Figure A1 illustrates the comparison more clearly. In the left panels (a) and (c) we see that the coefficient tracks the OLS closely, with some small regions of significance in the UQR coefficients at the highest quantiles. In the right hand column, (b) and (d), there is clear evidence of a change in result at lower quantiles; from being significantly above the OLS regression values in the main paper the new results in panel (b) show the impact of football to never climb above the OLS coefficient. At the upper end of the distribution we see that the OLS coefficient is outside the 95% confidence interval of the quantile regression for a larger range than was noted in the main paper.

Our results in this appendix should not be seen as a surprise; where individuals take in a football match their expenditure will be high. If their main trip purpose is to watch the match then they will often arrive close to match-day and subsequently leave the UK shortly after the game they will be left with a much higher spend per day than other visitors who stay longer but do not engage in such expensive activities. With most matches taking places at weekends the EPL suits such short trips well. Hence the key message to take from the daily spending estimates is that OLS is not representing the effect of football attendance on total expenditure as well as policy-makers should demand; UQR has clear advantages.

C Regional Models

A methodological enhancement of our work is the inclusion of fixed effects within the UQR framework; to our knowledge this is the first time such an approach has been taken in tourism expenditure. Understanding the role of football attendance amongst visitors from each of the geographic regions has merit; low numbers of attendees from certain regions mean we necessarily can not study them independently. We thus focus on three regions, those providing most inbound tourists: European Union member states, non-EU members within Europe, and North America. Whilst it may be of interest to disagregate further into country of origin it is not practical when so few respondents actually attend matches. We demonstrate in tables A4 to A9 that match attendance has similar effects for North American and European Union nationals but that those from outside the EU have a much stronger encouragement to spend when going to games. Figure **??** demonstrates this point very clearly.

Analysis should not be limited to live football and in these tables we also see may other di-

Table A2: Unconditional Quantile Regression Estimates for Inbound Expenditure per day in the United Kingdom: Adjusted Expenditure

Variable	Total expenditure						Equality
	OLS	$\tau = 0.10$	$\tau = 0.25$	$\tau = 0.50$	$\tau = 0.75$	$\tau = 0.90$	
Attend live football	0.168	0.097	0.218	0.247	0.191*	0.126	6.083
	(0.144)	(0.157)	(0.163)	(0.142)	(0.096)	(0.073)	
Air departure	0.521**	0.739	0.692**	0.607***	0.430***	0.262**	520.43***
	(0.210)	(0.409)	(0.245)	(0.139)	(0.129)	(0.109)	
Male	0.143***	0.121*	0.168***	0.138***	0.114***	0.115***	6.636
	(0.037)	(0.062)	(0.052)	(0.031)	(0.022)	(0.029)	
Aged under 25	0.004	0.103	0.069	-0.119**	-0.132**	-0.121***	8.086
	(0.072)	(0.108)	(0.076)	(0.042)	(0.042)	(0.024)	
Aged 25-64	0.381***	0.508***	0.464***	0.264***	0.225***	0.161***	24.729***
	(0.070)	(0.118)	(0.041)	(0.027)	(0.022)	(0.042)	
Purpose: Holiday	0.509***	0.796***	0.914***	0.544***	0.156**	0.038	100.66***
	(0.055)	(0.082)	(0.085)	(0.035)	(0.062)	(0.050)	
Purpose: Business	0.511***	0.086	0.431***	0.600***	0.696***	0.638***	89.87***
	(0.111)	(0.203)	(0.103)	(0.064)	(0.095)	(0.146)	
Require visa	0.204	0.155	0.166	0.207	0.240**	0.279*	0.684
	(0.170)	(0.282)	(0.231)	(0.119)	(0.097)	(0.147)	
Group size: 2	-0.210***	-0.110**	-0.190***	-0.204***	-0.262***	-0.285***	47.39***
	(0.022)	(0.048)	(0.030)	(0.012)	(0.034)	(0.048)	
Group size: 3 or more	-0.409***	-0.354***	-0.565***	-0.455***	-0.376***	-0.356***	119.21***
	(0.026)	(0.042)	(0.045)	(0.042)	(0.034)	(0.057)	
Influence: Friends	-0.315***	-0.239***	-0.458***	-0.394***	-0.262***	-0.211***	192.41***
	(0.040)	(0.057)	(0.048)	(0.037)	(0.030)	(0.041)	
Influence: Guidebook	0.046	0.163***	0.173**	0.006	-0.023	-0.049	30.13***
	(0.035)	(0.047)	(0.059)	(0.037)	(0.028)	(0.035)	
Influence: Review sites	0.089***	0.186***	0.136***	0.091**	0.037**	0.022	58.72***
	(0.021)	(0.028)	(0.035)	(0.035)	(0.015)	(0.020)	
Influence: Tourist boards	0.074	0.071	0.047	0.040	0.050	0.030	0.435
	(0.044)	(0.051)	(0.048)	(0.041)	(0.046)	(0.107)	
Influence: Media	0.002	-0.037	0.021	0.037	0.100	-0.005	28.98***
	(0.069)	(0.113)	(0.076)	(0.052)	(0.058)	(0.070)	
Influence: Social Media	0.125***	0.159***	0.157***	0.163***	0.048*	0.091*	29.02***
	(0.024)	(0.046)	(0.029)	(0.037)	(0.026)	(0.042)	
Constant	3.432***	1.478***	2.479***	3.627***	4.576***	5.376***	
	(0.212)	(0.376)	(0.240)	(0.144)	(0.120)	(0.110)	
Observations	39,525	39,525	39,525	39,525	39,525	39,525	
R-squared	0.141	0.042	0.104	0.147	0.136	0.070	

Notes: *OLS* provides coefficients for Ordinary Least Squares regression with robust standard errors. τ denotes the regression quantile at which the unconditional model is estimated. UQR models fitted with cluster robust standard errors at the region of origin level. Significance denoted by $^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$.

Table A3: Unconditional Quantile Regression Estimates for Inbound Expenditure per day in the United Kingdom: Unadjusted Expenditure

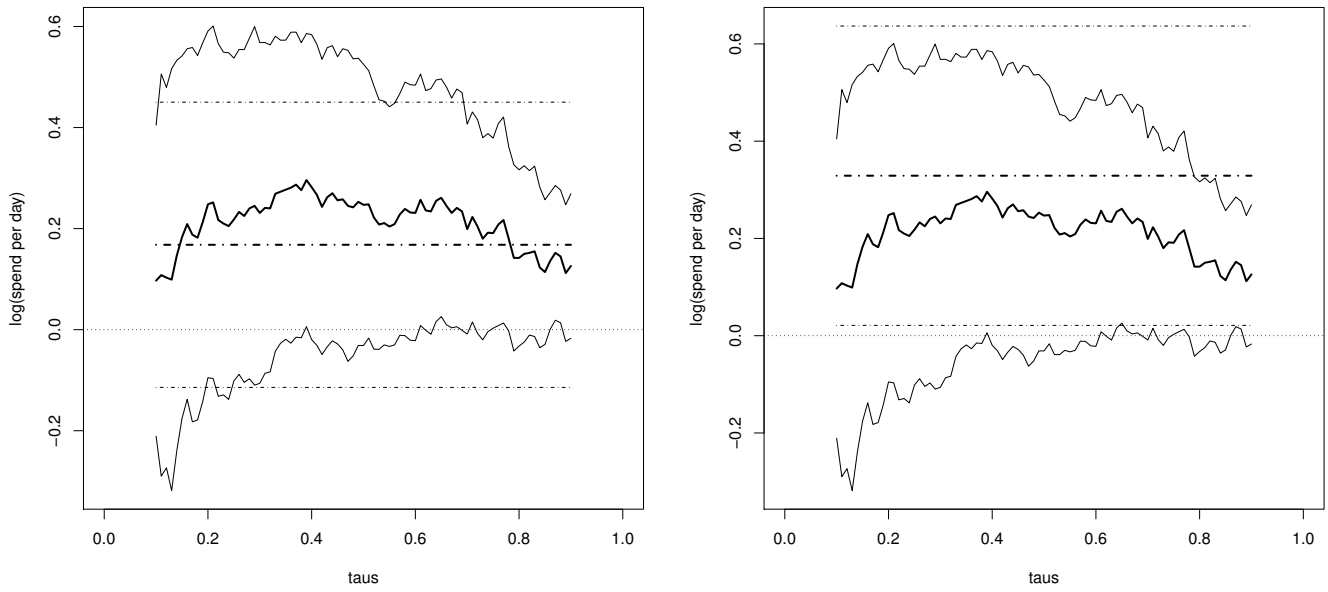
Variable	Total expenditure						Equality
	OLS	$\tau = 0.10$	$\tau = 0.25$	$\tau = 0.50$	$\tau = 0.75$	$\tau = 0.90$	
Attend live soccer	0.329*	0.327**	0.400*	0.411**	0.351**	0.194*	14.49**
	(0.157)	(0.136)	(0.187)	(0.172)	(0.142)	(0.091)	
Air passenger	0.520**	0.753*	0.697**	0.588***	0.431***	0.260**	622.88***
	(0.210)	(0.412)	(0.246)	(0.141)	(0.129)	(0.108)	
Male	0.143***	0.115	0.169***	0.140***	0.115***	0.117***	7.059
	(0.037)	(0.064)	(0.052)	(0.031)	(0.021)	(0.030)	
Aged under 25	0.005	0.107	0.070	-0.120**	-0.131**	-0.122***	8.535***
	(0.072)	(0.109)	(0.075)	(0.042)	(0.041)	(0.024)	
Aged 25 to 64	0.382***	0.500***	0.465***	0.257***	0.225***	0.160***	26.95***
	(0.069)	(0.120)	(0.040)	(0.030)	(0.022)	(0.041)	
Purpose: Holiday	0.506***	0.795***	0.917***	0.543***	0.153**	0.034	103.45***
	(0.055)	(0.085)	(0.086)	(0.036)	(0.061)	(0.051)	
Purpose: Business	0.510***	0.092	0.434***	0.606***	0.691***	0.628***	98.94***
	(0.111)	(0.204)	(0.103)	(0.063)	(0.095)	(0.143)	
Require visa	0.203	0.164	0.169	0.204	0.238**	0.277*	0.767
	(0.170)	(0.273)	(0.235)	(0.122)	(0.097)	(0.146)	
Group size: 2	-0.208***	-0.106*	-0.189***	-0.213***	-0.261***	-0.286***	35.32***
	(0.022)	(0.049)	(0.029)	(0.011)	(0.033)	(0.047)	
Group size: 3 or more	-0.406***	-0.357***	-0.559***	-0.458***	-0.373***	-0.356***	164.95***
	(0.025)	(0.035)	(0.043)	(0.045)	(0.034)	(0.057)	
Influence: Friends	-0.316***	-0.239***	-0.460***	-0.400***	-0.264***	-0.214***	195.41***
	(0.040)	(0.057)	(0.047)	(0.038)	(0.030)	(0.040)	
Influence: Guidebook	0.045	0.166***	0.175**	-0.004	-0.018	-0.052	38.05***
	(0.035)	(0.049)	(0.057)	(0.037)	(0.027)	(0.034)	
Influence: Review websites	0.088***	0.178***	0.134***	0.092**	0.039**	0.027	80.12***
	(0.021)	(0.025)	(0.036)	(0.036)	(0.014)	(0.020)	
Influence: Tourist board	0.073	0.091	0.049	0.047	0.044	0.029	0.542
	(0.044)	(0.053)	(0.047)	(0.040)	(0.046)	(0.106)	
Influence: Media	-0.001	-0.032	0.024	0.049	0.092	-0.006	17.94**
	(0.069)	(0.109)	(0.081)	(0.051)	(0.056)	(0.069)	
Influence: Social Media	0.124***	0.163***	0.163***	0.147***	0.046	0.090*	21.50***
	(0.024)	(0.045)	(0.032)	(0.038)	(0.027)	(0.043)	
Constant	3.433***	1.473***	2.470***	3.645***	4.576***	5.384***	
	(0.213)	(0.377)	(0.242)	(0.146)	(0.120)	(0.110)	
Observations	39,525	39,525	39,525	39,525	39,525	39,525	
R-squared	0.142	0.043	0.105	0.148	0.137	0.070	

Notes: *OLS* provides coefficients for Ordinary Least Squares regression with robust standard errors. τ denotes the regression quantile at which the unconditional model is estimated. UQR models fitted with cluster robust standard errors at the region of origin level. Significance denoted by $^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$.

Figure A1: Impact of Live Football Attendance on Inbound Visitor Expenditure in the United Kingdom

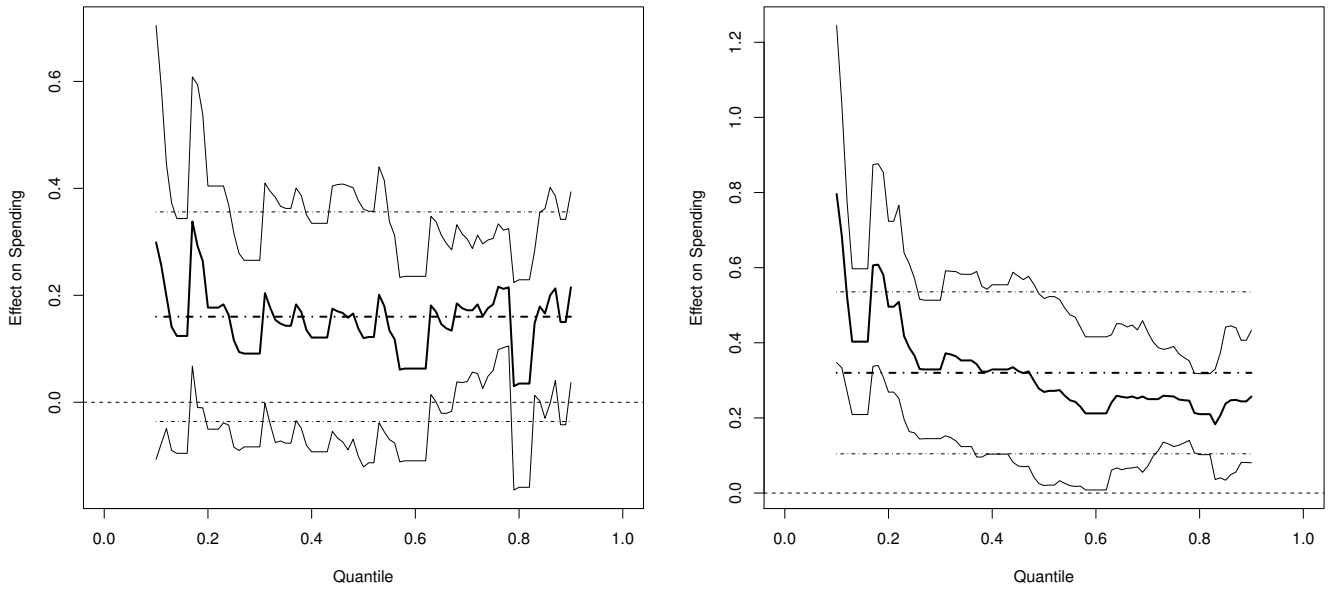
(a) Adjusted Expenditure

(b) Unadjusted Expenditure



(c) Adjusted Expenditure

(d) Unadjusted Expenditure



Notes: Left panel displays ticket price adjusted expenditure. Right panel shows the total expenditure recorded for each visitor. Top Row is the per day expenditure of this appendix. Bottom row is total expenditure from the main paper. 95% confidence intervals are plotted as dotted lines for the Unconditional Quantile Regression (UQR). OLS coefficients are plotted using a dot-dash line, with corresponding 95% confidence intervals drawn as dotted lines

vergences between trip characteristics, demographics and destination influences. Length of stay reports higher coefficients for North Americans in both adjusted and unadjusted cases, whilst departing via air has greatest impact on non-EU Europeans. Our male dummy produces positive significant estimates for the EU and North America, but for non-EU respondents it is females who spend more, significantly so under the unadjusted expenditure at the 10^{th} percentile. Age likewise has little significance in the non-EU group, except at the highest quantil $(\tau = 0.9)$. For North America and the EU under 25's spend less than their elders, but in the tails of the distribution younger non-EU citizens spend more. Purpose of visit has significant effects but again there is a split; Europeans, from both the EU and non-EU countries spend more if on holiday but North Americans spend more if on business. Group size effects are similar across al six regressions, while the visa dummy necessarily only appears in the non-EU case. Friends exert a similar negative influence on spending, again almost identical across the models for each expenditure measure. Social media and traditional media influence EU citizens to spend more but this effect is much weaker in the other two regions. Review websites have their strongest persuasion factor for North Americans, likewise guidebooks, making these the natural channels through which to promote tourism across the Atlantic.

Our regional work confirms deviation amongst the importance of covariates for explaining expenditure over and above that which is identified for live football within the main paper; this appendix has highlighted much of this. For all stakeholders in tourism encouraging spending has merit and appreciating the various channels through which this can be done is of clear value. All of these differences may be exploited through considered targetting and again the worth of UQR in aiding that process is underlined.

Table A4: Unconditional Quantile Regression Estimates for Inbound Expenditure per day in the United Kingdom: European Union Adjusted Expenditure

Variable	Total expenditure						Equality
	OLS	$\tau = 0.10$	$\tau = 0.25$	$\tau = 0.50$	$\tau = 0.75$	$\tau = 0.90$	
Length of stay (log)	0.509***	0.405***	0.389***	0.383***	0.431***	0.685***	262.5***
	(0.011)	(0.022)	(0.011)	(0.008)	(0.008)	(0.019)	
Attend live football	0.181***	0.238**	0.178***	0.115***	0.151***	0.358***	12.52*
	(0.049)	(0.104)	(0.060)	(0.043)	(0.042)	(0.082)	
Air departure	0.396***	0.638***	0.433***	0.361***	0.180***	0.137***	182.8***
	(0.018)	(0.044)	(0.023)	(0.016)	(0.015)	(0.025)	
Male	0.076***	0.056*	0.059***	0.056***	0.066***	0.116***	6.341
	(0.014)	(0.034)	(0.019)	(0.014)	(0.014)	(0.024)	
Aged 0-24	-0.105***	-0.087	-0.137***	-0.152***	-0.178***	-0.184***	1.396
	(0.034)	(0.082)	(0.045)	(0.032)	(0.032)	(0.057)	
midd	0.123***	0.168**	0.089**	0.059**	0.030	0.085	
	(0.032)	(0.074)	(0.040)	(0.029)	(0.030)	(0.054)	
purpholiday	0.437***	0.954***	0.670***	0.432***	0.200***	-0.041	
	(0.017)	(0.043)	(0.024)	(0.017)	(0.016)	(0.028)	
purpbus	0.253***	0.267***	0.290***	0.281***	0.251***	0.323***	
	(0.026)	(0.059)	(0.032)	(0.022)	(0.022)	(0.042)	
personsa2	-0.203***	-0.181***	-0.222***	-0.217***	-0.160***	-0.231***	
	(0.017)	(0.042)	(0.024)	(0.017)	(0.017)	(0.029)	
personsa3	-0.418***	-0.444***	-0.469***	-0.383***	-0.319***	-0.505***	
	(0.019)	(0.051)	(0.028)	(0.020)	(0.018)	(0.029)	
dvfrc	-0.238***	-0.177***	-0.277***	-0.219***	-0.207***	-0.236***	
	(0.016)	(0.038)	(0.022)	(0.015)	(0.015)	(0.027)	
dvgbk	0.096***	0.167***	0.144***	0.071***	0.065**	0.045	
	(0.021)	(0.039)	(0.029)	(0.025)	(0.028)	(0.047)	
dvweb	0.122***	0.093**	0.174***	0.099***	0.098***	0.172***	
	(0.022)	(0.046)	(0.031)	(0.027)	(0.029)	(0.052)	
dvtob	0.189***	0.195***	0.144***	0.194***	0.287***	0.204**	
	(0.031)	(0.050)	(0.041)	(0.037)	(0.045)	(0.087)	
dvnmt	0.137***	0.170**	0.073	0.122**	0.129**	0.292***	
	(0.044)	(0.078)	(0.062)	(0.050)	(0.054)	(0.106)	
dvsom	0.170***	0.328***	0.104**	0.058	0.076*	0.229***	
	(0.033)	(0.054)	(0.048)	(0.039)	(0.041)	(0.077)	
Constant	4.579***	3.093***	4.185***	4.945***	5.559***	5.902***	
	(0.042)	(0.101)	(0.052)	(0.036)	(0.036)	(0.064)	
Observations	16,533	16,533	16,533	16,533	16,533	16,533	
R-squared	0.247	0.077	0.149	0.190	0.177	0.140	

Notes: *OLS* provides coefficients for Ordinary Least Squares regression with robust standard errors. τ denotes the regression quantile at which the unconditional model is estimated. UQR models fitted with cluster robust standard errors at the region of origin level. Significance denoted by $^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$.

Table A5: Unconditional Quantile Regression Estimates for Inbound Expenditure per day in the United Kingdom: European Union Unadjusted Expenditure

Variable	Total expenditure						Equality
	OLS	$\tau = 0.10$	$\tau = 0.25$	$\tau = 0.50$	$\tau = 0.75$	$\tau = 0.90$	
dvlft	0.394***	0.642***	0.385***	0.366***	0.227***	0.383***	
	(0.039)	(0.070)	(0.054)	(0.042)	(0.044)	(0.083)	
lstay	0.505***	0.373***	0.379***	0.395***	0.431***	0.689***	
	(0.011)	(0.020)	(0.011)	(0.008)	(0.008)	(0.019)	
flow1	0.394***	0.590***	0.428***	0.274***	0.179***	0.137***	
	(0.017)	(0.041)	(0.023)	(0.016)	(0.015)	(0.026)	
male	0.074***	0.046	0.059***	0.056***	0.066***	0.118***	
	(0.014)	(0.032)	(0.019)	(0.014)	(0.014)	(0.024)	
ythd	-0.104***	-0.061	-0.123***	-0.124***	-0.175***	-0.185***	
	(0.034)	(0.076)	(0.044)	(0.032)	(0.033)	(0.057)	
midd	0.123***	0.163**	0.093**	0.063**	0.031	0.086	
	(0.032)	(0.069)	(0.040)	(0.029)	(0.030)	(0.054)	
purpholiday	0.432***	0.875***	0.649***	0.421***	0.197***	-0.040	
	(0.017)	(0.040)	(0.023)	(0.017)	(0.016)	(0.028)	
purpbus	0.249***	0.252***	0.281***	0.284***	0.251***	0.319***	
	(0.026)	(0.055)	(0.031)	(0.022)	(0.022)	(0.043)	
personsa2	-0.201***	-0.167***	-0.212***	-0.180***	-0.159***	-0.233***	
	(0.017)	(0.039)	(0.024)	(0.017)	(0.017)	(0.030)	
personsa3	-0.411***	-0.407***	-0.462***	-0.327***	-0.320***	-0.509***	
	(0.018)	(0.047)	(0.027)	(0.020)	(0.018)	(0.030)	
dvfrc	-0.240***	-0.165***	-0.275***	-0.258***	-0.205***	-0.239***	
	(0.016)	(0.036)	(0.021)	(0.015)	(0.015)	(0.027)	
dvgbk	0.096***	0.157***	0.138***	0.061**	0.068**	0.046	
	(0.020)	(0.037)	(0.028)	(0.026)	(0.028)	(0.047)	
dvweb	0.120***	0.088**	0.178***	0.092***	0.097***	0.168***	
	(0.022)	(0.042)	(0.031)	(0.028)	(0.029)	(0.052)	
dvtob	0.190***	0.201***	0.138***	0.204***	0.290***	0.194**	
	(0.030)	(0.045)	(0.041)	(0.038)	(0.045)	(0.087)	
dvnmt	0.134***	0.151**	0.047	0.141***	0.121**	0.295***	
	(0.044)	(0.074)	(0.061)	(0.050)	(0.055)	(0.106)	
dvsom	0.171***	0.304***	0.109**	0.085**	0.083**	0.231***	
	(0.032)	(0.050)	(0.047)	(0.040)	(0.041)	(0.077)	
Constant	4.587***	3.211***	4.210***	4.916***	5.561***	5.901***	
	(0.041)	(0.094)	(0.051)	(0.035)	(0.036)	(0.064)	
Observations	16,533	16,533	16,533	16,533	16,533	16,533	
R-squared	0.248	0.077	0.150	0.185	0.177	0.140	

Notes: *OLS* provides coefficients for Ordinary Least Squares regression with robust standard errors. τ denotes the regression quantile at which the unconditional model is estimated. UQR models fitted with cluster robust standard errors at the region of origin level. Significance denoted by $^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$.

Table A6: Unconditional Quantile Regression Estimates for Inbound Expenditure per day in the United Kingdom: Non-EU Adjusted Expenditure

Variable	Total expenditure						Equality
	OLS	$\tau = 0.10$	$\tau = 0.25$	$\tau = 0.50$	$\tau = 0.75$	$\tau = 0.90$	
dvlft	0.459***	0.317*	0.609***	0.590***	0.360***	0.405***	
	(0.069)	(0.185)	(0.122)	(0.092)	(0.100)	(0.125)	
lstay	0.444***	0.519***	0.461***	0.368***	0.401***	0.520***	
	(0.021)	(0.076)	(0.032)	(0.019)	(0.020)	(0.031)	
flow1	1.536***	5.384***	2.166***	1.055***	0.612***	0.296***	
	(0.050)	(0.245)	(0.082)	(0.046)	(0.042)	(0.050)	
male	0.009	-0.157	-0.042	0.043	0.011	0.057	
	(0.029)	(0.099)	(0.056)	(0.037)	(0.037)	(0.044)	
ythd	0.078	0.576*	-0.090	-0.174*	0.062	0.237**	
	(0.087)	(0.329)	(0.157)	(0.098)	(0.092)	(0.108)	
midd	0.205**	0.504	0.164	0.021	0.219**	0.244**	
	(0.082)	(0.311)	(0.145)	(0.092)	(0.086)	(0.099)	
purpholiday	0.652***	1.269***	1.214***	0.737***	0.360***	0.121**	
	(0.033)	(0.109)	(0.063)	(0.044)	(0.045)	(0.052)	
purpbus	-0.021	-1.708***	-0.047	0.282***	0.291***	0.187***	
	(0.047)	(0.183)	(0.082)	(0.053)	(0.056)	(0.069)	
visad	0.490***	0.294**	0.396***	0.493***	0.634***	0.799***	
	(0.041)	(0.121)	(0.061)	(0.047)	(0.057)	(0.082)	
personsa2	-0.329***	-0.470***	-0.440***	-0.290***	-0.245***	-0.195***	
	(0.035)	(0.130)	(0.065)	(0.043)	(0.042)	(0.049)	
personsa3	-0.412***	-0.374**	-0.655***	-0.331***	-0.374***	-0.402***	
	(0.039)	(0.146)	(0.084)	(0.053)	(0.049)	(0.051)	
dvfrc	-0.273***	-0.092	-0.299***	-0.349***	-0.300***	-0.323***	
	(0.032)	(0.107)	(0.060)	(0.041)	(0.041)	(0.049)	
dvgbk	0.070	-0.040	0.003	0.005	0.162*	0.113	
	(0.056)	(0.152)	(0.094)	(0.078)	(0.085)	(0.102)	
dvweb	0.085	0.013	0.107	0.226***	0.018	0.180*	
	(0.055)	(0.124)	(0.100)	(0.083)	(0.087)	(0.109)	
dvtob	0.171*	-0.132	0.215	0.287**	0.213	0.127	
	(0.088)	(0.321)	(0.147)	(0.116)	(0.140)	(0.178)	
dvnmt	0.263**	0.309	0.351**	0.115	0.387**	0.261	
	(0.126)	(0.288)	(0.164)	(0.166)	(0.180)	(0.243)	
dvsom	0.153**	0.056	0.130	0.098	0.258**	0.047	
	(0.075)	(0.233)	(0.146)	(0.102)	(0.108)	(0.125)	
Constant	3.458***	-1.695***	2.308***	4.206***	5.109***	5.747***	
	(0.104)	(0.428)	(0.182)	(0.110)	(0.104)	(0.125)	
Observations	5,202	5,202	5,202	5,202	5,202	5,202	
R-squared	0.406	0.306	0.278	0.231	0.173	0.154	

Notes: *OLS* provides coefficients for Ordinary Least Squares regression with robust standard errors. τ denotes the regression quantile at which the unconditional model is estimated. UQR models fitted with cluster robust standard errors at the region of origin level. Significance denoted by $^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$.

Table A7: Unconditional Quantile Regression Estimates for Inbound Expenditure per day in the United Kingdom: Non-EU Unadjusted Expenditure

Variable	Total expenditure						Equality
	OLS	$\tau = 0.10$	$\tau = 0.25$	$\tau = 0.50$	$\tau = 0.75$	$\tau = 0.90$	
dvlft	0.607***	0.561***	0.837***	0.678***	0.570***	0.404***	
	(0.061)	(0.124)	(0.102)	(0.091)	(0.104)	(0.125)	
lstay	0.442***	0.516***	0.454***	0.364***	0.400***	0.518***	
	(0.021)	(0.076)	(0.032)	(0.019)	(0.021)	(0.031)	
flow1	1.536***	5.424***	2.235***	1.053***	0.613***	0.296***	
	(0.050)	(0.246)	(0.081)	(0.045)	(0.042)	(0.050)	
male	0.008	-0.163*	-0.028	0.043	0.017	0.057	
	(0.029)	(0.099)	(0.055)	(0.037)	(0.038)	(0.044)	
ythd	0.081	0.580*	-0.097	-0.150	0.049	0.237**	
	(0.087)	(0.331)	(0.155)	(0.096)	(0.093)	(0.107)	
midd	0.205**	0.506	0.147	0.046	0.198**	0.244**	
	(0.082)	(0.314)	(0.143)	(0.090)	(0.087)	(0.099)	
purpholiday	0.652***	1.290***	1.171***	0.721***	0.353***	0.121**	
	(0.033)	(0.108)	(0.062)	(0.044)	(0.045)	(0.052)	
purpbus	-0.021	-1.717***	-0.034	0.273***	0.279***	0.186***	
	(0.047)	(0.183)	(0.080)	(0.053)	(0.056)	(0.069)	
visad	0.491***	0.292**	0.403***	0.487***	0.642***	0.797***	
	(0.040)	(0.122)	(0.059)	(0.047)	(0.057)	(0.082)	
personsa2	-0.328***	-0.492***	-0.428***	-0.286***	-0.249***	-0.195***	
	(0.035)	(0.130)	(0.064)	(0.043)	(0.042)	(0.049)	
personsa3	-0.411***	-0.378***	-0.636***	-0.324***	-0.382***	-0.401***	
	(0.039)	(0.146)	(0.082)	(0.053)	(0.049)	(0.051)	
dvfrc	-0.272***	-0.070	-0.293***	-0.352***	-0.295***	-0.322***	
	(0.032)	(0.106)	(0.059)	(0.041)	(0.041)	(0.049)	
dvgbk	0.070	-0.049	0.004	0.000	0.184**	0.113	
	(0.056)	(0.153)	(0.093)	(0.078)	(0.086)	(0.102)	
dvweb	0.085	0.001	0.114	0.229***	0.024	0.180*	
	(0.054)	(0.125)	(0.098)	(0.083)	(0.088)	(0.108)	
dvtob	0.171*	-0.123	0.182	0.261**	0.215	0.126	
	(0.088)	(0.324)	(0.141)	(0.117)	(0.141)	(0.178)	
dvnmt	0.261**	0.306	0.356**	0.116	0.386**	0.260	
	(0.126)	(0.290)	(0.164)	(0.166)	(0.181)	(0.242)	
dvsom	0.149**	0.046	0.136	0.119	0.251**	0.047	
	(0.075)	(0.234)	(0.145)	(0.101)	(0.109)	(0.125)	
Constant	3.459***	-1.727***	2.278***	4.199***	5.138***	5.752***	
	(0.104)	(0.430)	(0.179)	(0.108)	(0.105)	(0.125)	
Observations	5,202	5,202	5,202	5,202	5,202	5,202	
R-squared	0.410	0.309	0.291	0.231	0.175	0.154	

Notes: *OLS* provides coefficients for Ordinary Least Squares regression with robust standard errors. τ denotes the regression quantile at which the unconditional model is estimated. UQR models fitted with cluster robust standard errors at the region of origin level. Significance denoted by $^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$.

Table A8: Unconditional Quantile Regression Estimates for Inbound Expenditure per day in the United Kingdom: North America Adjusted Expenditure

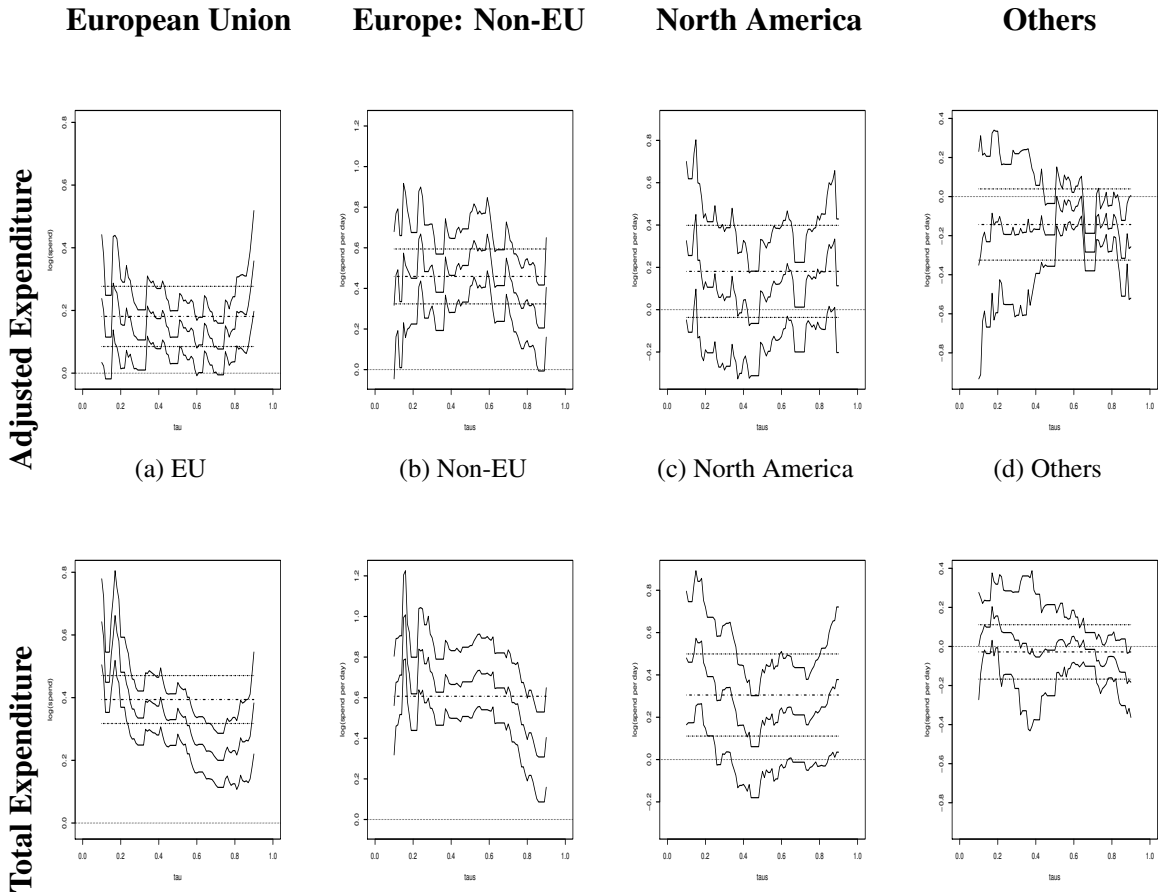
Variable	Total expenditure						Equality
	OLS	$\tau = 0.10$	$\tau = 0.25$	$\tau = 0.50$	$\tau = 0.75$	$\tau = 0.90$	
dvlft	0.181	0.326*	0.170	0.081	0.157	0.113	
	(0.111)	(0.191)	(0.164)	(0.126)	(0.114)	(0.161)	
lstay	0.618***	0.718***	0.729***	0.548***	0.466***	0.493***	
	(0.018)	(0.043)	(0.025)	(0.016)	(0.016)	(0.025)	
flow1	0.364***	0.787***	0.495***	0.530***	0.225***	0.077	
	(0.057)	(0.171)	(0.105)	(0.063)	(0.049)	(0.060)	
male	0.148***	0.194***	0.180***	0.165***	0.099***	0.070*	
	(0.029)	(0.068)	(0.046)	(0.034)	(0.032)	(0.041)	
ythd	-0.229***	-0.364**	-0.356***	-0.409***	-0.155***	0.003	
	(0.062)	(0.155)	(0.099)	(0.067)	(0.060)	(0.075)	
midd	0.195***	0.340***	0.329***	0.037	0.065	0.141**	
	(0.046)	(0.111)	(0.073)	(0.053)	(0.050)	(0.061)	
purpholiday	0.468***	0.883***	0.730***	0.515***	0.195***	-0.007	
	(0.034)	(0.082)	(0.056)	(0.040)	(0.036)	(0.046)	
purpbus	0.834***	1.055***	1.123***	0.926***	0.605***	0.318***	
	(0.043)	(0.091)	(0.063)	(0.049)	(0.051)	(0.068)	
o.visad	-						
personsa2	-0.229***	-0.123	-0.133**	-0.247***	-0.286***	-0.355***	
	(0.034)	(0.085)	(0.057)	(0.041)	(0.037)	(0.047)	
personsa3	-0.500***	-0.568***	-0.387***	-0.422***	-0.524***	-0.611***	
	(0.044)	(0.126)	(0.079)	(0.055)	(0.044)	(0.049)	
dvfrc	-0.200***	0.043	-0.101**	-0.279***	-0.276***	-0.270***	
	(0.031)	(0.071)	(0.050)	(0.036)	(0.034)	(0.044)	
dvgbk	0.228***	0.182**	0.303***	0.227***	0.191***	0.284***	
	(0.043)	(0.083)	(0.068)	(0.060)	(0.061)	(0.082)	
dvweb	0.192***	0.227**	0.167**	0.218***	0.219***	0.122	
	(0.049)	(0.097)	(0.075)	(0.063)	(0.063)	(0.084)	
dvtob	0.069	-0.065	0.037	0.092	0.206**	-0.040	
	(0.067)	(0.136)	(0.106)	(0.094)	(0.103)	(0.133)	
dvnmt	0.017	0.084	-0.037	-0.062	0.080	0.245	
	(0.096)	(0.168)	(0.151)	(0.120)	(0.122)	(0.178)	
dvsom	0.088	-0.132	-0.028	0.073	0.067	0.416***	
	(0.087)	(0.168)	(0.127)	(0.102)	(0.097)	(0.143)	
visad		0.000	0.000	0.000	0.000	0.000	
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	
Constant	4.477***	1.904***	3.090***	4.692***	6.009***	6.818***	
	(0.079)	(0.230)	(0.136)	(0.085)	(0.072)	(0.086)	
Observations	5,549	5,549	5,549	5,549	5,549	5,549	
R-squared	0.335	0.126	0.225	0.251	0.193	0.125	

Notes: *OLS* provides coefficients for Ordinary Least Squares regression with robust standard errors. τ denotes the regression quantile at which the unconditional model is estimated. All respondents in this group require a visa to enter the United Kingdom and so the visa dummy is omitted. Significance denoted by $^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$.

Table A9: Unconditional Quantile Regression Estimates for Inbound Expenditure per day in the United Kingdom: North America Unadjusted Expenditure

Variable	Total expenditure						Equality
	OLS	$\tau = 0.10$	$\tau = 0.25$	$\tau = 0.50$	$\tau = 0.75$	$\tau = 0.90$	
dvlft	0.305***	0.480***	0.364**	0.185	0.184	0.378**	
	(0.099)	(0.161)	(0.151)	(0.123)	(0.113)	(0.175)	
lstay	0.617***	0.727***	0.727***	0.547***	0.465***	0.498***	
	(0.017)	(0.043)	(0.025)	(0.016)	(0.016)	(0.025)	
flow1	0.365***	0.795***	0.483***	0.530***	0.224***	0.079	
	(0.057)	(0.172)	(0.104)	(0.063)	(0.049)	(0.060)	
male	0.149***	0.192***	0.179***	0.165***	0.098***	0.068*	
	(0.029)	(0.068)	(0.046)	(0.034)	(0.032)	(0.041)	
ythd	-0.225***	-0.359**	-0.359***	-0.405***	-0.155***	-0.027	
	(0.061)	(0.156)	(0.099)	(0.067)	(0.060)	(0.076)	
midd	0.195***	0.345***	0.333***	0.037	0.065	0.122**	
	(0.046)	(0.112)	(0.073)	(0.053)	(0.050)	(0.062)	
purpholiday	0.470***	0.889***	0.724***	0.519***	0.195***	-0.019	
	(0.034)	(0.082)	(0.056)	(0.040)	(0.036)	(0.046)	
purpbus	0.834***	1.064***	1.122***	0.923***	0.607***	0.314***	
	(0.043)	(0.092)	(0.063)	(0.049)	(0.051)	(0.068)	
o.visad	-						
personsa2	-0.229***	-0.117	-0.124**	-0.247***	-0.286***	-0.351***	
	(0.034)	(0.086)	(0.057)	(0.041)	(0.037)	(0.047)	
personsa3	-0.501***	-0.561***	-0.381***	-0.431***	-0.523***	-0.619***	
	(0.044)	(0.126)	(0.079)	(0.055)	(0.044)	(0.049)	
dvfrc	-0.199***	0.035	-0.104**	-0.284***	-0.277***	-0.273***	
	(0.031)	(0.071)	(0.050)	(0.036)	(0.034)	(0.044)	
dvgbk	0.226***	0.179**	0.300***	0.233***	0.191***	0.280***	
	(0.043)	(0.084)	(0.068)	(0.060)	(0.060)	(0.082)	
dvweb	0.192***	0.226**	0.164**	0.218***	0.219***	0.148*	
	(0.048)	(0.097)	(0.075)	(0.063)	(0.063)	(0.084)	
dvtob	0.068	-0.068	0.036	0.092	0.206**	0.006	
	(0.067)	(0.137)	(0.106)	(0.094)	(0.103)	(0.134)	
dvnmt	0.013	0.078	-0.044	-0.064	0.078	0.217	
	(0.095)	(0.169)	(0.151)	(0.119)	(0.122)	(0.178)	
dvsom	0.085	-0.139	-0.034	0.051	0.066	0.394***	
	(0.087)	(0.170)	(0.127)	(0.102)	(0.097)	(0.144)	
visad		0.000	0.000	0.000	0.000	0.000	
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	
Constant	4.477***	1.877***	3.104***	4.696***	6.010***	6.830***	
	(0.079)	(0.231)	(0.136)	(0.085)	(0.072)	(0.087)	
Observations	5,549	5,549	5,549	5,549	5,549	5,549	
R-squared	0.336	0.127	0.225	0.252	0.194	0.128	

Notes: *OLS* provides coefficients for Ordinary Least Squares regression with robust standard errors. τ denotes the regression quantile at which the unconditional model is estimated. UQR models fitted with cluster robust standard errors at the region of origin level. Significance denoted by $^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$.



(a) EU (b) Non-EU (c) North America (d) Others

(e) EU (f) Non-EU (g) North America (h) Others

Figure A2: Coefficient comparisons by region

Notes: Graphs are plotted using the outcomes of the unconditional quantile regressions for τ between 0.1 and 0.9 at intervals of 0.01. Solid lines indicate unconditional quantile regression results and horizontal dot-dash lines denote linear regressions. Coefficients are plotted as thick lines. Confidence intervals are plotted with thinner lines and are constructed at the 95% level to show significance of estimates. Both Adjsuted and unadjusted expenditures are plotted on the same vertical scale for each region to ease comparison.