

## Determinants of travellers' expenditures at airports

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### Abstract

This study applies a Double-Hurdle Model to a sample of 2,723 passengers to analyse whether socio-demographics (i.e. gender, age, level of education, income and place of residence), travel-related variables (i.e. type of accommodation and travel party) and flight-related determinants (i.e. check-in mode, wait time) and the pre-intention to buy significantly influence passengers' shopping behaviours (i.e. to buy or not to buy and the amount of money to be spent). Findings reveal that the 'decision to buy' is significantly influenced by travel-related (i.e. type of accommodation and travel party) and flight-related (i.e. wait time) variables only. On the contrary, the level of expenditure is significantly influenced by socio-demographics (i.e. age and income), travel-related variables (i.e. type of accommodation and travel party), flight-related variables (i.e. type of check-in) and pre-intention to buy. Overall, findings show that the determinants of 'decision to buy' and of 'how much to spend' are not the same. Furthermore, a key highlight is that the check-in modality exerts a significant influence on the level of expenditure, with passengers making their check-in in a traditional modality spending more than their counterparts who check-in online. Contributions to theory and managerial implications are discussed and suggestions for further research are given.

**Keywords:** Airport management; expenditure behaviour; socio-demographics; travel-related variables; flight-related variables, Italy.

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## Introduction

During the last few years, airports have been subject to many changes that have significantly challenged traditional marketing and management practices in this sector (e.g. Graham, 2009; Tovar & Martin-Cejas, 2009). Nowadays, the profitability of airports depends largely on non-aviation related activities (Del Chiappa, Atzeni e Loriga, 2019; Fasone, Kogler & Scuderi, 2016; Graham, 2009; Han, Yu & kim, 2018; Prentice & Kadan, 2019; Rhoades, Waguespack, & Young, 2000; Yokomi, Wheat & Mizutani, 2017), with airports more frequently representing leisure, retail and entertainment contexts (Appold & Kasarda, 2006; Lin & Chen, 2013). By the year 2040, it is estimated that the number of airport passengers worldwide may reach 22.2 billion, indicating a potentially large increase in the consumption of F&B (Food and Beverage) and retail services in airports (ACI, 2017).

In this scenario, researchers and practitioners need to gain a greater and deeper understanding about the main determinants of passengers' consumption and expenditure behaviours during their time at the airport (Crawford & Melewar, 2003; Doong, Wang & Law, 2012). This knowledge will provide useful information that may be used to dynamically tailor the retail assortment in airports to better reflect the characteristics of target consumers.

Despite this, so far very little research has examined expenditure behaviour of travellers in airports (e.g. Castillo-Manzano, López-Valpuesta & Sánchez-Braza, 2018; Torres, Dominguez, Valdés & Aza, 2005), with no published paper aimed at investigating the effect that one's check-in mode might have on his expenditure behaviour. That being said, further research is needed to deepen our understanding about this topic considering different airports and/or geographical area and/or a wider array of potential determinants of passengers' expenditures.

In order to fill this gap, this paper uses a Double-Hurdle model (Cragg, 1971) to estimate the influence that socio-demographic characteristics (i.e. gender, age, level of education, income and place of residence), travel-related determinants (type of accommodation and travel party) and flight-related determinants (i.e. check-in mode, wait time) exert on passengers' shopping behaviours (i.e. to buy or not to buy and the amount of money to be spent). To this aim, a sample of 2,723 passengers interviewed at a Mediterranean international airport is used. Furthermore, the study analyses whether significant differences exist in passengers' expenditure behaviour, based on the fact that they pre-planned or not to buy at the airport.

The paper is organized as follows. In the following section, an updated literature review is provided. In the third section, the methodological framework is outlined. The fourth section provides empirical findings. The fifth section presents the robustness checks and the last section provides the discussion and the concluding remarks.

## Literature review

Tourist expenditure may be considered a key variable used to segment the tourism market (Kozak, 2001) and a key determinant for the economic growth at both regional (e.g. Paci & Marrocu, 2014) and national (e.g. Figini & Vici, 2010) levels. Existing studies have been devoted to analyzing determinants of economic tourism expenditure adopting both a macro (aggregated) and micro (individual-based) perspective (Marroccu *et al.*, 2015).

However, while substantial literature has been devoted to analyzing tourism's economic impact at the macro level (i.e. destination and/or regional and/or country levels), limited research still beleaguers the aim to deepen our understanding about visitors' expenditure behaviours on a micro scale (e.g. museums, markets, etc.; Brida, Disegna & Osti, 2013; Wang & Davidson, 2010). Among the limited

number of studies analyzing travellers' expenditure behaviours by adopting a micro-level perspective, to the best of our knowledge few studies exist aimed at analyzing passengers' expenditure behaviours at airport-related retail services (e.g. Castillo-Manzano, 2010; Castillo-Manzano, *et al.*, 2018; Torres *et al.*, 2005).

Determinants of tourism expenditure can be grouped into three main categories; namely, socio-economic and demographic (e.g. gender, level of education, income, etc.) travel-related characteristics (e.g. type of accommodation, travel party, length of stay, purpose of travelling, etc.) and psychographic characteristics (e.g. travel motivations) (Brida & Scuderi, 2013; Marcusen, 2011; Marroccu, Paci & Zara, 2015; Wang *et al.*, 2006). Quite similarly, socio-demographics (age, gender, income, etc.), psychographics (e.g. Chung, 2015) and travel-related characteristics (purpose of travel, travel party, prior experience, etc.) have likewise been considered relevant determinant of consumers' passenger behaviours at airports (e.g. Castillo-Manzano, 2010; Del Chiappa, Martin & Roman, 2016; Geuens, Vantomme & Brengman, 2004; Lu, 2014), together with wait time (i.e. the time spent within the terminal building prior to departure, see for example: Chung, Wu & Chiang, 2013; Lin & Chen 2013) and the service-scape of the airport (e.g. Ali, Kim & Ryu, 2016; Entwistle, 2007; Moon, Yoon, & Han, 2017; Van Oel & Van den Berkhof, 2013; Wattanacharoensil, Schuckert & Graham, 2016; Wattanacharoensil *et al.*, 2017). Lu (2014) examined the influence of passengers' socio-demographic characteristics, trip characteristics and perceptions of airport shopping on their shopping intentions at airports. Geuens *et al.*, (2004), reported men being more likely to be apathetic or mood shoppers, while women tend to shop more. Perng, Chow & Liao (2010) reported that younger respondents spend more in souvenir shops and cafés compared to older travellers. Torres *et al.* (2005) reported that leisure tourists spend more than business travellers, while Castillo-Manzano (2010) highlighted that the likelihood of purchasing F&B increases by almost 7% when frequent flyers are considered. Other studies showed that the likelihood of buying and spending more increase as waiting time prior to boarding increases (Geuens *et al.*, 2004; Lin & Chen, 2013).

Existing marketing literature distinguishes buying behaviour into two main categories: planned and impulsive (e.g. Lu, 2014; Sharma & Nanda, 2014). Considering F&B retail services, previous studies show that over 60% of travellers plan to use shops or cafés and tend to arrive earlier at the airport to shop (Echevarne, 2008). However, when considering the overall airport-related retail offerings (F&B and non-F&B related), passengers' buying behaviours can be considered to be mostly impulsive (e.g. Crawford & Melewar, 2003; Graham, 2014; Omar & Kent, 2001; Volkova, 2009), even if differences remain based on passengers' characteristics, travel-related characteristics and service-scape-related characteristics of the airport (Omar, 2002). For example, leisure or charter passengers tend to be more prone to impulse buying and to the use of F&B facilities (Graham, 2014). Other studies found that the airport commercial environment is an important factor that influences passengers' responses and behaviours (Han *et al.*, 2020; Taheri *et al.*, 2019) and triggering their impulse-buying behaviours (e.g. Lu, 2014; Omar, 2002).

Expenditure behaviour can be analysed by studying buying probability (e.g. Alegre & Pou, 2004) and/or the intensity/level of expenditure (e.g. Kozak, 2001). Econometric analysis (via different methods) is the most-used approach when analyzing determinants of traveller's expenditures (e.g. Brida, *et al.*, 2013). Among studies analyzing the level of expenditures, the most frequently used econometric method is the OLS (Jang *et al.*, 2004; Kozak, 2001; Kozak, Gokovali, & Bahar, 2008; Marcussen, 2011). Some research has used a censored or truncated model, such as a Tobit one (Alderighi, Nicolini & Piga, 2016; Zheng & Zhang, 2013) or double-hurdle ones (Disegna & Osti, 2016; Jang & Ham, 2006; Zhang, H., Zhang, J. & Kuwano, 2012).

The existing literature investigates expenditure behaviour in many settings such as events (e.g. Del Chiappa, Tinaz & Turco, 2014), attractions (Oppermann, 1996), souvenirs (e.g. Park, 2000), students' trips (Tharane, 2015), Christmas Markets (Brida, *et al.*, 2013), mountain tourism (e.g. Fredman, 2008), wine tourism (e.g. Telfer & Hansimoto, 2000), domestic (Turner & Reisinger, 2001) and international tourism (Laesser & Crouch, 2006). Despite this variety, very few studies have been applied to airports.

While some studies are devoted to analyzing shopping behaviour in airport areas (e.g. Geuens *et al.*, 2004) very few are devoted to analyzing expenditure behaviour by studying buying probability and/or the intensity or level of expenditure. To the best of our knowledge, there are only few exceptions. Specifically, Torres *et al.* (2005) investigated the relationship between the expenditure in the commercial area of a Spanish airport and the passenger waiting time also considering the travel purpose of travellers (i.e. business versus leisure travellers). Specifically, the authors reported leisure tourists spending more than business travellers and showed that a clear relationship exists between shopping behaviour in commercial areas and their length of wait prior to boarding. According with previous studies, passenger spending on F&B services is higher when considering airports with a high proportion of low-cost carriers that do not offer free in-flight catering services (Graham, 2009) and when travellers fly long distance (Appold & Kasarda, 2006). Castillo-Manzano (2010) carried out a study on a sample of passengers at seven different regional airports in Spain and highlighted that expenditure behaviour was significantly influenced by country of origin, employment status, type of airline, connecting flight, group size, whether travelling with children, whether having been seen-off, mode of transport to reach the airport and wait time. More recently Castillo-Manzano *et al.*, (2018) carried out a study using data collected in six regional airports and two main hubs in the Spanish airport system considering sixteen different factors that might affect passengers' purchase decisions and volume of purchases (e.g. their reason for travelling and the duration of their trip, type of route, type of airline, time spent in airport, travel party size, etc.), they highlighted that passengers' consumer behaviours in the specific context of airport-based F&B services in malls at hub airports change when compared to how passengers would have behaved at regional airports. Specifically, their study reported a higher likelihood of making a purchase and a higher level of expenditure at hub airports. Hence, for example, Castillo-Manzano (2010) reported a significant difference in expenditure behaviour based on country of origin and occupation, with national travellers and students spending less when compared to their counterparts.

That said, it could be argued that most the current knowledge related to expenditure behaviour at airports is largely site-specific (with studies carried out in a limited number of countries, mostly Spain). According to Castillo-Manzano *et al.*, (2018) this circumstance calls for further research in other countries and airports to understand how expenditure behaviour differs or not with a change in geographic circumstances. Furthermore, to the best of our knowledge, no existing study has investigated whether significant differences in expenditure behaviour exists based on pre-intention to buy and check-in mode (traditional versus web check-in). As far as this latter variable is considered, existing studies tend to emphasize that airports have the convenience to incentivize the use of web check-in and self-service technology to bring down their operating costs, to optimize space and to speed-up the check-in process and the need for more airlines (e.g. Castillo-Manzano & López-Valpuesta, 2013). However, it could be argued that passengers managing their check-in online might tend to arrive at the airport (on average) later, compared to those in need to do traditional check-in procedures, thus resulting in a lower likelihood of buying and/or less expenditure. Despite the relevance that a deep understanding about the effect that check-in modality can have on actual passengers' expenditure behaviours, this research aspect remains unexplored in the current literature.

This study applies econometric analysis to a sample of passengers of an International Airport investigate whether expenditure behaviour is significantly influenced by socio-demographics (i.e. gender, age, level

of education, income and place of residence), travel-related characteristics (type of accommodation and travel party), flight experience-based determinants (i.e. type of check-in, wait time) and a pre-planned intention to buy.

## **Methodology**

### *Study Settings and Data Collection*

Relevant data were collected at the Olbia-Costa Smeralda International Airport. Among the European airports with up to five million passengers annually, this airport in 2017 received the 'ACI Europe highly commended' quality prize and ranked in second place after the Cork airport (Ireland). The airport is currently the main 'gateway' to Costa Smeralda (Emerald Coast), one of the best-known luxury tourism destinations in the world. In 2017, the airport reached 2,808,323 million passengers, of which around 48% were international travellers.

The questionnaire was divided into four sections. The first section asked respondents to provide some socio-demographic and travel-related information. The second section asked respondents to report whether they bought something while at the airport (before or after the security check), whether this buying was pre-planned or not and how much they spent in total for the different types of product/services offered by the airport retailers (e.g. books, food and beverages, handcrafts, etc.). The third section asked respondents to report their expenditure at the destination during the stay. The last section asked respondents to declare the main motivations for not buying at the airport.

The questionnaire was originally designed in Italian, but as different nationalities could appear in a sampling process with tourists, three different questionnaires were prepared by two professional translators (English, German and Italian). As previously done in other studies carried out in tourism-related settings (e.g. Seddighi, Nutall, & Theocharous, 2001), a back-translation method was adopted to guarantee quality assurance. We pre-tested the questionnaire on thirty native-speaking tourists from the three different language groups to assure the comprehensibility of the questions. No concerns emerged in these pilot tests. Hence, the three final questionnaires were considered as definitive.

Two trained interviewers directly supervised by one of the authors collected data for this study face-to-face at the airport. They intercepted 4,000 individuals while in the boarding area during May-October 2016. On average, in this period, the interviewers had access to the boarding area twice a week during specific time frames. This procedure was followed in accordance with the airport managers so as to not interfere with other marketing research and activities carried out directly by the airport staff (i.e. forty-eight days of data collection). Only individuals aged eighteen and over were asked to take part in the study. At the end of the data collection period, a convenience sample of 2,723 completed questionnaires was collected (response rate: 68.07%).

### *Theoretical Framework*

To empirically analyse expenditure determinants, the most commonly used econometric model is an OLS regression estimation (Jang *et al.*, 2004; Kozak, 2001; Marcussen, 2011). In OLS models, expenditures used as a dependent variable are usually transformed into logarithms, in order to provide a direct interpretation in terms of elasticity. Very few authors make use of pure or standardized (i.e. share of expenditure between category of tourism expenditure) values. Few studies exist in the current literature using a Tobit model (Tobin, 1958). Even less are studies adopting censored models (e.g. double hurdle; Cragg, 1971): these models consider that expenditure values cannot be lower than zero, thus leading several individuals to report zero expenditure. Based on prior research (i.e. McFadden, 1974), other researchers (e.g. Alegre & Pou, 2004) have applied a binary discrete-choice random-utility model to

analyse expenditure behaviour. This method has been utilized to take into consideration the decision of spending or not and to analyse the probability of making purchases.

For the purposes of this study (i.e. analysing determinants of expenditure behaviour at airport), a theoretical framework is developed by adapting those provided by Brida & Scuderi (2013) and Wang *et al.* (2006). To determine the model to be used, a preliminary OLS regression on our sample was run to test the most suitable set of variables to be considered as exogenous determinants of expenditure. When passengers declared having not made any purchases, the dependent variable assumed a zero value; when respondents reported to have spent some money, the dependent variable was considered to be the logarithm of the actual individual expenditure. Afterwards, the dependent variable was modelled as a dummy variable taking a value of 1 if the respondent had spent money at the airport, 0 otherwise. Hence, the Logit model allowed us to study the partial effects of determinants on purchasing probability. And the independent variables were chosen based both on previous studies in the literature (e.g. Castillo-Manzano, 2010; Guens *et al.*, 2010; Lin & Chen, 2013; Lu, 2014; Torres *et al.*, 2005) and on the statistical significance of the regression test. Results of this preliminary OLS regression suggest that the following determinants can be used to develop our model: socio-demographics (e.g. gender, age, level of education, income and place of residence), travel-related variables (e.g. type of accommodation), flight-related variables (e.g. type of check-in, wait time) and the pre-intention to buy (see Appendix 1).

In order to better disentangle behaviours, this study assumes that a traveller's expenditure at the airport can be interpreted as being a result of two subsequent, independent processes, namely: making a purchase or not (i.e. participation decision) and deciding on the amount of money to be spent (i.e. quantity decision). Despite the characteristics of the dependent variable (i.e. travellers' expenditures) could lead one to choose a Tobit model, the independence between the two processes (i.e. participation decision and quantity decision) made use of Tobit model inappropriate. In fact, a Tobit model considers both processes using the same set of variables, with these variables having the same effect on both the participation and quantity equations.

To overcome this 'bias' a double-hurdle model was used. It is a generalized version of the Tobit model (Gragg, 1971) and is based on the idea that two distinct hurdles have to be considered. Specifically, based on this model, two separate regression models were estimated. As a first step (i.e. the selection stage-the first hurdle), the likelihood of making a purchase was estimated by the Probit model (i.e. the participation equation). As a second step (i.e. the last stage-the second hurdle), an OLS regression model was used to estimate the amount of money that the consumer spent while at the airport (i.e. the quantity equation). The outcome of this model is given by two different sets of independent coefficients, instead of a single set of coefficients that would have obtained by using the traditional Tobit model.

It has been assumed that the passenger's expenditure ( $ExpAir_k$ ) is determined by socio-demographics ( $S_k$ , i.e. gender, age, level of education, income and place of residence), travel-related ( $TR_k$ , i.e. type of accommodation), flight-related variables ( $FR_k$ , i.e. type of check-in, waiting time prior to embarking) and the pre-intention to buy ( $IB_k$ ) (see the quantity equation 1).

$$ExpAir_k = f(S_k, TR_k, FR_k, IB_k) \quad (1)$$

Accordingly, the overall model to be used in our study can be specified as follow:

$$ExpAir_k = \alpha x + \varepsilon_k \quad (2)$$

$$if \min(\alpha x + \varepsilon_k, \beta y + \epsilon_k) > 0 \quad (3)$$

$$ExpAir_k = 0 \text{ otherwise} \quad (4)$$

Equation 2 describes the quantity equation (Equation 1 reframed following a linear regression approach), whereas Equation 3 and 4 represent the participation equation.  $x$  and  $y$  are the vectors respectively related to quantity and participation equations; both vectors include the same determinants, namely: socio-demographics ( $S_k$ ), travel-related variables ( $TR_k$ ), flight-related variables ( $FR_k$ ) and the pre-intention to buy ( $IB_k$ ). The error terms ( $\varepsilon_k$ ,  $\epsilon_k$ ) were independent and normally distributed.

## Results

### *Descriptive Analysis*

Table 1 shows the socio-demographic characteristics of respondents and their average expenditures. Individuals with higher mean expenditures were middle-aged men, with a university degree and annual incomes greater than 35,000 euros, along with being international travellers.

Results show that 37.34% of respondents shopped at the airport ( $N=1,017$ ), with 90% of them spending up to 60 euros; considering the overall sub-sample of shoppers, the average expenditure is 49.29 euros. Results highlight that passengers most frequently bought Sardinian food and wine (20.31%), while the product category reporting the highest average expenditure was clothing (87.18 euros).

**Table 1.** Mean expenditure by socio-demographics

Variables		Mean expenditure (euros)	%
Gender	Male	48.78	44.64%
	Female	49.70	55.36%
Age	18–24	35.78	11.21%
	25–34	42.90	17.40%
	35–44	48.44	20.85%
	45–54	59.31	24.29%
	55–64	53.10	14.95%
	>65	47.03	11.31%
Level of education	High school or below	43.74	51.67%
	University	55.48	38.10%
	Master/PhD	52.83	10.23%
Income	<15.000	39.18	14.47%
	15.001–25.000	45.40	25.61%
	25.001–35.000	46.13	24.60%
	35.001–50.000	49.99	17.71%
	> 50.000	68.74	17.61%
Place of residence	Sardinian	28.34	5.04%
	Italian	41.09	38.24%
	Foreigners	56.33	56.72%

According to Table 2, the lion's share of respondents checked-in online (53.69%); passengers doing face-to-face check-in reported higher mean expenditures (52.37 euros) compared to their other counterparts (46.63 euros). 52.27% of travellers had checked-in at least one hour prior to embarking, but the highest mean expenditure occurred when the wait time prior to boarding ranged from 31 to 45 minutes, or up to one hour.

Interesting insights were offered from results related to the type of accommodation where respondents enjoyed their stay in Sardinia. Most individuals stayed in hotel accommodations (54.48%), while 11.77%

of them stayed in a second home and 13.33% in a rented house or apartment. People staying at a hotel reported higher expenditure levels compared to their counterparts elsewhere; the lowest mean expenditure was reported for travellers visiting friends and relatives. Furthermore, travellers travelling alone (18.65%) reported a lower expenditure than those travelling with companions.

**Table 2.** Mean expenditure by flight experience and travel characteristics

Variables		Mean expenditure (euros)	%
Type of check-in	Traditional	52.37	46.31%
	Online	46.63	53.69%
Wait time prior to embarking	< 30 minutes	36.31	9.17%
	31-45 minutes	57.99	10.65%
	46-60 minutes	56.24	27.91%
	>1h	45.98	52.27%
Type of accommodation	B&B	36.60	4.48%
	Agritourism	26.83	1.35%
	Camping	43.75	1.67%
	Second home	48.39	11.77%
	Rented house or apartment	47.02	13.33%
	Visiting friends or relatives	26.04	8.44%
	Hotel	57.55	54.48%
Travel Party	Other	47.07	4.48%
	Alone	37.92	18.65%
	Not alone	51.77	81.35%

Table 3 shows that 46.83 % travellers pre-planned their buying prior their arrival at the airport, thus showing that buying is mostly impulsive.

**Table 3.** Mean expenditure by pre-intention to buy

Variables		Mean expenditure (euros)	%
Pre-intention to buy	Yes	56.9	46.83%
	No	41.5	53.17%

However, people pre-planning their buying were also reported as being those individuals with higher mean expenditures compared to those who bought impulsively once at the airport.

#### *Econometric Analysis*

Results of the double-hurdle model are shown in Table 4. The coefficients in the 'participation equation' column (first hurdle) indicate how a given variable affects the likelihood (probability) of buying something at the airport, while coefficients in the 'quantity equation' column (second hurdle) show whether a certain variable influences the level of expenditure (once the decision to make purchase is made).

Our findings show that the buying decision is significantly and positively influenced by travel party, wait time prior to embarking and type of accommodation (e.g. whether staying at a hotel). On the other one hand, the expenditure (i.e. quantity equation) is significantly and positively influenced by income, check-in modality, type of accommodation, travel party (i.e. whether travelling alone) and the pre-intention to buy. More specifically, the level of expenditure is higher when passengers with higher incomes are considered, when passengers use traditional check-in, when they stay at a hotel for their



accommodation, whether travelling with companions (not alone) and if they were somehow pre-planning to purchase things prior their arrival at the airport.

**Table 4.** *Double-hurdle model on the expenditure level in logarithm*

Determinants domain	Variable name	Participation Equation	Standard error	Quantity Equation	Standard Error
Socio-demographics					
Gender	Male	-0.01	0.27	-0.1	0.07
Age	Age <35	0.50	0.41	-0.17*	0.09
Education	Years of education	0.05	0.04	0.00	0.01
Income	Income	-0.04	0.12	0.07**	0.03
Place of residence	Foreigners	0.13	0.29	0.12	0.08
Flight-related					
Type of check-in	Traditional check-in	-0.23	0.27	0.15**	0.07
Waiting time	Waiting time prior to embarkation	0.29*	0.15	0.06	0.05
Travel-related					
Type of accommodation	Visiting Family and friends	0.24	0.37	-0.26*	0.14
	Hotel	1.07**	0.42	0.24***	0.08
Travel party	Not alone	0.51*	0.27	0.24***	0.1
Pre-intention to buy		0.23	0.28	0.30***	0.07
Constant		-0.26	0.75	2.38***	0.28

\* =  $p < 0.10$ , \*\* =  $p < 0.05$ , \*\*\* =  $p < 0.01$

On the other one hand, the expenditure was significantly and negatively influenced by age and type of accommodation (e.g. if visiting family and friends). In particular, results highlight that the level of expenditure tends to be lower when passengers are younger (< 35 years old) and enjoy staying with their family or friends (i.e. visiting friends and relatives-VFRs).

This outcome confirms prior studies showing that the expenditure at airports tend to increase when passengers have higher incomes (e.g. Castillo-Manzano, 2010) and to decrease when they are younger (e.g. Castillo-Manzano, 2010), but contradict others who did not find any significant influence of age on expenditure behaviour (e.g. Perng *et al.*, 2010). Even our findings report that gender and education did not influence the decision of buying and the expenditure levels and confirm with those of existing studies (e.g. Castillo-Manzano, 2010). Our study reveals that passengers travelling with companions (not alone) significantly influenced both the likelihood to make purchases and the related amount of expenditure; this seems contradictory, at least partially, to existing studies. For example, Castillo-Manzano (2010) revealed that people travelling with children have a higher likelihood of purchasing but also that they tend to spend significantly less than people travelling without them. Our results also revealed that the wait time prior to embarkation significantly influenced the decision to make a purchase-confirming prior studies, such as Lin & Chen, 2013 - but not the level of expenditure. Again, this evidence partially contradicts prior studies, which usually reported wait time having a significant influence on both the likelihood of making a purchase and the level of expenditure (e.g. Castillo-Manzano, 2010).

Our study shows that passengers' residency did not significantly influence either the decision to buy or the level of expenditure, thus contradicting prior studies such as Castillo-Manzano (2010) and Castillo-Manzano *et al.*, (2018). For example, Castillo-Manzano (2010) found domestic travellers (i.e. Spanish ones) had a higher likelihood of buying and a greater expenditure level. Beyond confirming and/or rejecting existing studies, our results added new knowledge to the current body of literature devoted to analyse passengers' expenditure behaviours by highlighting that the type of accommodation and the check-in modality are relevant variables to be considered when analyzing passengers' shopping behaviours. Finally, our findings also showed that the passengers' 'pre-intention to buy' did not significantly influence the actual decision to make purchases while at airport. Despite this outcome, the variable was able to significantly influence the level of expenditure, thus confirming Lu (2014).

### *Robustness Check*

The double-hurdle model is the most suitable one to use when researchers deal with two separate, subsequent and independent decisions such as 'buying decision' and 'expenditure level'. In fact, the main assumption of the double-hurdle method (Cragg, 1971) is the independence between the two processes. To assure that our assumption about the independency between participation (4) and quantity (3) equations, a Heckman (1979) regression model was run. This model is based on the assumption that the quantity equation is distorted by the existence of an implied participation process, which is strictly correlated with the quantity equation. To overcome this issue, Heckman (1979) inserted an additional independent variable in the quantity equation called Mill's ratio. The Mill's ratio formalizes the dependence between the two decisions processes. It is calculated as the ratio between the probability that an individual falls into the 'participation category' and the cumulative probability of an individual's decision. If both the participation and quantity equations are dependent and subsequent decisions, the Mill's ratio will be different from zero with an acceptable level of significance and the two equations need to be considered as being related (and vice versa). Hence, the Heckman model needs to be used to identify the determinants of both participation and quantity equations. On the contrary, when the Mill's ratio is zero with an acceptable level of significance, the two equations need to be considered independently, and the double-hurdle model proposed by Cragg (1971) needs to be considered as the most suitable model to be used.

Regressors (i.e. the expenditure determinants considered in our analysis) and disturbance term in participation equation (3 and 4) determine whether an observation falls into the 'participation category' ( $E > 0$ ) or not ( $E = 0$ ). In particular, in the first step of the econometric analysis (i.e. the one related to the decision 'to buy or not to buy') a latent variable is considered ( $B^*_t$ ) describing the net benefit from participation. This latent variable depends on a set of different variables (i.e. our regressors) and a disturbance term: if the net benefit is greater than zero, the individual falls in the participation category.

Taking into consideration the censored nature of the sample, the dependent variable is given by the expenditure level reported by travellers ( $E_k$ ), the latent variable ( $B^*_t$ ) is the net benefit of making purchases while at the airport; hence, the expected value of expenditure [i.e.  $\xi(E_t)$ ] can be determined as follows:

$$\xi(E_k | B^*_k > 0) = \alpha x + \lambda \tilde{\lambda}(\alpha x) \quad (5)$$

where  $\tilde{\lambda}(\alpha x)$  is the Mill's ratio and  $x$  is a vector related to socio-demographics ( $S_k$ ), travel-related variables ( $TR_k$ ), flight-related variables ( $FR_k$ ) and the pre-intention to buy ( $IB_k$ ). The Heckman model is estimated by running an OLS regression where the Mill's ratio is considered to be an independent variable, as well as all the other determinants of travellers' expenditures. Results are presented in Table 5.

**Table 5.** Heckman model

Determinants domain	Variables name	Coefficients	Standard Error
Socio-demographics			
Gender	Male	-0.1	0.07
Age	Age < 35	-0.16*	0.09
Level of education	Year of education	0.01	0.01
Income		0.07**	0.03
Place of residence	Foreigners	0.13	0.08
Flight-related			
Type of check-in	Traditional check-in	0.14**	0.08
Wait time prior to embarking		0.06	0.05
Travel -related			
Type of accommodation	Visiting	-0.25*	0.14
	Family and friends		
	Hotel	0.27***	0.10
Travel party	Not alone	0.24***	0.1
Pre-intention to buy		0.30***	0.07
Mill's ratio		0.55	1.04
Constant		2.38***	0.28

\* =  $p < 0.10$ , \*\* =  $p < 0.05$ , \*\*\* =  $p < 0.01$

On the whole, the significance of Mill's ratio supports the decision to deal with two independent hurdles and strengthens the decision to treat traveller's expenditures in the airport with a double-hurdle model (Cragg, 1971).

### Discussion and conclusion

The aim of this study was to investigate socio-demographic, travel-related and flight-related determinants of travellers' expenditures at the airport in terms of both the decision 'to buy or not to buy' and 'how much to spend'. To achieve this aim, an empirical investigation on a convenience sample of 2,723 passengers interviewed at an International Airport was presented and discussed in this study.

On the whole, our findings reveal that 37.34% of individuals made purchases; out of these, 53.17% were impulsive in nature, thus confirming existing studies (Crawford & Melewar, 2003; Graham, 2014). Furthermore, the results show that the determinants of 'decision to buy' and of 'how much to spend' are not the same. On the one hand, the 'decision to buy' resulted to be significantly influenced just by variables that are travel-related (i.e. type of accommodation and travel party) and flight-related (i.e. wait time to embarkation). On the other hand, the level of expenditure was significantly influenced by socio-demographics (i.e. age and income), travel-related variables (i.e. type of accommodation and travel party), flight-related variables (i.e. check-in modality) and by the pre-intention to buy. No significant differences were reported to exist based on gender, education and residency either for 'decision to buy' or 'how much to spend'.

These conclusions are significant for both researchers and airport managers. On the one hand, they provide further insights into the still quite underdeveloped scientific debate on determinants of airport shoppers' expenditure behaviour. In particular, our findings simultaneously confirm and disconfirm existing literature and provide contradictory evidence when compared with prior studies carried out in

different contexts, thus suggesting that airport-based characteristics (e.g. service-scape, retail assortment, etc.) and destination-based characteristics (e.g. type of visitors, etc.) need to be carefully considered when analyzing a passenger's expenditure behaviour at the airport. Furthermore, our study adds new information to the current body of knowledge highlighting that the check-in modality exerts a significant influence on the level of expenditure, with passengers making their check-in in a traditional modality spending more than their counterparts who check-in online.

On the other hand, our findings suggest that airport managers and their retailers must recognize nuances in the way travellers' spending behaviours are based on their socio-demographics, travel-related characteristics and flight-related characteristics, so that they can effectively develop retail marketing strategies where the mix of retail format and related assortment is designed to better reflect the characteristics of their target consumers. For example, the fact that younger passengers spend less than older passengers suggests airport managers and their retailers to lower the costs of their products and/or to widen the assortment of items by including those that are usually favoured by millennials. For example, Food & Beverage-related retailers might consider offering a wider variety of healthy and natural food, craft beer or drinks promoting energy, immunity, digestive health (Aquilani *et al.*, 2015; CBD Marketing, 2017). Also, because travellers staying at hotels spend more than those residing in other types of accommodations, airport managers and destination marketers could co-market activities that attract the highest possible number of travellers interested in booking a hotel. In a similar vein, airport managers and retailers might find interesting to launch co-marketing activities with hotels to create common fidelity programs and/or to offer hotel guest with special promotions. Further, they suggest how airport and airline managers should focus their attention when deciding to incentivize their customers who pass through the experience of web check-in. In fact, favouring web check-in could contribute to reduce the queuing time both at the traditional check-in points and security (thus increasing the passengers' satisfaction and contributing to keep lower the number of employees that would be needed to manage whether all check-ins are managed in a traditional manner). Despite these advantages, our results suggest that favouring web check-in will decrease overall mean expenditures. That said, airport managers should make their decisions comparing costs and benefits of each alternative (for traditional versus web check-in) also considering the effect that the different check-in modalities exert in terms of passengers' expenditures.

Although this study helps to fill a gap in the existing knowledge in the literature and proposes some interesting implications for airport managers, limitations still remain. Firstly, it utilized a convenience sample; hence, findings cannot be generalized. Further, our study is highly site-specific. Specifically, it introduced a concrete case study involving a specific airport in a specific tourism destination; the idiosyncratic characteristics of the airport and of tourist flows at the destination could affect airport shoppers' behaviours. Consequently, this study calls for future research aimed at further testing of the robustness of our results in other airport systems to confirm whether passenger's expenditure behaviours change based on geographical circumstances. Secondly, our study used on-site passengers as research subjects and employed a conventional survey method, namely an interview and questionnaire administered face-to-face, similar to previous studies. These methods might not have helped to capture the real expenditures of respondents and to identify the underlying causes of the differences, which could be embedded in the pre-trip decision-making and post-trip evaluation processes (Li *et al.*, 2008). For example, it is evident that an increase in travel budget would increase a passenger's spending (Chang, Chen, & Meyer, 2013). This moderating effect merits attention in future research, too. Future research would benefit from using a more sophisticated data collection method such as action-tracking technology (Della Lucia *et al.*, 2011). Another interesting method could be projected and implemented in collaboration with airports with the aim of providing all the retailers with a payment system that allow to type and/or to scan the boarding card number so that all the

expenses made by a single passenger might be automatically associated to the same boarding pass number. Then, passengers could be asked to fill a brief questionnaire aimed at asking them for their boarding card number and simplify obtaining their socio-demographics, plus travel- and flight-related information. Hence, the information from the survey could be merged with objective information about the passengers' expenditures. Finally, this study did not consider the moderating effects that service-scape and atmospherics, retail assortment and airport layout could exert on their spending behaviours, aspects which merit attention in future studies.

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## Appendix 1

### *Independent variables*

<b>Variables</b>	<b>Definition</b>
Gender	Dummy: 1=male, 0=female
Age	Dummy: 1= < 35 years old, 0=otherwise
Level of education	Discrete variable: from 5 to 22 considering the years of education corresponding to each level of Education declared by respondents (e.g. elementary school: 5 years, secondary school: 3 years, high school: 5)
Place of residence	Dummy: 1=foreigners, 0=non-foreigners
Income	Discrete variable from 1 (low) to 5 (high) for the travellers' income
Type of check-in	Dummy: 1= online check-in, 0= traditional check-in
Type of accommodation: "visiting family and friends"	Dummy: 1= if the respondents stayed as a guest from family or friends, 0=otherwise
Type of accommodation: "hotel"	Dummy: 1= if the respondents stayed in hotel, 0=otherwise
Travel party	Dummy: 1 if the respondents travelled with companions, 0=otherwise
Waiting time before to embark	Discrete variable from 1 (less than 30 minutes) to 4 (more than 60 minutes) for the waiting time between security check and embarking



Pre-intention to buy

Dummy: 1=if the decision to buy in airport was pre-planned, 0=otherwise

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