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Air passengers' willingness to pay for ancillary services on long-haul flights

Paul Chiambaretto

Montpellier Business School - University of Montpellier, 2300 avenue des Moulins, 34070 Montpellier, France
i3-CRG, Ecole Polytechnique, CNRS, 828, Boulevard des Maréchaux, 91762 Palaiseau, France

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ABSTRACT

While ancillary services were initially provided by legacy carriers on short- and medium-haul flights, the emergence of long-haul low-cost carriers has contributed to the adoption of ancillary services on long-haul flights as well. Nevertheless, limited attention has been paid to the specifics of ancillary services on long-haul flights and to how much passengers are willing to pay for such services. In this research, we aim to assess the willingness of passengers to pay for various ancillary services on long-haul flights and show how these values differ depending on passenger characteristics. Based on a choice-based conjoint analysis, we first investigate the importance of five ancillary services (checked baggage, inflight meal, seat selection, priority boarding, and onboard Wi-Fi) in the flight ticket selection process. In addition, we measure passengers' willingness to pay for the entire sample and for subsets of respondents based on trip motive and age. Regarding trip motive, we reveal that leisure passengers are willing to pay more for most ancillary services than are business passengers. By contrast, when distinguishing between millennial and nonmillennial respondents, neither subsample is globally willing to pay more for ancillary services, with differences for each service. Finally, we compare the estimated willingness to pay for short- and long-haul services and reveal that flight duration has a contrasting impact on the willingness to pay for ancillary services (with either a positive or null impact on willingness to pay). In addition, our comparison of the estimated willingness to pay with the actual fees charged by airlines allows us to draw conclusions on their attractiveness for passengers.

1. Introduction

Whether they are legacy carriers or low-cost carriers[1], an increasing number of airlines rely on ancillary services to personalize passenger experiences and increase revenue (Warnock-Smith et al., 2017). At the overall airline industry level, these ancillary revenues account for more than 12% of global revenues and up to 50% of some individual airlines' revenues (IdeaWorks, 2018). While these ancillary services and revenues were initially provided on short- and medium-haul flights, the emergence of long-haul low-cost carriers has contributed to their expansion to long-haul flights (Daft and Albers, 2012; De Poret et al., 2015; Soyk et al., 2017). Used as a way to

E-mail address: p.chiambaretto@montpellier-bs.com.

[1] A *legacy carrier* can be defined as a traditional or historical airline that was usually created before the liberalization of air transport, with an emphasis on the quality of service provided to the passenger. In Europe, legacy carriers include Air France, British Airways, Lufthansa, and others. By contrast, a *low-cost carrier* refers to an airline (often created after the liberalization of air transport) with a business model based on a cost domination strategy. In Europe, examples of such airlines are Ryanair, Easyjet, Vueling, and others.

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reduce basic fares, ancillary services were first implemented by long-haul low-cost carriers before being adopted by legacy carriers on long-haul routes (Soyk et al., 2018; Albers et al., 2020). However, our knowledge regarding the specifics of ancillary services and their valuation on long-haul routes remains limited.

Over the past few decades, significant attention has been paid to the measurement of willingness to pay for various ancillary services. Most of these contributions conducted experiments to assess how much passengers are willing to pay for services with an emphasis on short- and medium-haul routes (Espino et al., 2008; Balcombe et al., 2009; Chen and Wu, 2009). Because long-haul flights present unique features in terms of length, comfort and passengers' characteristics, we argue that passengers may have a different willingness to pay for ancillary services on such flights. Nevertheless, the literature regarding the willingness to pay for ancillary services on long-haul flights remains limited. A first contribution by Wittmer and Rowley (2014) provided valuable insights into how passengers value various ancillary services differently on short- and long-haul routes without measuring their willingness to pay. A more recent study by Warnock-Smith et al. (2017) investigated the willingness to pay for ancillary services on long-haul flights, but their assessment was based on respondents' declarations, leading to potential biases (Miller et al., 2011). Accordingly, we argue that a more detailed approach is needed to investigate the willingness to pay of air passengers for ancillary services on long-haul flights.

In this research, we first aim to reveal the willingness of passengers to pay for various ancillary services on long-haul flights. These ancillary services have been chosen because we expect them to differ in terms of importance and thus the willingness of passengers to pay for them on long-haul routes compared to short-haul routes. We then want to study how the values of willingness to pay differ depending on passenger characteristics.

To do so, we build on an experimental research design and implement a choice-based conjoint analysis, a method commonly used to assess consumers' willingness to pay in tourism and air transportation industries (Suh and McAvoy, 2005; Chiambaretto et al., 2013; Chia-Jung and Pei-Chun, 2014; Lyu, 2017). In this choice-based conjoint analysis, respondents were placed in a scenario in which they were asked to choose between several plane tickets on a long-haul flight between Paris and New York. These plane tickets were characterized by six attributes (with various levels for each attribute): ticket price (370–460€), checked baggage (included or not), inflight meal (none, snacks or gourmet meal), priority boarding (included or not), seat selection (included or not) and onboard Wi-Fi (none, one hour or unlimited). Our dataset is composed of 6356 plane ticket decisions made by 454 respondents. The overall sample was first analyzed globally before being decomposed into subsamples based on the respondents' main trip motive and age.

Our research reveals some interesting findings. First, in the overall sample, the most important attributes in the plane ticket selection process are the price (33.33% of the decision), the possibility of having checked baggage (19.67%) and the type of inflight meal offered (19.48%). We then calculate the willingness to pay for each ancillary service presented in our profile. Then, we run two additional analyses on subsets of the respondents. Regarding the trip motive, we show that respondents who travel mainly for leisure are willing to pay more for ancillary services than respondents who travel mainly for business motives (except for Wi-Fi, for which business travelers are willing to pay more). By contrast, dividing our sample according to respondents' age does not result in a clear pattern of differences in willingness to pay. Millennials have a higher willingness to pay than nonmillennials for several services (checked baggage, priority boarding and Wi-Fi during the entire flight), but the result is reversed for other services (inflight meals, seat selection and 1 h of Wi-Fi). Going further, we compare the estimated willingness to pay for short- and long-haul services and reveal that flight duration has a contrasting impact on the willingness to pay for ancillary services (with either a positive or null impact on the willingness to pay). More precisely, we highlight that a longer flight increases strongly the willingness to pay for checked baggage and snacks and moderately for seat selection. By contrast, we underline that flight duration has no significant impact on the willingness to pay for gourmet meals, priority boarding, and Wi-Fi. Finally, our comparison of the estimated willingness to pay with the actual fees charged by airlines allows us to draw some conclusions on their attractiveness for passengers.

This research contributes to two complementary streams of the literature. First, it contributes to the growing literature on ancillary services by offering key insights about their valuation on long-haul flights. It also contributes to the emerging literature on long-haul low-cost carriers by providing an in-depth investigation of one of their main revenue streams.

2. Literature review

2.1. The growing importance of ancillary services

Whether flying with a legacy carrier or a low-cost carrier, air passengers are offered the opportunity to buy ancillary services in addition to their basic ticket to improve their flight experience. Indeed, in recent decades, we have witnessed a growing trend toward product unbundling and the development of ancillary revenues in the air transport industry. These ancillary revenues can be defined as "*revenue[s] beyond the sale of tickets that [are] generated by direct sales to passengers, or indirectly as a part of the travel experience*" (O'Connell and Warnock-Smith, 2013). Most authors argue that these ancillary services date back to the end of the 1990s or early 2000s, in line with the development of low-cost carriers (O'Connell and Warnock-Smith, 2013). These ancillary services were initially used by low-cost carriers as a way to reduce the main fare and become more attractive to consumers who do not require these services, as they pay for only what they consume (Vinod and Moore, 2009), especially when there are very large differences in the valuation of these additional services (Cui et al., 2018). However, ancillary services are now increasingly used by legacy carriers, which have adopted a mimetic approach to counterattack the unbundling strategy (Chiambaretto and Dumez, 2012; Warnock-Smith et al., 2017). As a consequence, according to a study published by IdeaWorks (2018), almost 93 billion US dollars of ancillary revenues were collected in 2018 (while they represented only 32.5 billion US dollars in 2011). Interestingly, some airlines, such as Spirit and Allegiant, earn more than 50 dollars of ancillary revenue per passenger on average.

Ancillary services encompass various types of services. Garrow et al. (2012) propose a typology in which they differentiate between

three main types of ancillary services: (1) the "most established fees" are fees that have always existed before deregulation or the development of low-cost carriers (such as ticket exchange, onboard pets or unaccompanied minors); (2) the "fees for services that used to be free" are services that were free of charge in the past but owing to unbundling must now be paid (such as luggage, onboard food, seat selection, etc.); and (3) the "fees on newly introduced services," which are associated with the launch of services that did not exist before and for which demand might be limited, such as premium dinners or onboard Wi-Fi. Whatever the type of ancillary service, paying an additional fee may cause some dissatisfaction among air passengers (Chung and Petrick, 2013). However, the distinction made above matters. In that vein, Tuzovic et al. (2014) show that the perceived betrayal experienced by air passengers is higher when they have to pay for services that used to be free than when they have to pay for services that have always been charged for and for extra services that did not previously exist. However, a recent contribution by Yazdi et al. (2017) reveals that the introduction of ancillary services (more precisely, baggage fees) is not always negative and may even exert a positive impact, as it contributes to increased product quality (in this case, by reducing flight delays). In that vein, several contributions have highlighted that the implementation of baggage fees has contributed to the improvement in on-time departure performance and a reduction in mishandled baggage rates (Scotti et al., 2016; Nicolae et al., 2016, 2017).

2.2. Setting prices for ancillary services

The acceptance of ancillary services is strongly impacted by their price and by their articulation with the basic fare. Indeed, the introduction of ancillary services forces both airlines and air passengers to make a trade-off between the basic fare and ancillary revenue. Implicitly, the philosophy associated with ancillary services relies on the idea that the introduction of a fee (such as a baggage fee) should lead to a reduction in the basic fare (without the bag). However, as shown by Brueckner et al. (2015), although the average basic fare does decrease, the decrease is less than the baggage fee such that the total price (basic fare + baggage fee) is higher than that before the introduction of the fee. In fact, several contributions highlight the necessity to analyze in greater detail the trade-off made by airlines between the basic fare and additional fees. In that vein, Scotti and Dresner (2015) show that if airlines have to increase their total price, it is better for them to increase the price of their fees than the price of their basic fare as the demand is more sensitive to price variations of the basic fare. These results have led contributions such that of Ødegaard and Wilson (2016) to call for new revenue management systems that optimize revenues based on basic fares while also accounting for ancillary services.

To do so, airlines must assess the importance and willingness to pay for ancillary services. Most papers assessing these prices rely on choice experiments in which respondents are asked to rank or select a ticket among different options that differ along several criteria. Such experiments can assess whether air passengers value these services and how much they are willing to pay for them. For example, Wittmer and Rowley (2014) rely on a choice-based conjoint analysis to assess whether passengers value the additional services. Some key contributions focused on short-haul routes have aimed to estimate the willingness to pay of passengers for ancillary services. Investigating ancillary services on a Spanish route, Espino et al. (2008) not only reveal the willingness to pay of air passengers for food, comfort, reliability and frequency but also show how passenger characteristics may impact willingness to pay. A similar approach is followed by Balcombe et al. (2009) for the Spanish market from the perspective of a charter airline. Analyzing the market between China and Taiwan, Chen and Wu (2009) estimate willingness to pay and show how it differs with the motive for the trip (leisure vs business). Finally, at the boundary between air and rail markets, Chiambaretto et al. (2013) investigate the willingness to pay for different ancillary services for air-rail intermodal tickets. The commonality among all these contributions is that they investigate short-haul routes, while ancillary services have become increasingly adopted on long-haul routes.

2.3. The specifics of ancillary services for long-haul flights

Over the past decade, a growing number of airlines have been created with the ambition to expand the low-cost business model to long-haul routes. These long-haul low-cost carriers have appeared mainly on the Asian and North Atlantic markets and have adapted the traditional low-cost business model to long-haul routes (Wensveen and Leick, 2009; Moreira et al., 2011; Daft and Albers, 2012; De Poret et al., 2015). Despite some difficulties in the replicability of the business model (Francis et al., 2007), long-haul low-cost carriers display unit costs that are approximately 20–30% lower than those of legacy carriers (Soyk et al., 2017). In addition to lower costs, long-haul low-cost carriers also have a specific profile in terms of revenues. As noted by Soyk et al. (2018), long-haul low-cost carriers tend to have much lower basic fares (−46% on average) than legacy carriers and tend to be much more reliant on ancillary revenues (+646% on average) because of their product unbundling strategy. However, ancillary services on long-haul flights are not implemented by only long-haul low-cost carriers. The business model convergence observed in short-haul markets (Windle and Dresner, 1999; Jarach et al., 2009; Daft and Albers, 2015; Azadian and Vasigh, 2019) has also appeared in long-haul markets, with a convergence of airlines' practices and business models (Pearson et al., 2015; Rodríguez and O'Connell, 2018; Albers et al., 2020). As a consequence, in addition to long-haul low-cost carriers, an increasing number of legacy carriers have unbundled their fares and implemented ancillary services on long-haul flights.

Ancillary services and revenues present different characteristics for short-haul and long-haul flights for three main reasons. First, long-haul routes serve, by definition, destinations that are more distant. Previous research has shown a strong correlation between the purchasing power of passengers and the distance of the destinations they fly to, such that passengers on long-haul flights have, ceteris paribus, higher purchasing power and thus a larger potential budget for ancillary services (Sun and Lin, 2019). Second, more distant destinations are also associated with longer stays (Bao and Mckercher, 2008), which impact the valuation of checked baggage compared to shorter stays, for which passengers can travel with a simple carry-on. Finally, the longer flight time impacts the valuation of attributes independent of the type of airline, with more importance attached to comfort and inflight services than for short-haul

flights (Hunt and Truong, 2019). Thus, the specifics of ancillary services on long-haul flights are worth investigating in further detail.

Paradoxically, while several contributions have highlighted the growing importance of ancillary services on long-haul routes (especially through the development of long-haul low-cost carriers), limited attention has been paid to the actual valuation of these ancillary services on long-haul routes. To the best of our knowledge, only the article by Warnock-Smith et al. (2017) asks participants to express their willingness to pay for short-haul and long-haul flights. They reveal that for most services, passengers were willing to pay more for services on long-haul flights than on short-haul flights. Although their contribution provides some interesting initial insights into the comparison between short- and long-haul routes, this article took a declaration-based approach in which respondents are asked to declare the price they would be willing to pay for different services. As has been explained by Miller et al. (2011), asking respondents to directly estimate their willingness to pay may lead them to underestimate or overestimate their declared price (especially for new products), leading to limited external validity of the findings. In this research, we thus aim to fill this gap by measuring air passengers' willingness to pay for various ancillary services on a long-haul route using an experimental research design.

3. Methods

3.1. An experimental research design based on a choice-based conjoint analysis

In recent years, an increasing number of contributions have relied on experimental methods to reveal the willingness to pay for ancillary services (Espino et al., 2008; Chen and Wu, 2009; Chiambaretto et al., 2013; Rouncivell et al., 2018). While studies based on actual choices or real-life purchases provide useful insights regarding the willingness to pay of current consumers (Hensher, 2010), the purpose of experimental studies is not to study actual choices but to reveal the respondents' or consumers' preferences through an experiment. Experimental approaches are particularly interesting to investigate product attributes or characteristics that are not currently or extensively offered on the real market (Pullman et al., 2002; Lee et al., 2006). In addition, experimental studies are relevant when studying the willingness to pay of non-consumers, offering insights for firms to extend their market base (Dauda and Lee, 2015; Monchambert, 2020).

Conjoint analysis is one of the most extensively used experimental methods to reveal consumers' preferences and willingness to pay in tourism studies (Suh and McAvoy, 2005; Chia-Jung and Pei-Chun, 2014; Lyu, 2017), and it has been used to investigate ancillary services, mainly on short-haul routes (Chiambaretto et al., 2013; Wittmer and Rowley, 2014). Conjoint analysis can be categorized as a within-subject design in which the same individual responds to all treatments and serves as his or her own control (such that no control group is needed). Accordingly, conjoint analysis allows for the collection of data on consumers' assessments and preferences as they are being made (McCullough, 2002).

The most common type of conjoint analysis is metric conjoint analysis, in which respondents are asked to rank or grade profiles or products with different attributes using a Likert scale. While metric conjoint analysis provides a better assessment of willingness to pay than many other traditional estimation techniques (Miller et al., 2011), it is not always realistic. Accordingly, whether the goal is to assess consumers' or managers' preferences, many scholars argue that a choice-based conjoint analysis places the respondents in a more realistic setting, as they are forced to choose a given product among alternative options instead of rating the options (Jaeger et al., 2001; Rao, 2008; Chiambaretto et al., 2020). Despite putting the respondents in a hypothetical setting in which they are forced to make a choice between two options, choice-based conjoint analysis has been shown to provide reliable estimates of respondents' willingness to pay, limiting biases compared to other estimation techniques (Carlsson and Martinsson, 2001; Miller et al., 2011; Tanaka et al., 2014). Consequently, choice-based conjoint analysis has been extensively used to estimate the willingness to pay for various products and industries. Focusing on the transportation industry, choice-based conjoint analysis has been used to reveal respondents' willingness to pay in studies focusing on various topics, such as public transportation (Molin and Timmermans, 2006), ancillary revenues (Wittmer and Rowley, 2014), autonomous vehicles (Shin et al., 2015), or even green cars and electric vehicles (Helveston et al., 2015; Costa et al., 2019). Accordingly, we argue that a choice-based conjoint analysis is a relevant approach to investigate air passengers' willingness to pay for various ancillary services on long-haul flights.

3.2. Attributes and plane ticket profiles

In a choice-based conjoint analysis, a given product is characterized as a profile that includes a given number of attributes (McCullough, 2002). For example, a plane ticket for a given destination is described by a set of attribute levels (price, inflight meal, checked baggage, etc.), and the respondents are asked to select one of these plane tickets. As respondents make choices, they implicitly reveal their preferences and provide information regarding how they value these different attributes. Selecting the right attributes is thus essential, and they must be selected based on their likelihood of impacting the profile choice while limiting the number of total attributes to six or seven at most (Green and Srinivasan, 1990; McCullough, 2002). While many attributes can impact the likelihood of choosing a given airline ticket, limiting the number of attributes is important not only to avoid confusion for respondents (who could feel overwhelmed by too much information regarding each ticket) but also to avoid an exponential growth of profiles and thus choices to be made by respondents (Orme, 2010). Then, for each attribute (e.g., price), different levels (e.g., different levels of prices) are selected to reflect the variety of options that could be provided to consumers.

Accordingly, to analyze how passengers value the various ancillary services on a long-haul flight, we characterize the plane ticket using a set of attributes that impact the likelihood of choosing a ticket. Considering our research question, in addition to the total price paid by the passenger (which accounts for the first attribute and which is needed to assess the willingness to pay), we focused on the ancillary services to determine our remaining attributes. Building on recent literature reviews on ancillary services (O'Connell and

Warnock-Smith, 2013; Warnock-Smith et al., 2017), we first created a list of all the ancillary services provided by airlines on short- and long-haul routes. We then downsized this list by focusing on attributes whose importance may significantly differ because of the duration of the air trip and thus may be worthy of study (Wittmer and Rowley, 2014; Warnock-Smith et al., 2017): the possibility to check baggage, the option to have an inflight meal and the opportunity to select a seat. These three attributes were particularly interesting to study as they have already been analyzed on short-haul routes (Espino et al., 2008; Balcombe et al., 2009; Correia et al., 2012; Leon and Uddin, 2017; Rouncivell et al., 2018). In addition to these three attributes, we integrated ancillary services that have recently been introduced by airlines but for which we lack insights concerning willingness to pay, especially on long-haul flights: the possibility of priority boarding and access to onboard Wi-Fi (Tuzovic et al., 2014; Warnock-Smith et al., 2017; Bellizzi et al., in press). Accordingly, based on this selection process, we identify the following six attributes: (1) total price, (2) checked baggage, (3) inflight meal, (4) priority boarding, (5) seat selection and (6) onboard Wi-Fi.

In a last step, for each attribute, we define various levels to account for the variety of options associated with each attribute. These different levels have been defined according to the most common offerings of airlines on long-haul routes. In the specific case of the "Total price" dimension, the average price on the Paris–New York route in 2018 was approximately 415€. Thus, we decided to investigate price levels surrounding this average value with a 10% variation upward (around 460€) and downward (around 370€). We then needed to have increments (from one level to the other) that were large enough to avoid having too many levels but also small enough to create the possibility of a fine-grained analysis of willingness to pay. Thus, we opted for increments of 30€, yielding 4 different levels (370, 400, 430, and 460€) for the price dimension. Table 1 summarizes these different attributes and their respective levels.

3.3. Decision situation and experimental design

Considering the total number of attributes and attribute levels, 288 different plane tickets must be compared. To compare pairs of tickets, these 288 profiles would require each respondent to make 41,328 choices.[2] Because this task would have been impossible for participants, we used XLStat to generate a simpler design that is D-optimal. D-optimal designs are the result of an optimization that consists of maximizing the determinant of the information matrix. In other words, the algorithm aims to maximize the quantity of information that can be extracted from the experiment, and several iterations are made by the algorithm until the highest Log (Determinant) is obtained. As the approach enables various technical constraints to be accounted for while minimizing the number of trials, D-optimal designs are increasingly used in conjoint analyses (Kessels et al., 2006; Vermeulen et al., 2008; Goos et al., 2010). Interestingly, the criteria of balance, orthogonality and minimum overlap are not always met in D-optimal designs. However, these criteria become less important because the D-optimal design aims to extract as much information as possible from the experiment (and thus, the goals targeted by the criteria of balance, orthogonality and minimum overlap are already encompassed in its design). We used this design for our experiment/data collection, and the design yielded 12 profiles and 14 choices (each choice was between two plane tickets).

Participants in the experiment were first provided a short description of the research project. Specifically, we explained that we investigate air passengers' preferences on long-haul flights such as flights between Paris and New York (which usually last for eight hours and can be considered as typical long-haul flights). In addition, we specified the context in which the decision would take place and the attributes being considered. Regarding the context, the following text was provided: "*Imagine that you are about to book a plane ticket for a return flight between Paris and New York. Several plane tickets are provided to you. These tickets not only differ in terms of price but also in terms of services. We are going to show you successively several tickets, by groups of two. Each time, two offers are compared, and you will be asked to tell us which one you prefer. Do not worry, there is no wrong answer. For your information, the average call price for a return ticket in Economy is 415€*". Following this introductory text, all respondents were offered the same 14 choices between pairs of plane tickets. Considering the complexity of the task, there was no time limit for each answer to avoid putting respondents in a stressful situation. Once a selection was made, the following choice was presented to the respondent. An example of a choice between two tickets is provided in Table 2.

3.4. Data collection and analysis

Our dataset is composed of 6356 plane ticket decisions made by 454 respondents through an online survey. With more than 6000 decisions, our sample size is similar to or larger than those in other studies using conjoint analyses or investigating ancillary services while offering sufficient statistical power (Chiambaretto et al., 2013; Wittmer and Rowley, 2014; Chia-Jung and Pei-Chun, 2014; Lyu, 2017). The responses were collected using a snowball sampling approach through an online survey shared on various social networks (Baltar and Brunet, 2012). To enable not only a global analysis on our entire sample but also specific analyses along various criteria, we provide additional elements regarding our sample composition. Regarding the trip motive of the 454 respondents, we build on the categorization suggested by previous research (Chiambaretto et al., 2013; Wittmer and Rowley, 2014; Warnock-Smith et al., 2017) to state that 120 respondents (26.4%) usually fly for business purposes, whereas 334 (73.4%) mainly fly for leisure purposes. Regarding the respondents' behavior, 203 (44.7%) can be categorized as frequent flyers (i.e., respondents who have flown more than 5 times over

[2] The number of total plane tickets comes from the combination of all different potential levels, such that $288 = 4 \times 2 \times 3 \times 2 \times 2 \times 3$ different tickets need to be compared. In parallel, to compare two by two all of these different plane tickets, a respondent would have $\binom{288}{2} = \frac{288!}{286!2!} = 41,328$ choices to make.

Table 1
Attributes and levels used for the profiles.

Attribute	Number of levels	Level 1	Level 2	Level 3	Level 4
Total price	4	370	400	430	460
Checked baggage	2	Not included	Included	–	–
Inflight meal	3	Not included	Snacks	Gourmet meal	
Priority boarding	2	Not included	Included	–	–
Seat selection	2	Not included	Included	–	
Onboard Wi-Fi	3	Not included	1 h of Wi-Fi	Wi-Fi during the entire flight	–

Table 2
Example of a choice between two plane tickets offering different levels of services.

Ticket A	*Characteristics*	*Ticket B*
460	*Price (€)*	370
Included	*Checked baggage*	Included
Snacks	*Inflight meal*	Gourmet meal
Not included	*Priority boarding*	Included
Included	*Seat selection*	Not included
Wi-Fi during all the flight	*Onboard Wi-Fi*	Wi-Fi during all the flight

the last 12 months), while 251 (55.3%) do not fly frequently. Finally, concerning age, previous research has shown that millennials tend have specific preferences regarding their travel and air transport experiences (Veiga et al., 2017; Gures et al., 2018; So et al., 2018; Shen et al., 2020) such that we want to investigate further this segmentation criterion. Because past contributions define millennials as people born after 1980, 264 respondents (58.1%) can be categorized as millennials (i.e., born after 1980), while 190 of the respondents (41.9%) are older.

Once the data are collected, to estimate the relative contribution of the different attributes (and levels) to the choice of a given plane ticket, we rely on a multinomial logit (MNL) model (Islam et al., 2007; Louviere et al., 2000). The choice-based conjoint analysis is structured around the idea that the plane ticket chosen by a respondent is the one that provides the highest level of utility. More precisely, the conjoint analysis assumes that the overall utility $V_{r,i}$ (of a given respondent *r*for plane ticket *i*) is a linear combination of the partial (or part-worth) utilities generated by the various ticket attributes (McCullough, 2002). For each attribute, one of the levels is set as the reference level such that its utility is set to 0. For this attribute, the remaining estimated part-worth utilities β are thus comparisons with the reference level, which allows us to assess the additional utility provided by a change from one reference level to another reference level (e.g., from no meal on board to snacks). Thus, the utility function can be described as follows:

$$V_{r,i} = \sum_k \beta_{k,r,i} Price_k + \beta_{4,r,i} Baggage + \sum_l \beta_{l,r,i} Meal_l + \beta_{7,r,i} Priority + \beta_{8,r,i} Seat + \sum_m \beta_{m,r,i} WiFi_m$$

The multinomial logit (MNL) model can accommodate this utility function. The MNL model represents the respondent *r*'s choice of plane ticket *i* among the set J of plane ticket alternatives in terms of choice probabilities.

$$prob_r(i/J) = \frac{\exp(V_{r,i})}{\sum_j^J \exp(V_{r,j})}$$

The estimated part-worth utilities β indicate the attribute's effect (for a given level) on the utility associated with a plane ticket with these characteristics and, consequently, how this utility affects the probability of choosing this plane ticket.

Once the part-worth utilities are estimated, two additional analyses are required. First, to understand the importance of each attribute in the decision process, we measure its relative contribution by dividing the maximum difference of the partial utility of the attribute by the sum of the maximum differences of the partial utilities for every attribute (Wittmer and Rowley, 2014). Second, we convert the relative utilities of two levels of the same attribute into euros (more details will be provided in Section 4.1.3) to measure the

willingness to pay for various ancillary services (Chiambaretto et al., 2013).

4. Findings

In this section, we first analyze of the entire sample (Section 4.1) and then decompose the sample according to the respondents' main trip motive (Section 4.2) and age (Section 4.3). For each sample, we first analyze the partial utility to identify similarities or differences in the valuation of various ancillary services; we then calculate the importance of each attribute in the decision and finally assess the willingness to pay associated with each level.

4.1. Analysis of the overall sample

4.1.1. Analysis of partial utilities

The partial (or part-worth) utilities associated with each attribute and level are detailed in Table 3.

As explained earlier, the coefficient β indicates the attribute's effect on the utility associated with a plane ticket and thus the probability of choosing this type of ticket. For each attribute, we set the value of coefficient β to 0 for one of the levels. For a given level, if β is positive (resp., negative), this specific level increases (resp., decreases) the likelihood of selecting a ticket with this level (compared to a plane ticket having the reference level for this attribute).

Our analysis of partial utilities reveals that an increase in the total price of the plane ticket progressively reduces the utility associated with the offer and thus the likelihood of choosing this ticket (for instance, for the level 460€, $\beta = -2.613$, $p < 0.0001$). Regarding checked baggage, the presence of checked baggage in the offer increases the utility of the ticket ($\beta = 1.542$, $p < 0.0001$) and its attractiveness for consumers. Concerning inflight meals, having a snack or a gourmet meal included in the ticket has a positive impact on utility, with more utility for the gourmet meal ($\beta = 1.526$, $p < 0.0001$) than for snacks ($\beta = 0.891$, $p < 0.0001$). Similarly, both priority boarding ($\beta = 0.319$, $p < 0.0001$) and seat selection ($\beta = 1.069$, $p < 0.0001$) are valued by passengers and increase the likelihood of choosing a plane ticket offering these features. Finally, regarding onboard Wi-Fi, although both feature levels are valued positively by respondents, in contrast to our expectations, respondents seem to place more value on tickets offering only 1 h of Wi-Fi during the flight ($\beta = 0.769$, $p < 0.0001$) than tickets offering Wi-Fi during the entire flight ($\beta = 0.543$, $p < 0.0001$).[3]

4.1.2. The relative importance of plane ticket attributes

Once the partial utilities are estimated, we want to measure the relative contribution of the different attributes characterizing a plane ticket. We divide the maximum difference in the partial utility of a variable by the sum of the maximum differences in the partial utilities for every variable.[4] The relative importance of an attribute is always a positive number such that even for an attribute that contributes negatively to the attractiveness of a plane ticket (for instance, the price), its value is still positive. The importance of the different attributes is displayed in Table 4.

Table 4 shows that the most important attribute is the price of the ticket, as it accounts for 33.33% of the decision. The presence (or absence) of checked baggage and inflight meals are also important factors, as they both account for 19% of the decision. While seat selection remains quite impactful (13.64%), the presence of onboard Wi-Fi (9.81%) and priority boarding (4.07%) have only a marginal effect on the attractiveness of the plane ticket.

4.1.3. Measuring the willingness to pay for ancillary services

Choice-based conjoint analysis is extensively used because of its usefulness in assessing the willingness to pay of respondents for specific attributes (and their respective levels). By converting the relative utilities of two levels of the same attribute into euros, we can measure the willingness to pay to switch from a given level to the other level for a specific attribute. To do so, we take the following steps.

(1) For the variable price, we take the maximum and minimum partial utility values. The highest value is reached for the level 370 ($\beta = 0$), and the lowest value is reached for the level 460 ($\beta = -2.613$). Consequently, the range in terms of partial utility variation for the attribute price is 2.613 (=0 − (−2.613)). In other words, increasing the plane ticket price by 90€ (from 370€ to 460€) decreases the respondents' utility by 2.613 units. As a consequence, when the price increases by 1 euro, the utility decreases by −0.029 (= (0 − (−2.613))/(370–460).
(2) Based on the previous step, we can convert units of utility into euros. Accordingly, to increase the utility by one unit, respondents are, on average, willing to pay 34.44€ (=1/0.029).

[3] Whether for the overall sample analysis or the subsample analyses, our results show that respondents tend to value more (and, thus, have a higher willingness to pay for) 1 h of Wi-Fi compared with Wi-Fi during the entire flight. This unexpected result has already been observed for other variables in previous experimental and choice-based conjoint studies when more than two levels are offered for the same attribute (Espino et al., 2008; Correia et al., 2012; Chiambaretto et al., 2013; Leon and Uddin, 2017). These contributions argue that, without questioning the validity of the overall trend, such unexpected findings can be explained by noise in the data collection and analysis. The noise can stem from either the limited size of the sample or a misunderstanding of the differences between the various levels by the respondents.

[4] For instance, the importance of the "Price" attribute equals 0.33 = 2.613/ (2.613 + 1.542 + 1.526 + 0.319 + 1.069 + 0.769).

Table 3
Partial utilities for plane ticket selection for long-haul flights – overall sample.

Attribute	Level	β	Standard error	Pr > Khi²
Price	370	0	0.000	
	400	−1.074***	0.111	<0.0001
	430	−1.562***	0.067	<0.0001
	460	−2.613***	0.117	<0.0001
Checked baggage	Not included	0	0.000	
	Included	1.542***	0.066	<0.0001
Inflight meal	Not included	0	0.000	
	Snacks	0.891***	0.104	<0.0001
	Gourmet meal	1.526***	0.101	<0.0001
Priority boarding	Not included	0	0.000	
	Included	0.319***	0.062	<0.0001
Seat selection	Not included	0	0.000	
	Included	1.069***	0.105	<0.0001
Onboard Wi-Fi	Not included	0	0.000	
	1 h of Wi-Fi	0.769***	0.108	<0.0001
	Wi-Fi during the entire flight	0.543***	0.077	<0.0001

N = 6,356 / R^2 (Nagelkerke) = 0.401 / * p < 0.1; ** p < 0.01; *** p < 0.001.

Table 4
Importance of attributes in the selection of a plane ticket for long-haul flights – overall sample.

Attribute	Importance (in %)
Price	33.33%
Checked baggage	19.67%
Inflight meal	19.48%
Seat selection	13.64%
Onboard Wi-Fi	9.81%
Priority boarding	4.07%
Total	100%

(3) This conversion rule (from partial utility to euros) can be used to calculate the willingness to pay. For each attribute and level, we observe partial utility variation. Consequently, we can convert the utility into euros. Taking the attribute checked baggage as an example, a plane ticket offering checked baggage offers 1.542 additional units of utility compared to a ticket without checked baggage. Because we know that a unit of utility is valued at 34.44€, we can state that passengers are willing to pay 53.13€ (=1.542 × 34.44) to have a checked baggage on a return flight or 26.56€ for a one-way flight.[5] Table 5 summarizes the willingness to pay for the various ancillary services listed in our experiment.

As will be explained in detail in the discussion, only some of these willingness-to-pay results are in line with the average price charged by airlines for such ancillary services, while others differ substantially.

4.2. Analysis according to the trip motive

In this part, the overall sample is divided into two subsamples according to the motive of travel. This criterion is important, as it has been shown that the trip motive has a significant impact on the price and time sensitivity of respondents as a whole (Belobaba et al., 2009; Vasigh et al., 2013) and for ancillary services specifically (Chen and Wu, 2009; Wittmer and Rowley, 2014; Warnock-Smith et al., 2017). Accordingly, we divided our sample of 454 respondents into 334 who travel mainly for leisure (4676 decisions) and 120 respondents who primarily travel for business (1,680 decisions).

4.2.1. Analysis of partial utilities – by trip motive

As we did for the overall sample, we start by analyzing partial utilities. As shown in Table 6, for both subsamples (respondents who travel for business or leisure motives), we observe the same pattern in terms of the valuation of the different attributes and levels as for the overall sample. For all the attributes and levels, the coefficients are significantly different from 0 (except for the reference level, which is set to 0).

In addition to assessing these partial utilities, we investigate whether these valuations differ with the trip motive. In other words,

[5] In the remainder of the article, even if the willingness to pay is assessed based on return tickets, we only provide the willingness to pay for one-way flights because ancillary services are usually charged on a one-way flight basis. We assume that the estimated fee for ancillary services on a one-way flight accounts for half the estimated fee for a return flight.

Table 5
Willingness to pay for ancillary services on long-haul flights – overall sample.

Ancillary service	Price for a return ticket (€)	Price for a one-way flight (€)
Checked baggage	53.13	26.56
Snacks	30.71	15.35
Gourmet meal	52.58	26.29
Priority boarding	10.98	5.49
Seat selection	36.83	18.41
1 h of Wi-Fi	26.48	13.24
Wi-Fi during the entire flight	18.72	9.36

Table 6
Partial utilities for plane ticket selection for long-haul flights – by trip motive.

		Decisions made by respondents who travel mainly for business purposes			Decisions made by respondents who travel mainly for leisure purposes			Business vs leisure	
Attribute	Level	β	Standard error	Pr > Khi^2	β	Standard error	Pr > Khi^2	Welsch t	P-Value
Price	370	0.000	0.000		0.000	0.000			
	400	−1.016***	0.218	< 0.0001	−1.094***	0.130	< 0.0001	4.5905	< 0.0001
	430	−1.572***	0.130	< 0.0001	−1.560***	0.077	< 0.0001	−1.2441	< 0.0001
	460	−2.523***	0.209	< 0.0001	−2.654***	0.142	< 0.0001	7.5665	< 0.0001
Checked baggage	Not included	0.000	0.000		0.000	0.000			
	Included	1.448***	0.126	< 0.0001	1.579***	0.077	< 0.0001	−13.2162	< 0.0001
Inflight meal	Not included	0.000	0.000		0.000	0.000			
	Snacks	0.792***	0.182	< 0.0001	0.936***	0.128	< 0.0001	−9.3726	< 0.0001
	Gourmet meal	1.494***	0.175	< 0.0001	1.548***	0.124	< 0.0001	−3.5979	< 0.0001
Priority boarding	Not included	0.000	0.000		0,000	0.000			
	Included	0.229*	0.122	< 0.0600	0.351***	0.073	< 0.0001	−13.0080	< 0.0001
Seat selection	Not included	0.000	0.000		0,000	0.000			
	Included	0.867***	0.183	< 0.0001	1.151***	0.128	< 0.0001	−18.4730	< 0.0001
Onboard Wi-Fi	Not included	0.000	0.000		0.000	0.000			
	1 h of Wi-Fi	0.783***	0.190	< 0.0001	0.771***	0.132	< 0.0001	0.7771	< 0.0001
	Wi-Fi during the entire flight	0.622***	0.149	< 0.0001	0.514***	0.090	< 0.0001	9.3763	< 0.0001
		N = 1680 R^2 (Nagelkerke) = 0.389			N = 4676 R^2 (Nagelkerke) = 0.407				

* $p < 0.1$; ** $p < 0.01$; *** $p < 0.001$.

for a given level of a specific attribute, we investigate whether respondents who travel mainly for business value this attribute more or less than the other respondents. We implement a Welsch *t*-test to test for any potential difference in the valuation of a given level between respondents who belong to the two groups.

Table 6 reveals that respondents who travel for leisure (hereafter called leisure passengers) tend to be more price sensitive than respondents who travel for business (business passengers), as leisure passengers see their utility decrease more when the price increases ($\beta_{business} = -2.523$ vs $\beta_{leisure} = -2.654$; Welsch *t*-test = 7.5665; $p < 0.00001$).

Regarding checked baggage, leisure passengers value tickets that include checked baggage more than business passengers do ($\beta_{business} = 1.448$ vs $\beta_{leisure} = 1.579$; Welsch *t*-test = −13.2162; $p < 0.00001$). The same results are observed for inflight meals, whether snacks or a gourmet meal, with leisure passengers placing more value on tickets offering inflight meals than business passengers do ($\beta_{business} = 1.494$ vs $\beta_{leisure} = 1.548$; Welsch *t*-test = −3.5979; $p < 0.00001$). Concerning tickets offering an option for priority boarding, business passengers place less value on such tickets than do leisure passengers ($\beta_{business} = 0.229$ vs $\beta_{leisure} = 0.351$; Welsch *t*-test = 13.0080; $p < 0.00001$). The same pattern is observed for seat selection, with leisure passengers placing more value on tickets offering the opportunity to select a seat than business passengers do ($\beta_{business} = 0.867$ vs $\beta_{leisure} = 1.151$; Welsch *t*-test = −18.4730; $p < 0.00001$). However, business passengers place more value on flights offering unlimited Wi-Fi than leisure passengers do ($\beta_{business} = 0.622$ vs $\beta_{leisure} = 0.514$; Welsch *t*-test = 9.3763; $p < 0.00001$).

4.2.2. The relative importance of plane ticket attributes – by trip motive

After analyzing partial utilities, we analyze the importance of the different attributes in the ticket selection process. Accordingly, Table 7 (below) reveals the importance of each attribute for the two subsamples.

Table 7 shows that for both types of respondents, the most important attribute in the ticket selection process remains the price, which accounts for approximately one-third of the decision process. Regarding the checked baggage and inflight meal attributes, a slight difference is observed between the two subsamples, as business passengers value an inflight meal (2nd most important attribute) more than checked baggage (3rd most important attribute), whereas leisure passengers rank these attributes in the opposite order. Finally, both subsamples rank the remaining attributes in the same order but with different levels of importance. Accordingly, the 4th most important criterion is seat selection, which accounts for 11.79% of the decision for business passengers and 14.29% for leisure passengers. Onboard Wi-Fi ranks as the 5th most important criterion for both subsamples and accounts for 10.68% of the decision for business passengers and 9.59% for leisure passengers. Finally, the least important criterion is priority boarding, which accounts for only 3.11% of the decision for business passengers and 4.35% for leisure passengers.

4.2.3. Willingness to pay for ancillary services – by trip motive

Once the partial utilities are estimated and the respective importance is highlighted, we can convert these partial utilities into euros and assess the willingness to pay for the various ancillary services for both subsamples. Table 8 summarizes the different amounts passengers are willing to pay for each service.

We note that for most ancillary services, leisure passengers are willing to pay more for these additional services than business passengers. The difference in willingness to pay is particularly high for priority boarding (+53.5%) and seat selection (+32.9%). These differences can be explained by the fact that most business passengers travel frequently and already enjoy the benefits associated with superior statuses in frequent flyer programs, such as the ability to board first or to select their seat (Agostini et al., 2015; Terblanche, 2015). By contrast, regarding onboard Wi-Fi, leisure passengers are willing to pay less than business passengers (−17.4%). A potential explanation for this price difference is that business passengers value the ability to send e-mails or to be reached more than leisure passengers, who might see their flights as an opportunity to disconnect and enjoy some calm.

4.3. Analysis according to respondents' age

In this section, we decompose the sample according to respondents' age, which is expected to impact airline preferences (Chen and Chao, 2015) and the valuation of ancillary services (Chiambaretto et al., 2013). Specifically, we divide our sample into two subsamples: millennials (born in 1980 or later) and nonmillennials (born before 1980). We select this distinction because a large number of long-haul, low-cost carriers (such as Joon, Level, and Wow Air) have been created to target as a priority the growing market of millennials and rely on unbundled plane tickets to become attractive (Hunt and Truong, 2019). Moreover, several tourism studies have highlighted that millennials have specific preferences regarding their travel and air transport experiences (Veiga et al., 2017; Gures et al., 2018; So et al., 2018; Shen et al., 2020). Accordingly, we divided our sample such that of 454 respondents, 264 are categorized as millennials (3696 decisions) and 190 respondents are nonmillennials (2660 decisions).

4.3.1. Analysis of partial utilities – by age

As in the two previous sections, we start by analyzing partial utility. As shown in Table 9, for both subsamples (millennials and nonmillennials), the same pattern is observed in terms of the valuation of the different attributes and levels as for the overall sample. For all the attributes and levels, the coefficients are significantly different from 0 (except for the reference level, which is set to 0). In addition, we implement a Welsch *t*-test to test for potential differences in the valuation of a given level between respondents who belong to the two groups.

Table 9 highlights that millennials tend to be more price sensitive than nonmillennials, as millennials see their utility decrease more when the price increases ($\beta_{millennials} = -3.036$ vs $\beta_{non\text{-}millennials} = -2.186$; Welsch *t*-test $= -52.6321$; $p < 0.00001$). Regarding checked baggage, millennials place more value on tickets that include checked baggage than nonmillennials do ($\beta_{millennials} = 1.714$ vs $\beta_{non\text{-}millennials} = 1.408$; Welsch *t*-test $= 33.6989$; $p < 0.000011$). The same results are observed for priority boarding, which is valued more by millennials than by nonmillennials ($\beta_{millennials} = 0.400$ vs $\beta_{non\text{-}millennials} = 0.247$; Welsch *t*-test $= 17.8628$; $p < 0.00001$). However,

Table 7
Importance of attributes in the selection of a plane ticket for long-haul flights – by trip motive.

	Decisions made by respondents who travel mainly for business purposes		Decisions made by respondents who travel mainly for leisure purposes	
Attribute	Rank	Importance (in %)	Rank	Importance (in %)
Price	1	34.35%	1	32.95%
Checked baggage	3	19.72%	2	19.60%
Inflight meal	2	20.35%	3	19.22%
Priority boarding	6	3.11%	6	4.35%
Seat selection	4	11.79%	4	14.29%
Onboard Wi-Fi	5	10.68%	5	9.59%
Total		100%		100%

Table 8
Willingness to pay for ancillary services on long-haul flights – by trip motive.

Ancillary service (€)	Respondents who travel mainly for business purposes	Respondents who travel mainly for leisure purposes	(leisure/ business)
Checked baggage	24.95	27.20	9.0%
Snacks	13.64	16.12	18.2%
Gourmet meal	25.74	26.66	3.6%
Priority boarding	3.94	6.04	53.5%
Seat selection	14.92	19.83	32.9%
1 h of Wi-Fi	13.49	13.28	−1.6%
Wi-Fi during the entire flight	10.72	8.85	−17.4%

Table 9
Partial utilities for plane ticket selection for long-haul flights – by age.

		Decisions made millennials			Decisions made by nonmillennials			Millennials vs nonmillennials	
Attribute	Level	β	Standard error	Pr > Khi^2	β	Standard error	Pr > Khi^2	Welsch t	P-Value
Price	370	0.000	0.000		0.000	0.000			
	400	−1.360***	0.159	< 0.0001	−0.805***	0.164	< 0.0001	−36.2045	< 0.0001
	430	−1.804***	0.100	< 0.0001	−1.332***	0.094	< 0.0001	−51.0042	< 0.0001
	460	−3.036***	0.161	< 0.0001	−2.186***	0.182	< 0.0001	−52.6321	< 0.0001
Checked baggage	Not included	0.000	0.000		0.000	0.000			
	Included	1.714***	0.094	< 0.0001	1.408***	0.098	< 0.0001	33.6989	< 0.0001
Inflight meal	Not included	0.000	0.000		0.000	0.000			
	Snacks	0.834***	0.137	< 0.0001	0.950***	0.167	< 0.0001	−8.1147	< 0.0001
	Gourmet meal	1.481***	0.128	< 0.0001	1.611***	0.167	< 0.0001	−9.4077	< 0.0001
Priority boarding	Not included	0.000	0.000		0.000	0.000			
	Included	0.400***	0.088	< 0.0001	0.247**	0.091	< 0.0001	17.8628	< 0.0070
Seat selection	Not included	0.000	0.000		0.000	0.000			
	Included	0.957***	0.132	< 0.0001	1.218***	0.173	< 0.0001	−18.1634	< 0.0001
Onboard Wi-Fi	Not included	0.000	0.000		0.000	0.000			
	1 h of Wi-Fi	0.670***	0.140	< 0.0001	0.884***	0.174	< 0.0001	−14.5107	< 0.0001
	Wi-Fi during the entire flight	0.615***	0.108	< 0.0001	0.525***	0.115	< 0.0001	8.6030	< 0.0001
		N = 3696			N = 2660				
		R^2 (Nagelkerke) = 0.432			R^2 (Nagelkerke) = 0.376				

* $p < 0.1$; ** $p < 0.01$; *** $p < 0.001$

regarding inflight meals, whether snacks or a gourmet meal, nonmillennials place more value on tickets offering inflight meals than millennials do ($\beta_{millennials} = 1.481$ vs $\beta_{non\text{-}millennials} = 1.611$; Welsch *t*-test = −9.4077; $p < 0.00001$). The same pattern is observed for seat selection, with nonmillennial passengers placing more value on plane tickets offering the opportunity to choose a seat than millennial passengers do ($\beta_{millennials} = 0.957$ vs $\beta_{non\text{-}millennials} = 1.218$; Welsch *t*-test = −18.1634; $p < 0.00001$). Regarding onboard Wi-

Table 10
Importance of attributes in the selection of a plane ticket for long-haul flights – by age.

	Decisions made by millennials		Decisions made by nonmillennials	
Attribute	Rank	Importance (in %)	Rank	Importance (in %)
Price	1	36.76%	1	28.93%
Checked baggage	2	20.76%	3	18.63%
Inflight meal	3	17.94%	2	21.33%
Priority boarding	6	4.83%	6	3.27%
Seat selection	4	11.58%	4	16.12%
Onboard Wi-Fi	5	8.13%	5	11.72%
Total		100%		100%

Fi, a very specific pattern is observed. Table 9 reveals that for one hour of Wi-Fi, nonmillennial passengers value tickets offering this feature more than millennials ($\beta_{millennials} = 0.670$ vs $\beta_{non\text{-}millennials} = 0.884$; Welsch *t*-test = −14.5107; $p < 0.00001$). However, when Wi-Fi is offered during the entire flight, the preferences are reversed ($\beta_{millennials} = 0.615$ vs $\beta_{non\text{-}millennials} = 0.525$; Welsch *t*-test = 8.6030; $p < 0.00001$).

4.3.2. The relative importance of plane ticket attributes – by age

Once the analysis of partial utilities is performed, we analyze the importance of the different attributes in the ticket selection process. These attributes are detailed in Table 10.

Table 10 reveals that all respondents (independent of their age) consider the price of the ticket to be the most important criterion, but price has greater importance for millennials (36.76%) than for nonmillennials (28.93%). Regarding the second and third most important criteria, the two subsamples differ in their preferences. For millennials, checked baggage matters more (20.76%) than the type of inflight meal (17.94%). By contrast, nonmillennials value the presence of an inflight meal (21.33%) more than the ability to check baggage (18.63%). Regarding the three remaining attributes, the ranking is the same for both subsamples: seat selection followed by onboard Wi-Fi and priority boarding. However, despite having the same ranking, nonmillennials value the possibility to select a seat (16.12% vs 11.58%) and onboard Wi-Fi (11.72% vs 8.13%) more than millennials.

4.3.3. Willingness to pay for ancillary services – by age

In addition to estimating partial utilities and the importance associated with each attribute, we assess the willingness to pay for the various ancillary services for both subsamples. Table 11 summarizes the different amounts passengers are willing to pay for each service.

Regarding ancillary fees, neither subsample is globally willing to pay more for services. Millennials are willing to pay significantly more for priority boarding (+61.6% compared to nonmillennials) and checked baggage (+21.8%). By contrast, millennials place less value than nonmillennials on the ability to select a seat (−21.4%), and regarding inflight meals, millennials have a much lower willingness to pay than older passengers (−12.2% for snacks and −8.1% for gourmet meals). These last two attributes are key features of low-cost carriers on short-haul flights, and the absence of seat selection and inflight meals have clearly changed the behavior of their customers, among which millennials are highly represented (Veiga et al., 2017). Regarding onboard Wi-Fi, an interesting pattern appears, with millennials willing to pay less than nonmillennials for 1 h of Wi-Fi (−24.2%) but willing to pay more to have Wi-Fi during the entire flight (+17.3%). This result is in line with recent studies that show that millennials are used to freemium business models and pricing schemes, as they are not willing to pay much for limited services (such as 1 h of Wi-Fi) but value more unlimited services, e.g., Wi-Fi during the entire flight (Chen et al., 2018; Bordonaba-Juste et al., in press).

5. Discussion and conclusions

5.1. Interpretation of the analysis by trip motive and age

This experimental research design allowed us to assess how each attribute and level is valued by respondents and to highlight the importance (or weight) of these various attributes in the ticket selection process. Furthermore, our study made it possible to assess the willingness to pay for both the entire sample and for subsamples, with significant differences observed based on respondents' characteristics.

Before interpreting the differences for our subsamples, it is worth noting that the criteria used to divide our entire sample into subsamples are not completely independent. These two segmentation criteria (main trip motive and age) may be interrelated. For instance, respondents that travel mainly for business purposes account for 19.7% of millennial respondents and 35.8% of nonmillennial respondents. Put differently, overall, older respondents tend to travel more for business purposes than younger respondents. Accordingly, while we provide a separate analysis to explain differences in the willingness to pay according to the trip motive and age, it is important to keep in mind that some factors might explain these differences for both types of subsample analyses (age and trip motive).

Regarding trip motive, previous contributions have underlined that trip motive affects price and time sensitivity and the willingness to pay for ancillary services (Chen and Wu, 2009; Chiambaretto et al., 2013; Wittmer and Rowley, 2014; Warnock-Smith et al., 2017). In line with these contributions, we show that, on average, respondents who travel mainly for leisure purposes are globally willing to pay more for ancillary services than respondents who travel mainly for business purposes (except for Wi-Fi, for which business

Table 11
Willingness to pay for ancillary services on long-haul flights – by age.

Ancillary service (€)	Millennial respondents	Nonmillennial respondents	(millennials/nonmillennials)
Checked baggage	29.53	24.25	21.8%
Snacks	14.37	16.36	−12.2%
Gourmet meal	25.51	27.75	−8.1%
Priority boarding	6.88	4.26	61.6%
Seat selection	16.48	20.97	−21.4%
1 h of Wi-Fi	11.54	15.23	−24.2%
Wi-Fi during the entire flight	10.60	9.03	17.3%

passengers are willing to pay more). Nevertheless, the difference in terms of willingness to pay does not have the same intensity for all of the features. For instance, business passengers value significantly less than leisure passengers the ability to board by priority or to select their seats. A potential explanation might be that most business passengers have high status in frequent flyer programs that already provide them these benefits for free or at a reduced price, such that their membership may actually change their perceptions and behavior and thus reduce their willingness to pay (Agostini et al., 2015; Terblanche, 2015). By contrast, for some attributes or levels, business and leisure passengers have a quite similar willingness to pay (even if the difference is statistically significant), such as the option for a gourmet meal. Paying for a gourmet meal can be associated with a hedonic choice that provides pleasure and satisfaction to the passenger (Han et al., 2019). Although we understand that a leisure passenger can opt for an ancillary service that increases its hedonic satisfaction, we argue that business passengers who often spend many hours in planes every week can also be attracted to this option because they believe they deserve to treat themselves during their business trips (Martín et al., 2011). Regarding Wi-Fi, focusing on the level of providing unlimited Wi-Fi during the flight, we show that business passengers are willing to pay more than leisure passengers for this service. As we previously suggested, a potential explanation for this price difference may come from the fact that business passengers could value the ability to send e-mails or be reached more than leisure passengers who might view their flights as an opportunity to disconnect and enjoy some calm (Darmell & Rampal, 2017; Egger et al., 2020).

Dividing our sample according to respondents' age, with a distinction between millennials and nonmillennials, was important because several long-haul, low-cost carriers (such as Joon, Level, and Wow Air) have targeted as a priority the growing market of millennials (Hunt and Truong, 2019) and because several studies have shown that millennials have specific preferences regarding their travel and air transport experiences (Veiga et al., 2017; Gures et al., 2018; So et al., 2018; Shen et al., 2020). Nevertheless, in contrast to the trip motive analysis, our distinction by age does not result in a clear pattern in terms of differences in willingness to pay. Millennials have a higher willingness to pay than nonmillennials for several services (checked baggage, priority boarding and Wi-Fi during the entire flight), but the result is reversed for other services (inflight meals, seat selection and 1 h of Wi-Fi). The generational effect associated with the extensive use of low-cost carriers by millennials, a higher importance associated with the Internet and more hedonic consumption may explain some of these differences (Holbrook, 2000; Veiga et al., 2017).

5.2. *Comparing estimated and actual ancillary fees for long-haul flights*

In addition to measuring willingness to pay, it is important to consider the actual fees charged by airlines on the transatlantic market. We selected 6 carriers (2 American legacy carriers, 3 European legacy carriers and 1 long-haul low-cost carrier). For each airline, we provide the fees associated with a transatlantic flight for the ancillary services investigated (see Table 12). The comparison yields some interesting results.

Most legacy carriers provide one free checked bag and charge either for an additional piece of baggage or when the passenger buys a basic fare (that does not include any checked baggage). While the willingness to pay of our respondents is between 24.25€ and 29.53€, the fees charged by airlines are between 49€ and 91€ (100 USD). This important difference suggests that airlines overcharge passengers for baggage to discourage them from registering too many bags. A potential explanation might be airlines' policy to have an optimal number of checked bags to limit the total weight of the aircraft (Bhatta, 2013), to reduce the turnaround time of the aircraft (More and Sharma, 2014) and to leave sufficient room for freight in the aircraft (Wong et al., 2009).

For inflight meals, the comparison of the estimated willingness to pay and the actual fees reveals a good match. For snacks, respondents were willing to pay between 13.64€ and 16.36€, while the actual fees were between 8.1 € (8.99 USD) and 17.1€ (15£). The same result is observed for gourmet meals, with respondents having a willingness to pay between 25.51€ and 27.75€, and the actual

Table 12
Estimated willingness to pay and actual fees charged by airlines for various ancillary services.

		By trip motive		By age	
Ancillary service (€)	Overall sample	Business	Leisure	Millennials	Nonmillennials
Checked baggage	26.56	24.95	27.20	29.53	24.25
Snacks	15.35	13.64	16.12	14.37	16.36
Gourmet meal	26.29	25.74	26.66	25.51	27.75
Priority boarding	5.49	3.94	6.04	6.88	4.26
Seat selection	18.41	14.92	19.83	16.48	20.97
1 h of Wi-Fi	13.24	13.49	13.28	11.54	15.23
Wi-Fi during the entire flight	9.36	10.72	8.85	10.60	9.03

Ancillary service (€)	Delta Airlines	United Airlines	Air France	Lufthansa	British Airways	Level
Checked baggage	100 USD	60 USD	70–85€	60€	60£	49€
Snacks	8.99 USD	10 USD	13€	15€	15£	14€
Gourmet meal	No offer	No offer	28€	25€	18£	35€
Priority boarding	15 USD	15 USD	No offer	No offer	No offer	No offer
Seat selection	Free	Free/9 USD	Free/20€	Free/35€	Free/20£	25–45€
1 h of Wi-Fi	No offer	7 USD	8€	7€	4.99£	8.99€
Wi-Fi during the entire flight	28 USD	19 USD	18€	17€	14.99£	29.99€

Fees in the table are for transatlantic flights. Regarding seat selection, for most airlines, a fee is charged if the passenger wants to select his/her seat more than 24 h before the flight.

fees being between 20.51€ (18£) and 35€. The good fit between the willingness to pay and the actual fees confirms the existence of a real demand for paid meals (when they are not offered) or premium meals to improve the passenger inflight experience (Jones, 2012).

Most respondents have a limited willingness to pay for priority boarding (between 3.94€ and 6.88€), and not many airlines (only the two American carriers) offer this ancillary service for 13.7€ (15 USD). That airlines do not offer this option (or offer it at a price that is much higher than the willingness to pay) can be explained by the fact that many passengers benefit from this feature for free through frequent flyer programs and that adding more priority passengers would not only create more complexity in the boarding process but would also generate a feeling of unfairness among passengers (Alexander et al., 2012).

Concerning seat selection, our experiment shows that respondents are willing to pay between 14.92€ and 20.97€. For most airlines, a fee is charged if the passenger wants to select his/her seat more than 24 h before the flight, and seat selection becomes free when online check-in begins. The fees for seat selection are between 8.1€ (9 USD) and 45€ depending on the airline and fare, with most fees being approximately 20–30€. The fact that the actual fees are in line with the willingness to pay for seat selection underlines the existence of a real demand for these features (Rouncivell et al., 2018).

Last, regarding the unlimited offer for Wi-Fi, our experiment reveals that respondents are willing to pay between 9.03€ and 10.72€. We reviewed the actual fees charged by airlines and determine that the estimated willingness to pay for Wi-Fi matches quite well the price for 1 h of Wi-Fi (between 4.99£ and 8.99€), whereas unlimited offers are approximately 14.99£ and 29.99€. This finding shows that airlines currently charge Wi-Fi at a price that is much higher than the willingness to pay of their passengers. Consequently, most passengers probably opt for the 1 h option because the unlimited offer appears too expensive for them.

5.3. Comparing estimated ancillary fees for short- and long-haul flights

Whereas our experimental approach only investigated long-haul flight scenarios, it is important to discuss the extent to which our willingness-to-pay differs from that for short-haul flights. To do this, we rely on previous studies that estimated the willingness to pay for various ancillary services on short-haul routes.

Regarding the ability to pay for checked baggage, our analysis revealed a global willingness to pay of 26.56€ (with estimates ranging from 24 to 29€). Quite paradoxically, whereas the ancillary service "checked baggage" has been extensively investigated for its operational implications (Scotti et al., 2016; Nicolae et al., 2017), only Warnock-Smith et al. (2017) actually investigated the willingness to pay for checked baggage on short-haul flights. Based on a stated preference approach, they show that passengers are willing to pay a bit more than 5€ (4.16£) on short-haul flights, which is far less than the amount we estimated for long-haul flights. Thus, a clear difference exists in terms of willingness to pay for checked baggage between short- and long-haul flights.

Concerning inflight meals, we estimated that respondents were willing to pay between 13.64€ and 16.36€ for snacks and between 25.51€ and 27.75€ for gourmet meals. Previous contributions of inflight meals on short-haul flights have made a distinction between snacks for which passengers are willing to pay between 5 and 10€ (Espino et al., 2008; Warnock-Smith et al., 2017) and gourmet meals for which they are willing to pay up to 30€ (Chen and Wu, 2009; Balcombe et al., 2009). Our results reveal that passengers on long-haul flights are willing to pay between 2 and 3 times as much as passengers on short-haul flights for snacks, underlining the necessity for passengers to eat on long-haul flights. By contrast, there is no significant difference in the valuation of gourmet meals between short- and long-haul passengers, showing that flight duration does not impact the valuation of this service.

Our analysis of priority boarding reveals that most respondents have a limited willingness to pay (between 3.94€ and 6.88€). Because this feature is not extensively offered by airlines, only Warnock-Smith et al. (2017) reveals that passengers are willing to pay around 5€ (4.65£) for this service on short-haul flights. We do not see any significant difference in the valuation of this service, depending on flight duration. This finding may be explained by the fact that this service (to board before the other passengers) presents the same benefits and has the same duration independent of the flight duration.

We show that respondents are willing to pay between 14.92€ and 20.97€ on long-haul flights for the ability to select a seat. Previous research dedicated to short-haul flights revealed slightly lower values for the willingness to pay for seat selection, ranging from 12€ to 22€ (Espino et al., 2008; Balcombe et al., 2009; Warnock-Smith et al., 2017). This finding shows that being able to select one's seat is slightly more valued on long-haul flights than on short-haul flights. Nevertheless, the difference between the values remains negligible, indicating that flight duration seems to have a marginal effect on the willingness to pay for seat selection.

Finally, concerning Wi-Fi, we show that respondents are willing to pay between 8.85 and 10.72€ for unlimited Wi-Fi during the flight. Because airlines have recently offered this feature, only the study by Warnock-Smith et al. (2017) shows (on a declaration basis) that passengers are willing to pay approximately 23€ (21£) for Wi-Fi on short-haul flights. Nevertheless, considering the recent introduction of this service and the limited number of studies on the topic, we cannot draw any conclusions regarding the impact of flight duration on the willingness to pay for Wi-Fi.

To summarize, our analysis shows that, in contrast to our expectations, flight duration has a contrasting impact on the willingness to pay for ancillary services. We reveal that a longer flight increases strongly the willingness to pay for checked baggage and snacks and moderately for seat selection. By contrast, we underline that flight duration has no significant impact on the willingness to pay for gourmet meals, priority boarding, and Wi-Fi.

5.4. Contributions to the existing literature

Our research contributes to two streams of research. Our research first contributes to the growing literature on ancillary services by offering insights into the willingness to pay of passengers for various ancillary services on long-haul flights. To date, most contributions related to ancillary services have focused on short- or medium-haul flights and ignored the specifics of ancillary services on long-haul

flights. Only two attempts have been made to investigate ancillary services on long-haul flights, focusing on the importance of criteria in the decision process (Wittmer and Rowley, 2014) or using declarations to assess the willingness to pay (Warnock-Smith et al., 2017). We extend these contributions by using conjoint analysis to provide a better assessment of the willingness to pay for several ancillary services and show that, in contrast to our expectations, flight duration has a contrasting impact on the willingness to pay for ancillary services. In addition, we highlight the importance of the trip motive and the respondents' age in determining the willingness to pay, inviting scholars and airlines to implement a more fine-grained pricing policy.

This study also contributes to the emerging literature on long-haul low-cost carriers that rely extensively on ancillary services and force legacy carriers to unbundle their long-haul offerings to remain attractive to consumers. While these contributions highlight the key role of ancillary services in the business model of long-haul low-cost carriers, they did not sufficiently investigate how much passengers are actually willing to pay for these ancillary services. Accordingly, our research provides significant insights into one of the specific revenue streams for these carriers. Building on this research, scholars and airlines will be able to strengthen their ability to take advantage of ancillary revenues on long-haul markets.

5.5. Limitations and directions for future research

Despite making several key contributions, this research suffers from a number of limitations that represent many directions for future research.

A first limitation comes from the attributes chosen to characterize our profiles. For statistical reasons, we had to limit our investigation to six attributes, but other key attributes could have been investigated (Warnock-Smith et al., 2017). As airlines offer more and more diversified ancillary services, we invite future researchers to replicate our experimental research design with other ancillary services on long-haul flights, such as access to inflight entertainment, lounge access and carbon offsetting programs.

A second potential limitation stems from the division of our sample into subsamples. To ensure a sufficient number of observations in each subsample, we divided our sample into two samples, but a more fine-grained analysis might reveal additional insights. Regarding the age dimension, different thresholds might be interesting to investigate and could generate insights into the preferences of some categories of passengers (such as seniors). In addition, a continuous approach could provide more fine-grained findings (such as a non-linear effect of age on the willingness to pay). Regarding the trip motive dimension, as suggested by the existing literature, we categorized our respondents by the main trip motive of their previous flights. A complementary approach with different scenarios in which the respondent is put in either a personal or a professional context might produce additional insights. Furthermore, in addition to dividing the sample according to trip motive and respondents' age, we invite future researchers to investigate additional passenger characteristics, such as disposable income, occupation, gender or even nationality. Previous contributions have highlighted that such characteristics may exert an impact on respondents' willingness to pay (Balcombe et al., 2009; Leon and Uddin, 2017; Warnock-Smith et al., 2017; Rouncivell et al., 2018).

A third limitation is related to the geographical scope of our investigation. We considered a scenario in which respondents made choices based on a flight between Paris and New York. It would be interesting to study whether the findings differ when respondents are asked to make decisions about different routes (e.g., in Asia, South America, and the Middle East) with varying trip lengths. Indeed, although the ambition of our research was to show that the willingness to pay for ancillary services on long-haul flights may differ from that for short-haul flights, we have not properly measured the impact of flight duration on the willingness to pay. Future research could investigate scenarios with different flight duration (3 h, 6 h, 9 h, or even 12 h) to address in greater detail the impact of flight duration on the willingness to pay for ancillary services.

A final limitation stems from the experimental method that we used to reveal the willingness to pay for ancillary services: the choice-based conjoint analysis. Although this method has been shown to provide valuable insights, it is often viewed as repetitive and generates a significant level of fatigue such that respondents may not remain focused during the entire experiment (Hsu et al., 2017). To avoid this issue, other conjoint analysis techniques such as Adaptive Conjoint Analysis (ACA) could be used, and some contributions have already shown ACA's relevance to studying consumers' decisions and willingness to pay (Green et al., 1991; Shin et al., 2015).

Despite these limitations, we remain confident that our research makes key contributions to the investigation of ancillary services on long-haul flights and that more research is needed to analyze this promising research topic in greater detail.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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References

Agostini, C.A., Inostroza, D., Willington, M., 2015. Price effects of airlines frequent flyer programs: the case of the dominant firm in Chile. Transp. Res. Part A: Policy Pract. 78, 283–297. https://doi.org/10.1016/j.tra.2015.05.011.

Albers, S., Daft, J., Stabenow, S., Rundshagen, V., 2020. The long-haul low-cost airline business model: a disruptive innovation perspective. J. Air Transport Manage. 89, 101878 https://doi.org/10.1016/j.jairtraman.2020.101878.
Alexander, M., MacLaren, A., O'Gorman, K., White, C., 2012. Priority queues: where social justice and equity collide. Tour. Manage. 33 (4), 875–884. https://doi.org/10.1016/j.tourman.2011.09.009.
Azadian, F., Vasigh, B., 2019. The blurring lines between full-service network carriers and low-cost carriers: a financial perspective on business model convergence. Transp. Policy 75, 19–26. https://doi.org/10.1016/j.tranpol.2018.12.012.
Balcombe, K., Fraser, I., Harris, L., 2009. Consumer willingness to pay for in-flight service and comfort levels: a choice experiment. J. Air Transport Manage. 15 (5), 221–226. https://doi.org/10.1016/j.jairtraman.2008.12.005.
Baltar, F., Brunet, I., 2012. Social research 2.0: virtual snowball sampling method using Facebook. Internet Res. 22 (1), 57–74. https://doi.org/10.1108/10662241211199960.
Bao, Y.F., Mckercher, B., 2008. The effect of distance on tourism in Hong Kong: a comparison of short haul and long haul visitors. Asia Pacific J. Tour. Res. 13 (2), 101–111. https://doi.org/10.1080/10941660802048332.
Bellizzi, M. G., Eboli, L., Mazzulla, G., in press. An online survey for the quality assessment of airlines' services. Res. Transp. Bus. Manage. https://doi.org/10.1016/j.rtbm.2020.100515.
Belobaba, P., Odoni, A.R., Barnhart, C., 2009. The Global Airline Industry. Wiley.
Bhatta, B.P., 2013. Pay-as-you-weigh pricing of an air ticket: economics and major issues for discussions and investigations. J. Revenue Pricing Manage. 12 (2), 103–119. https://doi.org/10.1057/rpm.2012.47.
Bordonaba-Juste, M.V., Lucia-Palacios, L., Pérez-López, R., in press. Generational differences in valuing usefulness, privacy and security negative experiences for paying for cloud services. Inf. Syst. E-Bus. Manage. https://doi.org/10.1007/s10257-020-00462-8.
Brueckner, J.K., Lee, D.N., Picard, P.M., Singer, E., 2015. Product unbundling in the travel industry: the economics of airline bag fees. J. Econ. Manage. Strategy 24 (3), 457–484. https://doi.org/10.1111/jems.12106.
Carlsson, F., Martinsson, P., 2001. Do hypothetical and actual marginal willingness to pay differ in choice experiments?: application to the valuation of the environment. J. Environ. Econ. Manage. 41 (2), 179–192. https://doi.org/10.1006/jeem.2000.1138.
Chen, C.C., Nakayama, M., Leon, S., 2018. Are You Hooked on Paid Music Streaming? An Investigation into the Millennial Generation. IGI Global.
Chen, C.-F., Wu, T.-F., 2009. Exploring passenger preferences in airline service attributes: a note. J. Air Transport Manage. 15 (1), 52–53. https://doi.org/10.1016/j.jairtraman.2008.07.005.
Chen, H.-T., Chao, C.-C., 2015. Airline choice by passengers from Taiwan and China: a case study of outgoing passengers from Kaohsiung International Airport. J. Air Transport Manage. 49, 53–63. https://doi.org/10.1016/j.jairtraman.2015.08.002.
Chia-Jung, C., Pei-Chun, C., 2014. Preferences and willingness to pay for green hotel attributes in tourist choice behavior: the case of Taiwan. J. Travel Tour. Market. 31 (8), 937–957. https://doi.org/10.1080/10548408.2014.895479.
Chiambaretto, P., Baudelaire, C., Lavril, T., 2013. Measuring the willingness-to-pay of air-rail intermodal passengers. J. Air Transport Manage. 26, 50–54. https://doi.org/10.1016/j.jairtraman.2012.10.003.
Chiambaretto, P., Bengtsson, M., Fernandez, A.-S., Näsholm, M.H., 2020. Small and large firms' trade-off between benefits and risks when choosing a coopetitor for innovation. Long Range Plan. 53 (1), 101876 https://doi.org/10.1016/j.lrp.2019.03.002.
Chiambaretto, P., Dumez, H., 2012. The role of bundling in firms' marketing strategies: a synthesis. Recherche et Applications En Marketing 27 (2), 91–106.
Chung, J.Y., Petrick, J.F., 2013. Price fairness of airline ancillary fees: an attributional approach. J. Travel Res. 52 (2), 168–181. https://doi.org/10.1177/0047287512457261.
Correia, A., Pimpão, A., Tão, M., 2012. Willingness to pay for frills when travelling with low-cost airlines. Tour. Econ. 18 (6), 1161–1174.
Costa, E., Montemurro, D., Giuliani, D., 2019. Consumers' willingness to pay for green cars: a discrete choice analysis in Italy. Environ. Dev. Sustain. 21 (5), 2425–2442. https://doi.org/10.1007/s10668-018-0141-z.
Cui, Y., Orhun, A.Y., Duenyas, I., 2018. How price dispersion changes when upgrades are introduced: theory and empirical evidence from the airline industry. Manage. Sci. 65 (8), 3835–3852. https://doi.org/10.1287/mnsc.2018.3117.
Daft, J., Albers, S., 2012. A profitability analysis of low-cost long-haul flight operations. J. Air Transport Manage. 19, 49–54. https://doi.org/10.1016/j.jairtraman.2012.01.010.
Daft, J., Albers, S., 2015. An empirical analysis of airline business model convergence. J. Air Transport Manage. 46, 3–11. https://doi.org/10.1016/j.jairtraman.2015.03.008.
Darmell, M., Rampal, K., 2017. Connected or Disconnected: The Art of Operating in a Connected World. SAGE Publishing India.
Dauda, S.Y., Lee, J., 2015. Technology adoption: a conjoint analysis of consumers' preference on future online banking services. Inf. Syst. 53, 1–15. https://doi.org/10.1016/j.is.2015.04.006.
De Poret, M., O'Connell, J.F., Warnock-Smith, D., 2015. The economic viability of long-haul low cost operations: evidence from the transatlantic market. J. Air Transport Manage. 42, 272–281. https://doi.org/10.1016/j.jairtraman.2014.11.007.
Egger, I., Lei, S.I., Wassler, P., 2020. Digital free tourism – An exploratory study of tourist motivations. Tour. Manage. 79, 104098 https://doi.org/10.1016/j.tourman.2020.104098.
Espino, R., Martín, J.C., Román, C., 2008. Analyzing the effect of preference heterogeneity on willingness to pay for improving service quality in an airline choice context. Transp. Res. Part E: Logist. Transp. Rev. 44 (4), 593–606. https://doi.org/10.1016/j.tre.2007.05.007.
Francis, G., Dennis, N., Ison, S., Humphreys, I., 2007. The transferability of the low-cost model to long-haul airline operations. Tour. Manage. 28 (2), 391–398. https://doi.org/10.1016/j.tourman.2006.04.014.
Garrow, L.A., Hotle, S., Mumbower, S., 2012. Assessment of product debundling trends in the US airline industry: customer service and public policy implications. Transp. Res. Part A: Policy Pract. 46 (2), 255–268. https://doi.org/10.1016/j.tra.2011.09.009.
Goos, P., Vermeulen, B., Vandebroek, M., 2010. D-optimal conjoint choice designs with no-choice options for a nested logit model. J. Stat. Plan. Inference 140 (4), 851–861. https://doi.org/10.1016/j.jspi.2009.09.006.
Green, P.E., Srinivasan, V., 1990. Conjoint analysis in marketing: new developments with implications for research and practice. J. Market. 54 (4), 3–19. https://doi.org/10.2307/1251756.
Green, P.E., Krieger, A.M., Agarwal, M.K., 1991. Adaptive conjoint analysis: some caveats and suggestions. J. Mark. Res. 28 (2), 215–222. https://doi.org/10.1177/002224379102800208.
Gures, N., Inan, H., Arslan, S., 2018. Assessing the self-service technology usage of Y-Generation in airline services. J. Air Transport Manage. 71, 215–219. https://doi.org/10.1016/j.jairtraman.2018.04.008.
Han, H., Lee, K.-S., Chua, B.-L., Lee, S., Kim, W., 2019. Role of airline food quality, price reasonableness, image, satisfaction, and attachment in building re-flying intention. Int. J. Hospital. Manage. 80, 91–100. https://doi.org/10.1016/j.ijhm.2019.01.013.
Helveston, J.P., Liu, Y., Feit, E.M., Fuchs, E., Klampfl, E., Michalek, J.J., 2015. Will subsidies drive electric vehicle adoption? Measuring consumer preferences in the U.S. and China. Transp. Res. Part A: Policy Pract. 73, 96–112. https://doi.org/10.1016/j.tra.2015.01.002.
Hensher, D.A., 2010. Hypothetical bias, choice experiments and willingness to pay. Transp. Res. Part B: Methodol. 44 (6), 735–752. https://doi.org/10.1016/j.trb.2009.12.012.
Holbrook, M.B., 2000. The millennial consumer in the texts of our times: experience and entertainment. J. Macromarket. 20 (2), 178–192. https://doi.org/10.1177/0276146700202008.
Hsu, D.K., Simmons, S.A., Wieland, A.M., 2017. Designing entrepreneurship experiments: a review, typology, and research agenda. Organ. Res. Methods 20 (3), 379–412. https://doi.org/10.1177/1094428116685613.
Hunt, J., Truong, D., 2019. Low-fare flights across the Atlantic: impact of low-cost, long-haul trans-Atlantic flights on passenger choice of Carrier. J. Air Transport Manage. 75, 170–184. https://doi.org/10.1016/j.jairtraman.2018.12.005.

IdeaWorks, 2018. 2018 Airline Ancillary Revenue Rankings.
Islam, T., Louviere, J.J., Burke, P.F., 2007. Modeling the effects of including/excluding attributes in choice experiments on systematic and random components. Int. J. Res. Mark. 24 (4), 289–300. https://doi.org/10.1016/j.ijresmar.2007.04.002.
Jaeger, S.R., Hedderley, D., MacFie, H.J.H., 2001. Methodological issues in conjoint analysis: a case study. Eur. J. Mark. 35 (11/12), 1217–1239. https://doi.org/10.1108/EUM0000000006474.
Jarach, D., Zerbini, F., Miniero, G., 2009. When legacy carriers converge with low-cost carriers: exploring the fusion of European airline business models through a case-based analysis. J. Air Transport Manage. 15 (6), 287–293. https://doi.org/10.1016/j.jairtraman.2009.01.003.
Jones, P., 2012. Flight Catering. Routledge.
Kessels, R., Goos, P., Vandebroek, M., 2006. A comparison of criteria to design efficient choice experiments. J. Mark. Res. 43 (3), 409–419. https://doi.org/10.1509/jmkr.43.3.409.
Lee, J., Cho, Y., Lee, J.-D., Lee, C.-Y., 2006. Forecasting future demand for large-screen television sets using conjoint analysis with diffusion model. Technol. Forecast. Soc. Chang. 73 (4), 362–376. https://doi.org/10.1016/j.techfore.2004.12.002.
Leon, S., Uddin, N., 2017. Airline ancillary services: an investigation into passenger purchase behavior. J. Transp. Res. Forum 56 (1). https://doi.org/10.5399/osu/jtrf.56.1.4411. Article 1.
Louviere, J.J., Hensher, D., Swait, J., 2000. Stated Choice Methods: Analysis and Applications. Cambridge University Press.
Lyu, S.O., 2017. Which accessible travel products are people with disabilities willing to pay more? A choice experiment. Tour. Manage. 59, 404–412. https://doi.org/10.1016/j.tourman.2016.09.002.
Martín, J.C., Román, C., Espino, R., 2011. Evaluating frequent flyer programs from the air passengers' perspective. J. Air Transport Manage. 17 (6), 364–368. https://doi.org/10.1016/j.jairtraman.2011.02.008.
McCullough, D., 2002. A user's guide to conjoint analysis. Market. Res. 14 (2), 18–23.
Miller, K.M., Hofstetter, R., Krohmer, H., Zhang, Z.J., 2011. How should consumers' willingness to pay be measured? An empirical comparison of state-of-the-art approaches. J. Mark. Res. 48 (1), 172–184. https://doi.org/10.1509/jmkr.48.1.172.
Molin, E.J.E., Timmermans, H.J.P., 2006. Traveler expectations and willingness-to-pay for Web-enabled public transport information services. Transp. Res. Part C: Emerg. Technol. 14 (2), 57–67. https://doi.org/10.1016/j.trc.2006.05.003.
Monchambert, G., 2020. Why do (or don't) people carpool for long distance trips? A discrete choice experiment in France. Transp. Res. Part A: Policy Pract. 132, 911–931. https://doi.org/10.1016/j.tra.2019.12.033.
More, D., Sharma, R., 2014. The turnaround time of an aircraft: a competitive weapon for an airline company. Decision 41 (4), 489–497. https://doi.org/10.1007/s40622-014-0062-0.
Moreira, M., O'Connell, J.F., Williams, G., 2011. The viability of long-haul, low cost business models. J. Air Transport Stud. 2 (1), 69–91.
Nicolae, M.L., Ferguson, M.E., Garrow, L.A., 2016. Measuring the benefit of offering auxiliary services: do bag-checkers differ in their sensitivities to airline itinerary attributes? Prod. Oper. Manage. 25 (10), 1689–1708. https://doi.org/10.1111/poms.12569.
Nicolae, M., Arıkan, M., Deshpande, V., Ferguson, M., 2017. Do bags fly free? An empirical analysis of the operational implications of airline baggage fees. Manage. Sci. 63 (10), 3187–3206. https://doi.org/10.1287/mnsc.2016.2500.
O'Connell, J.F., Warnock-Smith, D., 2013. An investigation into traveler preferences and acceptance levels of airline ancillary revenues. J. Air Transport Manage. 33, 12–21. https://doi.org/10.1016/j.jairtraman.2013.06.006.
Ødegaard, F., Wilson, J.G., 2016. Dynamic pricing of primary products and ancillary services. Eur. J. Oper. Res. 251 (2), 586–599. https://doi.org/10.1016/j.ejor.2015.11.026.
Orme, B., 2010. Getting Started with Conjoint Analysis: Strategies for Product Designing and Pricing Research. Research Pusblisher LLC.
Pearson, J., O'Connell, J.F., Pitfield, D., Ryley, T., 2015. The strategic capability of Asian network airlines to compete with low-cost carriers. J. Air Transport Manage. 47, 1–10. https://doi.org/10.1016/j.jairtraman.2015.03.006.
Pullman, M.E., Moore, W.L., Wardell, D.G., 2002. A comparison of quality function deployment and conjoint analysis in new product design. J. Prod. Innov. Manage 19 (5), 354–364. https://doi.org/10.1111/1540-5885.1950354.
Rao, V.R., 2008. Developments in conjoint analysis. In: Wierenga, B. (Ed.), Handbook of Marketing Decision Models. Springer, US, pp. 23–53. https://doi.org/10.1007/978-0-387-78213-3_2.
Rodríguez, A.M., O'Connell, J.F., 2018. Can low-cost long-haul carriers replace Charter airlines in the long-haul market? A European perspective. Tour. Econ. 24 (1), 64–78. https://doi.org/10.1177/1354816617724017.
Rouncivell, A., Timmis, A.J., Ison, S.G., 2018. Willingness to pay for preferred seat selection on UK domestic flights. J. Air Transport Manage. 70, 57–61. https://doi.org/10.1016/j.jairtraman.2018.04.018.
Scotti, D., Dresner, M., 2015. The impact of baggage fees on passenger demand on US air routes. Transp. Policy 43, 4–10. https://doi.org/10.1016/j.tranpol.2015.05.017.
Scotti, D., Dresner, M., Martini, G., 2016. Baggage fees, operational performance and customer satisfaction in the US air transport industry. J. Air Transport Manage. 55, 139–146. https://doi.org/10.1016/j.jairtraman.2016.05.006.
Shen, Y (Sandy)., Choi, H.C., Joppe, M., Yi, S., 2020. What motivates visitors to participate in a gamified trip? A player typology using Q methodology. Tour. Manage. 78, 104074 https://doi.org/10.1016/j.tourman.2019.104074.
Shin, H.-S., Callow, M., Dadvar, S., Lee, Y.-J., Farkas, Z.A., 2015. User acceptance and willingness to pay for connected vehicle technologies: adaptive choice-based conjoint analysis. Transp. Res. Rec.: J. Transp. Res. Board 2531 (1), 54–62.
So, K.K.F., Oh, H., Min, S., 2018. Motivations and constraints of Airbnb consumers: findings from a mixed-methods approach. Tour. Manage. 67, 224–236. https://doi.org/10.1016/j.tourman.2018.01.009.
Soyk, C., Ringbeck, J., Spinler, S., 2017. Long-haul low cost airlines: characteristics of the business model and sustainability of its cost advantages. Transp. Res. Part A: Policy Pract. 106, 215–234. https://doi.org/10.1016/j.tra.2017.09.023.
Soyk, C., Ringbeck, J., Spinler, S., 2018. Revenue characteristics of long-haul low cost carriers (LCCs) and differences to full-service network carriers (FSNCs). Transp. Res. Part E: Logist. Transp. Rev. 112, 47–65. https://doi.org/10.1016/j.tre.2018.02.002.
Suh, Y.K., McAvoy, L., 2005. Preferences and trip expenditures—a conjoint analysis of visitors to Seoul, Korea. Tour. Manage. 26 (3), 325–333. https://doi.org/10.1016/j.tourman.2003.11.015.
Sun, Y.-Y., Lin, P.-C., 2019. How far will we travel? A global distance pattern of international travel from both demand and supply perspectives. Tour. Econ. 25 (8), 1200–1223. https://doi.org/10.1177/1354816618825216.
Tanaka, M., Ida, T., Murakami, K., Friedman, L., 2014. Consumers' willingness to pay for alternative fuel vehicles: a comparative discrete choice analysis between the US and Japan. Transp. Res. Part A: Policy Pract. 70, 194–209. https://doi.org/10.1016/j.tra.2014.10.019.
Terblanche, N.S., 2015. Customers' perceived benefits of a frequent-flyer program. J. Travel Tour. Market. 32 (3), 199–210. https://doi.org/10.1080/10548408.2014.895694.
Tuzovic, S., Simpson, M.C., Kuppelwieser, V.G., Finsterwalder, J., 2014. From 'free' to fee: Acceptability of airline ancillary fees and the effects on customer behavior. J. Retail. Consum. Serv. 21 (2), 98–107. https://doi.org/10.1016/j.jretconser.2013.09.007.
Vasigh, B., Fleming, K., Tacker, T., 2013. Introduction to Air Transport Economics: From Theory to Applications. Ashgate.
Veiga, C., Santos, M.C., Águas, P., Santos, J.A.C., 2017. Are millennials transforming global tourism? Challenges for destinations and companies. Worldwide Hospital. Tour. Themes 9 (6), 603–616. https://doi.org/10.1108/WHATT-09-2017-0047.
Vermeulen, B., Goos, P., Vandebroek, M., 2008. Models and optimal designs for conjoint choice experiments including a no-choice option. Int. J. Res. Mark. 25 (2), 94–103. https://doi.org/10.1016/j.ijresmar.2007.12.004.
Vinod, B., Moore, K., 2009. Promoting branded fare families and ancillary services: merchandising and its impacts on the travel value chain. J. Revenue Pricing Manage. 8 (2–3), 174–186. https://doi.org/10.1057/rpm.2008.63.

Warnock-Smith, D., O'Connell, J.F., Maleki, M., 2017. An analysis of ongoing trends in airline ancillary revenues. J. Air Transport Manage. 64, 42–54. https://doi.org/10.1016/j.jairtraman.2017.06.023.

Wensveen, J.G., Leick, R., 2009. The long-haul low-cost carrier: a unique business model. J. Air Transport Manage. 15 (3), 127–133. https://doi.org/10.1016/j.jairtraman.2008.11.012.

Windle, R., Dresner, M., 1999. Competitive responses to low cost carrier entry. Transp. Res. Part E: Logist. Transp. Rev. 35 (1), 59–75. https://doi.org/10.1016/S1366-5545(98)00025-8.

Wittmer, A., Rowley, E., 2014. Customer value of purchasable supplementary services: the case of a European full network carrier's economy class. J. Air Transport Manage. 34, 17–23. https://doi.org/10.1016/j.jairtraman.2013.07.002.

Wong, W.H., Zhang, A., Van Hui, Y., Leung, L.C., 2009. Optimal baggage-limit policy: airline passenger and cargo allocation. Transportation Science 43 (3), 355–369. https://doi.org/10.1287/trsc.1090.0266.

Yazdi, A.A., Dutta, P., Steven, A.B., 2017. Airline baggage fees and flight delays: a floor wax and dessert topping? Transp. Res. Part E: Logist. Transp. Rev. 104, 83–96. https://doi.org/10.1016/j.tre.2017.06.002.