AIRLINE ITINERARY CHOICE IN A DYNAMIC SUPPLY ENVIRONMENT: RESULTS FROM A STATED PREFERENCE SURVEY

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ABSTRACT

This paper investigates the choice of airline itineraries in dynamic settings using a tailored stated preference survey. The paper hypothesizes that airline itinerary choice is not a one-time event, but a continuous process during a certain time frame. Consumers can choose either to purchase an itinerary, deferring choice up to the end of the sales period, or completely declining the purchase. Understanding such consumers' behavior is specifically relevant to the tourism industry, where firms are extensively utilizing internet websites to offer their products (e.g., airline tickets, hotel rooms) to consumers.

The paper describes the stated preference survey with real itineraries of various airlines on medium and long-haul routes. Choice sets are composed with dynamic and static variables and socio-economic variables. Questionnaires were distributed electronically among various groups of respondents, yielding a sample of 914 persons.

Results show that (i) itinerary choice deferring takes place, with differences between tourists and business-travelers, (ii) the decision whether to defer choice is affected by dynamically changing variables and by the length of each respondent's allocated choice period, and (iii) the proposed methodology is adequate for investigating choice in dynamic settings and thus indicating its potential for further research in transportation planning and in tourism.

Keywords: Air Transportation, Discrete Choice Modeling, Dynamic Choice, Travelers Behavior.

JEL Classification: B49, C33, C35, L93

1. INTRODUCTION

The choice of products and services in many industries and economic sectors is performed in an increasingly dynamic environment, compared to the situation a few years ago. Traditionally, the marketing of products and services, as well as choice behavior, were conducted in a relatively static environment. Consumers relied on suppliers to provide them with pricing and availability quotes during working hours, needing to choose the product in a specific place and in person, which led to consumers enjoying less flexibility and conveniences.

The advent of the internet as a marketing channel created a new environment, which diversified the way in which manufacturers and suppliers market their products and services. This is also true in the air transportation industry, where airlines, travel agents and tour operators are proposing their products to their customers. In addition, this new medium enabled suppliers to diversify the information sources and selling channels for the consumers.

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Up until the establishment of the first web-based online travel agencies (e.g., Travelocity.com by SABRE in 1996) and airline websites (e.g. Alaska Airlines in 1995, quoted in Reed, 2005), consumers could obtain itinerary offers by either traditional offline travel agents or airline tickets sales offices. However, over the years, the implied benefits to both consumers and suppliers positioned this marketing channel as an increasingly important and popular one (Harteveldt, 2012). As a result of the wide usage of this marketing channel, it is now being utilized by last-minute travel agents and content suppliers, and/or data search engines such as Google.

On the supply side, marketing of airline itineraries (similar to many other products and services) is performed dynamically as part of yield management practices (Talluri & van Ryzin, 2004). Such practices are needed given the nature of the itinerary product (i.e., flight and fare details) (Carrier, 2008) and its selling limitations. Itineraries are allowed to be sold during a sales period which ends at a fixed departure date, resulting in the inability of airlines to store their unsold capacity for future sale, leading to a potential loss of revenues. For example, a Monday morning flight which leaves the gate with 20 unsold seats, each priced at 600 US Dollars (USD), will result in a 12,000 USD of loss revenues because the airline will not be able to sell this capacity after the flight's departure. However, these seats are available again for sale for the following flight.

It is important to put into context such ability of airlines to utilize yield management practices, and communicate its outcomes to the consumers using the internet. These practices originate from the de-regulating of air transportation markets policy in key countries, and the success of these policies. The first and well known attempt in the field of air transportation is the Airline Deregulation Act of 1978 (i.e., ADA) in the United States (Talluri & van Ryzin, 2004). This new law reduced the US Government's intervention in the air transportation industry and allowed airlines to conduct, among others, competitive pricing and capacity management. The success of this policy change in the USA led other nations such as the Netherlands and the European Union to act similarly (Doganis, 2002) with other countries following in the years afterwards.

The combination of change in regulatory regime, which enables airlines to change fares and capacity freely and the ability to present these changes to consumers online and to make their choice through this channel, raises the question whether these dynamic changes and ability to monitor them online affect the consumers' choice behavior. This paper investigates the choice behavior during a sales period, in which alternatives might change partially or completely. The dynamic behavior of the supply side, represented by the product price and unsold capacity (in addition to other non-static itinerary characteristics), may change. We assume here that such changes occur because certain number of consumers are trying to find a desired itinerary and at least some of them are choosing an itinerary, which results in airlines and online travel agencies (OTAs) reacting with changes to capacity and fares.

In addition to this introduction, this paper provides in chapter 2 a literature review on consumers' choice behavior of airline itinerary products. In this chapter it is shown that almost all research efforts in this field treated the itinerary choice problem as a static event, and not as a dynamic one. Chapter 3 describes in detail the methodology employed for this paper, and the formulation of a web-based stated preference (SP) questionnaire which was used to gather airline itinerary product choice information. In chapter 4 we provide selected results from analyzing the SP questionnaire, and in chapter 5 we provide summary and conclusions from this study.

2. LITERATURE REVIEW

Airline itinerary choice was studied using various methodologies, with the first studies being available as early as 1970. Issues such as aircraft choice (Gronau, 1970), flight fare(s) effect on individual's choice of airline tickets on long-haul flights (Kanafani & Sadoulet, 1977; Nason, 1980), service levels and price (Ghobrial & Soliman, 1992), and the effect of frequent flyer program (FFP) membership on business persons' airline choices (Nako, 1992). Since these studies were mostly conducted prior to the first initiatives of online itineraries offerings and choice environment, choice deferring was not included in choice experiments, although it was possible through mediators (i.e., via travel agent). The advent of the internet during the second half of the 1990's, provided the consumers with the ability to eliminate mediators and search for utility maximizing itineraries by themselves. However, this development was not replicated into scientific methodologies in the field of airline itinerary choice.

One of the most frequent topics studied is the general choice of airlines on domestic and/or international services. The factors leading to airline choice in the US domestic air transportation system was investigated by Proussaloglou and Koppelman (1995) and Coldren *et al.* (2003). In addition, itinerary choice was investigated also in other countries, such as Israel and South Korea. Bekhor and Freund-Feinstein (2006) investigated passengers' preferences in the Israeli domestic air transportation system as quality of service indicators. Yoo and Ashford (1996) investigated choice behavior regarding international airlines, with application to South Korea.

In addition to the issue of general airline choice, several studies were conducted on specific issues affecting the choice of airline itineraries. The topic of airline(s) choice affected by FFP membership was again investigated by Chin (2002). Carlsson (1999) investigated the willingness of business and private travelers to pay for various enhancements of service and environmental attributes. Data was collected by a return-by-mail SP questionnaire which was distributed in domestic airlines and rail services in Sweden. The issue of willingness to pay for upgraded quality of service was studied again in 2012 by Zhang in the Chinese market. In this study three logit models were employed to estimate the influence of price and three quality variables on tourists and business-persons' choice of local Chinese airlines. In addition, WTP (willingness to pay) was calculated as well. Not similar to the methodology by Carlson (1999), Zhang used SP survey which was distributed in Shanghai Hongqqiao Airport.

Araghi *et al.* (2016) studied the heterogeneity in air travelers' response to various passenger-oriented environmental policies, such as carbon offsetting fees, luggage allowance and ecoefficiency labeling of an airline. In this study the authors used SP surveys distributed among Dutch passengers flying transatlantic and used latent class modeling framework. Adler, Falzarano and Spitz (2005) investigated the tradeoff conducted by consumers when choosing a flight product in the US domestic air transportation system.

Passengers' choice was modeled on the topic of market shares due to its relevance to airlines' revenue management practices and strategies. Coldren and Koppelman (2005) used choice behavior data of passengers without indication to their trip purpose using RP (i.e., revealed preferences) questionnaires. Algers and Beser (2001) studied the effect of passengers' choice on yield management in domestic and international flights using data from a 1994 SAS airlines research. The topic of choice behavior regarding different airline types, service characteristics, willingness to pay for low-cost airlines flights and passenger types was studied by Chang and Sun (2012). In this study the authors used SP questionnaires with different choice scenarios which was distributed in Taipei Airport, and analyzed using multinomial logit model (MNL).

Theis *et al*. (2006) investigated the effect of minimizing total trip duration on an airline market share with emphasis on minimizing connection time at the hub. The research methodology included an extended time-table survey, SP rating experiment, and a collection of socioeconomic data. Warburg, Bhat and Adler (2006) estimated business passengers' choices with data gathered from SP questionnaires. Research findings show that gender and income levels have the most influence on service attribute sensitivity, while frequent flier program (FFP membership), employment status, and travel frequency are also important determinants.

The possible influence of psychological characteristics on air transportation itineraries choice was researched as well. Fleischer, Tchetchik and Toledo (2012) investigated the effect of fear of flight on itineraries choice. As noted by the authors, such psychological phenomena might affect the consumer's decision making by giving emphasis on characteristics that implies better safety.

Although most studies were treating choice modeling as a static event, several newer studies started to look into dynamic aspects of itinerary choice. However, in these studies the methodological framework is still static in its nature. Among these, Collins, Rose and Hess (2012) investigated online choice of airline itineraries using various web search tools to narrow results according to the consumer's criteria. In order to conduct such investigation, an online SP questionnaire resembling an airline/OTA website was formulated and included searching tools similar to those found in airlines' and OTAs' websites. Although this study looked on an online itinerary search which in reality is being updated continuously, the experiment itself was kept static without changes to the choice sets.

Lin and Sibdari (2009) investigated choice behavior in relation to dynamic pricing. The authors tried to investigate dynamic pricing competition between firms offering similar products. They formulated a game-theoretic model which looks at the supply side, while using discrete-time model in order to emulate the demand side. Drabas and Wu (2013) examined the effect of departure date proximity to the purchase date at discrete levels (i.e., 90, 30 and 5 days prior to departure). Carrier (2008) researched the choice of an airline itinerary and a fare product. In this study, passenger choices data, as reflected by booking data (i.e., RP data) on European short-haul flights was provided for this study by Amadeus' OTA.

Wen and Chen (2017) have studied the booking timing of low-cost carriers' passengers in Taiwan. The authors collected data for 69 days of low-cost carriers only on a single route using fares published only at three airlines' websites serving the Taiwan-Singapore route. The modeling framework included an SP survey and choice data was modeled using continuous logit model. This study is quite different from our study on terms of modeling framework, data ranges, airline types and route types, and therefore compliments this study and provide a different viewpoint.

3. METHODOLOGY

Our methodology was designed to include several elements. First we formulate a theoretical model which includes both the demand (i.e., consumer's decision making) and the supply sides. Following the model section we detail the survey preparation and questionnaires distribution.

3.1 Supply, demand and choice behavior model

On our model we first formulate the demand side and the consumer's decision making process (see Figure 1). Consumers interested in purchasing an airline ticket have the ability

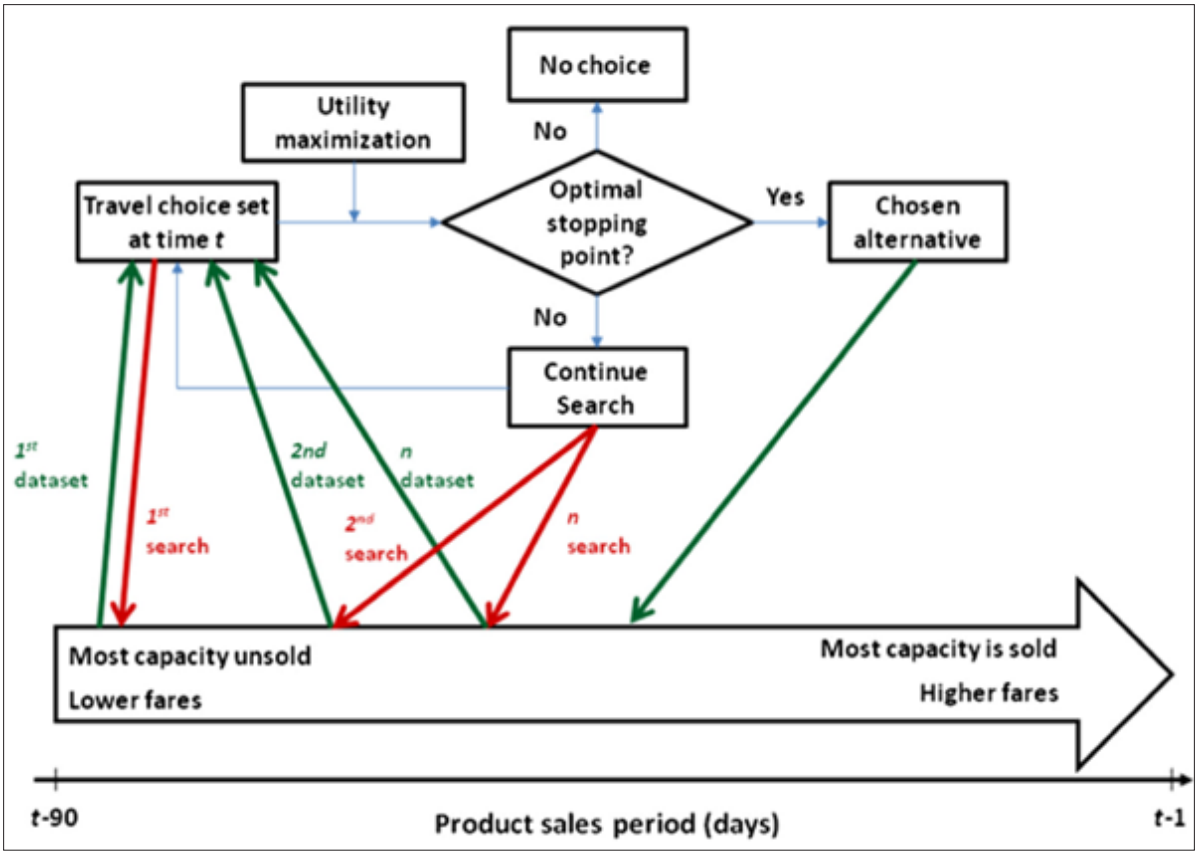
to access the offerings of air transportation firms using their websites or through a mediator's website (i.e., OTA). These online websites allow searching for itinerary products from the beginning of the sales period, till the designated departure date. In this paper we consider a sales period of 90 days. These websites offer consumers with the ability to monitor characteristics changes of these products during the itineraries sales period. These include fares, available capacity levels, and other details (e.g., punctuality and equipment types allocated to each flight). These monitored changes reflect, among others, the suppliers' yield management behavior, and other consumers' choice behavior. The ability to monitor these changes provides valuable inputs to airlines' consumers, who use it for utility evaluation. Consumers will tend to make efforts to maximize it, and choose the itinerary which fits best to their needs and wants. Based on this theory of utility maximization we formulate three possibilities open to the consumer. First possibility is to decide not to choose at all after receiving the initial search results. If consumers decide that the initial offering is not acceptable according to their requirement and/or desires (i.e., reaching optimal stopping point) but still wants to find a better offering, they can continue their search until they find an itinerary which provides them a desired utility maximization, or until the end of the sales period is reached or capacity is completely sold.

On the supply side, depicted on the lower part of Figure 1, airlines offer initial fares, classes and capacity at the beginning of the sales period. As time progress and consumers are starting to choose their itineraries, capacity decreases and fares are starting to rise. The latter is a result of each airline's yield management practices, as described by Talluri and van Ryzin (2004), and is affected also by the degree of competition on each O-D pairs and actions carried out by other airlines' yield management personnel. This might lead to change in fares, unsold capacity and equipment type utilized for each flight.

As can be understood from this model, the choice behavior of consumers and airlines decisions what to offer and when, affect each other. Consumers choices are argued to be affected by the airlines offerings and point in time when their search has begun (i.e., long/short before the end of sales date) which implies a risk of not being able to find a suitable itinerary or any itinerary at all). Airlines are argued to make their decisions based on forecasting and previous knowledge of demand patterns, but also based on how consumers behave during each sales period and how other airlines behave during the same period. Based on such influences, and the abovementioned ability to monitor offerings changes, we can hypothesize that consumer decides when and if to make a choice which maximize their utility which results in being able to purchase an itinerary.

From the research perspective, investigation of choice behavior when product attributes are being changed could be regarded as choice in dynamic settings. Although choice behavior was researched extensively in general and in the air transportation context as well, the majority of these studies dealt with choice in a static environment. Therefore the novelty of this paper is the incorporation of dynamic changing product characteristics to be treated as dynamic and not as static ones. In such scenario, the product/service is not being available all the time and at least some of its attributes do change to a certain degree during itinerary sales period.

Figure 1. Airline Itinerary Model Framework



Sources: Own Elaboration

3.2 Survey preparation

There are different methods to collect data about consumers' preferences. The first method is using real passengers' choices in the form of revealed preferences (RP) data, similar to the work by Carrier (2008). The second method is obtaining hypothetical choice data in the form of SP using real or hypothetical alternatives' attributes. The third method is the combined use of SP and RP methods. The benefits and disadvantages of each methodology are well documented in the literature (Freund-Feinstein & Bekhor, 2017).

In our specific study, a full RP survey requires the permission and cooperation of airlines and airports to collect data about passengers' choice and itineraries, and also to allow researchers to approach passengers for interviews inside airports. However, we could not obtain such permission to conduct a comprehensive RP study. Therefore, we opted to conduct a combined RP/SP survey, in which the revealed characteristics of the individual last flight formed the basis for the SP experiment, described in the following sections.

Given the purposes of this study, a complex questionnaire was designed in order to cover variety of choice scenarios with option to differ choice. Itineraries were formulated to include various types of routes, airline operations, service amenities and other characteristics of airline service and operations in order to genuinely represent real itineraries. Both tourists and business-travelers were included in the choice scenarios, as these passengers comprise the main users of air transportation.

In order to achieve these requirements it was needed to find several suitable medium-haul and long-haul routes for this study. In order to do so, all medium-haul and long-haul

flights originating from Tel Aviv Ben Gurion International Airport in Israel were analyzed, according to the following requirements:[3]

1. Airline mix. Markets which are served by a variety of airline types (i.e., full-service carriers {FSCs} and low-cost carriers {LCCs}); local airlines (both Israeli and foreign airlines from the destination countries); and, airlines which are members of a global alliance as well as airlines that are not affiliated with any alliance.
2. Multi-airport markets. Markets which are served by at least two airports.
3. Passenger mix. Both tourists and business-travelers for each destination.
4. Passenger volumes: Markets which attract a high number of passengers, reflecting a market's popularity and economic significance.

When we completed our analysis, four routes were chosen for itineraries data collection, as shown in Table 1. These included two medium-haul European routes and two long-haul North American routes.

Table 1. Medium and long-haul routes characteristics

Destination	Airline operations (passenger/flights)[1]	Airline[3]	Frequency weekly[2]	Airport[3]	Route	Model	Alliance
Berlin	257,000 (2.1%) / 1,815 (2.3%)	LY	13	SXF	Nonstop	FSC	None
		AB	16	TXL	1-stop	Hybrid	Oneworld
		AF	21	TXL	1-stop	FSC	SkyTeam
		BA	27	TXL	1-stop	FSC	Oneworld
		4U	7	SXF	1-stop	LCC	None
		LH	147	TXL	1-stop	FSC	Star Alliance
London	772,000 (6.2%) / 3,698 (1.9%)	LY	26	LHR	Nonstop	FSC	None
		BA	14	LHR	Nonstop	LCC	Oneworld
		U2	7	LTN	Nonstop	FSC	None
		AF	39	LHR	1-stop	FSC	SkyTeam
		LH	140	LHR	1-stop	FSC	Star Alliance
New York	1,194,000 (9.6%) / 4,019 (2.0%)	LY	29	EWR and JFK	Nonstop	FSC	None
		DL	7	JFK	Nonstop	FSC	SkyTeam
		UA	28	EWR	Nonstop	FSC	Star Alliance
		AC	21	EWR	1-stop	FSC	Star Alliance
		AF	42	JFK	1-stop	FSC	SkyTeam
		BA	112	EWR and JFK	1-stop	FSC	Oneworld
		LH	28	EWR and JFK	1-stop	FSC	Star Alliance
Toronto	139,000 (1.1%) / 784 (2.1%)	LY	4	YYZ	Nonstop	FSC	None
		AC	14	YYZ	Nonstop	FSC	Star Alliance
		AF	NA	YYZ	1-stop	FSC	SkyTeam
		BA	26	YYZ	1-stop	FSC	Oneworld
		LH	28	YYZ	1-stop	FSC	Star Alliance
		UA	55	YYZ	1-stop	FSC	Star Alliance

1 Nonstop flights only / 2 Combined number of nonstop and single stopover flights / 3 See Appendix A for list of airline and airport codes[4]

Sources: Airlines websites (2012); Civil Aviation Authority Israel (2013)

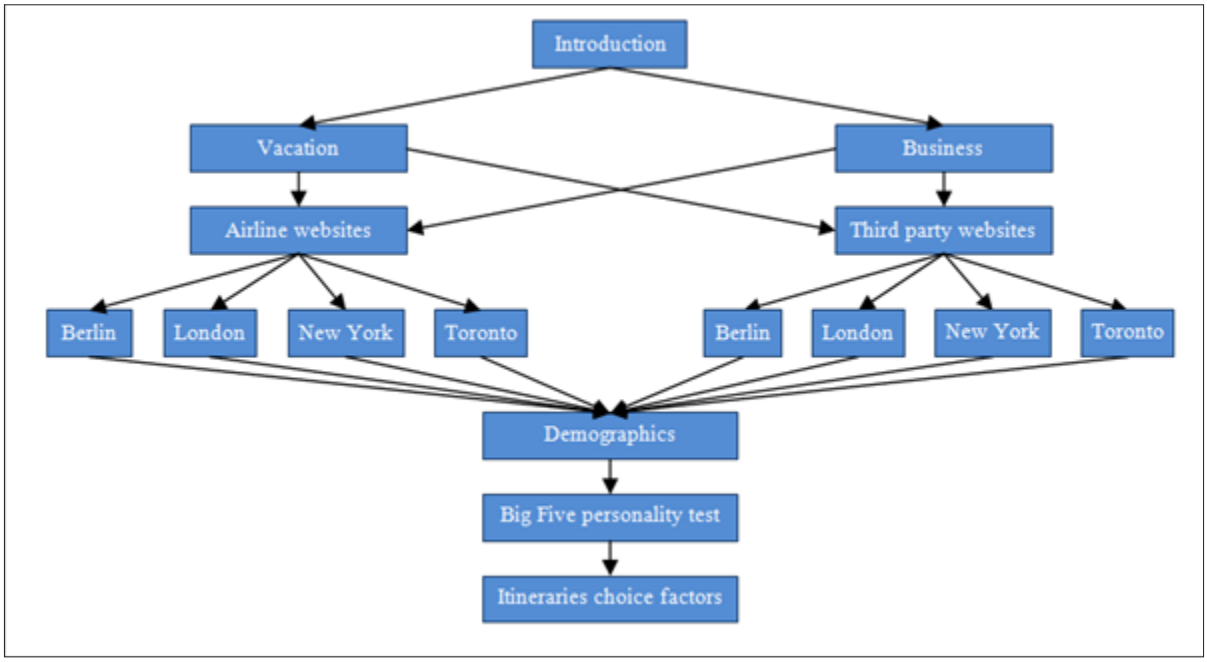
The questionnaire was designed and formulated using the Qualtrics web platform. This platform supplier was chosen based on its availability, this study's technical requirements and the platform's promised performance. Among this study's requirements it is worth mentioning the ease of questionnaires distribution (e.g., link by email, use of mailing lists, etc.), minimal need of local IT infrastructure, ease of questionnaires design and implementation

[3] Medium-haul and long-haul flights are the most common types, offerings originating from Tel Aviv Ben Gurion International Airport (i.e., the airport used in the empirical application in this study). Short-haul routes, with flight time of up to three hours, were not included in this study because it was found that there are not many variations between alternatives, the small number of such routes originating from Tel Aviv Airport, and since these routes are mostly serving vacation destinations which are not used by many business-travelers.

[4] This compilation is based on 2012 airlines' timetables and passenger numbers originating from Tel Aviv Ben-Gurion International Airport. Data was gathered from each airline's website and from the Civil Aviation Administration Israel website. For list of airlines data sources, see in the references section.

and technical assistance provided by the Qualtrics personnel. The questionnaire consisted of three parts, as depicted below in Figure 2.

Figure 2. Questionnaire Structure



Source: Own elaboration, based on Freund-Feinstein (2015)

3.2.1 Part one: introductory information

The first part of the questionnaire included introductory information, filling-in instructions and a link to an ethics declaration which was composed for this questionnaire. Following this introductory section, and prior to continuing to the second part of the questionnaire, several questions were formulated. First, a filtering question was included in order to allow participation to persons which has minimal experience with using international air travel (i.e., flew at least once during the past three years) and/or experience with choosing itineraries online.

Second, in order to match respondents to the questionnaire type appropriate for them, they were asked to state what was the purpose of their last trip (i.e., vacation or business-trip). The last question in this section was the type of travel expense provider (i.e., the respondent himself or the respondents' employer).

3.2.2 Part two: SP experiments

The second part of the questionnaire included SP experiments with choice sets formulated with real airlines itineraries. Since this questionnaire was designed for two types of passengers, four destinations and itinerary details available in two types of distribution channels, a total of 16 versions were needed (see Table 2). Each version consisted of 29 choice sets, representing the available itineraries for each day in a single hypothetical month, which reflected the final stage of the itineraries sales period[5]. Although a large number of itineraries were included in each SP version, not all of them were made available for each respondent. In order to get variations of choice periods and flight destinations offered to the respondents, a random numbers engine was embedded in each questionnaire which gave a different flight destinations and length of choice periods to each respondent. For example, one respondent

[5] Although regarded as a hypothetical month, the itineraries data was taken from airlines websites and from an OTA's website.

could get a choice set of itineraries to New York with an assigned choice period of 15 days (i.e., choice starts 15 days before departure date), while the next respondent might receive a set representing the itineraries available to Berlin with an assigned choice period of four days, and so on. This variability provides the ability to conduct choice estimation with the effect of variable starting dates compared to a fixed date of departure, and enables the analysis of the effect of short vs. long choice period on choice behavior.

Formulation of itineraries' choice sets required itinerary data from airlines' and OTA's websites. Therefore, requests for providing itinerary products data were sent to various airlines, OTAs and GDS'a (i.e., global distribution systems) providers but these were turned down, in many cases on grounds of commercial secrecy. As a solution to lack of cooperation from the above mentioned entities, itineraries data were gathered manually during April and May of 2012 from ten airline websites (Air Berlin, Air Canada, Air France, British Airways, Delta Air Lines, easyJet, El Al, Germanwings, Lufthansa, United) and from one OTA website (Travelocity.com). Itinerary data gathering for choice sets formulation was conducted in a similar way to the method suggested by Pope *et al*. (2009). Under this methodology simultaneous requests for itinerary quotes were placed at the airlines' and the OTA's websites. This data retrieval was carried out by accessing these websites simultaneously on a daily basis at the same time during the data gathering period. These search results were saved as screen shots in a PDF file format, and were converted into an Excel file which contained all itineraries' data. This file, in turn, was used as the basis for compiling the choice sets when formulating the SP questionnaire.

Although airlines and OTA websites provided almost all the needed data, it lacked punctuality information. As a solution, this technical data was gathered from flightstats.com website (Flightstats, 2012). This data provider is a specialized website dedicated for collecting and providing airlines operational indicators.

Table 2. Questionnaire Composition

	Passenger type	Distribution channel	Destinations
1-4	Tourists	Airlines websites (AWS)	Berlin (SXF, TXL), London (LHR, LTN), New-York (EWR, JFK), Toronto (YYZ)
5-8	Tourists	Online travel agencies (OTA)	Berlin (SXF, TXL), London (LHR), New-York (EWR, JFK), Toronto (YYZ)
9-12	Business	Airlines websites (AWS)	Berlin (SXF, TXL), London (LHR, LTN), New-York (EWR, JFK), Toronto (YYZ)
13-16	Business	Online travel agencies (OTA)	Berlin (SXF, TXL), London (LHR), New-York (EWR, JFK), Toronto (YYZ)

Source: Own elaboration, based on Freund-Feinstein (2015)

In order to create itineraries for the questionnaire it was needed to decide which variables would be included. First, a list of variables from past choice studies was formulated (See Appendix Two, in Freund-Feinstein, 2015). Based on this list, variables from the real itineraries that were gathered were chosen. The list included both dynamically changing variables and static itinerary variables, and levels for each variable was added from the before mentioned real itineraries. Table 3 provides the choice variables and their levels. It is important to note that unsold capacity in each day is not revealed to consumers until there are 10 seats or less available for sale. Therefore, we compiled a simple formula using the selling curve of FSC's and LCC's from Carrier (2008) and capacity in tourists class listed in seatguru.com (2012a, 2012b). Selected pictures of the itineraries choice sets are included in Figure 3.

Table 3. Itinerary Variables

Variable	Possible values	Airline websites (AWS)	Online travel agency (OTA)
Dynamic changing variables			
Fare (USD)			
Medium-haul	0-2,000	408.42-1,710.00	546.49-1,430.69
Long-haul	700-3,000	1,168.00-2,595.00	1,035.19-2,782.69
Cancellation fees (USD)			
Medium-haul	0-100% ticket fare	0-1,710.00	0-1,430.69
Long-haul	0-100% ticket fare	0-2,595.00	0-2,782.69
Seats left for sale per flight			
Medium-haul	0-9, ≥10	0-9, ≥ 10 ≤ 432	0-9, ≥ 10 ≤ 432
Long-haul	0-9, ≥10	0-9, ≥ 10 ≤ 432	0-9, ≥ 10 ≤ 432
On-time performance % (OTP)			
Medium-haul	0-100%	0-100%	0-100%
Long-haul	0-100%	0-100%	0-100%
Number of days till departure			
Medium-haul	2-30	2-30	2-30
Long-haul	2-30	2-30	2-30
static itinerary variables			
Airline names			
Medium-haul	AB, AF, BA, U2, LY, 4U, LH	AB, AF, BA, LY, LH, U2, 4U	AB, AF, BA, LY, LH
Long-haul	AC, AF, BA, DL, LY, LH, UA	AC, AF, BA, DL, LY, LH, UA	AC, AF, BA, DL, LY, LH, UA
Time of departure			
Medium-haul	Morning, Day hours, Noon, Afternoon, Evening, Night	Morning, Day hours, Noon, Afternoon, Evening, Night	Morning, Day hours, Noon, Afternoon, Evening, Night
Long-haul	Morning, Day hours, Noon, Afternoon, Evening, Night	Morning, Day hours, Noon, Afternoon, Evening, Night	Morning, Day hours, Noon, Afternoon, Evening, Night
Time of Arrival to final destination			
Medium-haul	Morning, Day hrs, Noon, Afternoon, Evening, Night, Next day arrival	Morning, Day hrs, Noon, Afternoon, Evening, Night, Next day arrival	Morning, Day hrs, Noon, Afternoon, Evening, Night, Next day arrival
Long-haul	Morning, Day hrs, Noon, Afternoon, Evening, Night, Next day arrival	Morning, Day hrs, Noon, Afternoon, Evening, Night, Next day arrival	Morning, Day hrs, Noon, Afternoon, Evening, Night, Next day arrival
Destination airport			
Medium-haul	TXL, SXF, LHR, LTN	TXL, SXF, LHR	TXL, SXF, LHR, LTN
Long-haul	EWR, JFK, YYZ	EWR, JFK, YYZ	EWR, JFK, YYZ
Layover times			
Medium-haul	Non-stop, <2 hrs, 2-5 hrs, >5 hrs	Non-stop, <2 hrs, 2-5 hrs, >5 hrs	Non-stop, <2 hrs, 2-5 hrs, >5 hrs
Long-haul	Non-stop, <2 hrs, 2-5 hrs, >5 hrs	Non-stop, <2 hrs, 2-5 hrs, >5 hrs	Non-stop, <2 hrs, 2-5 hrs, >5 hrs
Layover airport			
Medium-haul	Non-stop, CDG, CGN, LHR, MUC	Non-stop, CDG, CGN, LHR, MUC	Non-stop, CDG, CGN, LHR, MUC
Long-haul	Non-stop, CDG, EWR, FRA, LHR, YYZ	Non-stop, CDG, EWR, FRA, LHR, YYZ	Non-stop, CDG, EWR, FRA, LHR, YYZ
Total flight time			
Medium-haul	≤ 4.5 hrs, 4.5-5.5 hrs, >5.5 hrs	≤ 4.5 hrs, 4.5-5.5 hrs, >5.5 hrs	≤ 4.5 hrs, 4.5-5.5 hrs, >5.5 hrs
Long-haul	<12.5 hrs, 12.5-18 hrs, >18 hrs	<12.5 hrs, 12.5-18 hrs, >18 hrs	<12.5 hrs, 12.5-18 hrs, >18 hrs
Legroom (Pitch)			
Medium-haul	Small, Medium, Large	Small, Medium, Large	Small, Medium, Large
Long-haul	Small, Medium, Large	Small, Medium, Large	Small, Medium, Large
In-flight entertainment equipment (IFE)			
Medium-haul	No IFE, Common screen, Personal screen	No IFE, Common screen, Personal screen	No IFE, Common screen, Personal screen
Long-haul	No IFE, Common screen, Personal screen	No IFE, Common screen, Personal screen	No IFE, Common screen, Personal screen

Source: Own elaboration, based on Freund-Feinstein (2015)

Figure 3. SP Questionnaire Interface

Flights from NYC to Tel Aviv

The following are the flight itineraries available 3 days prior to the flight.

Please consider the flight options presented and decide the extent to which they meet the requirements.

If you choose to purchase one of the available options, rank your three preferred flight options in order of preference, where 1 = most preferred itinerary and 3 = least preferred itinerary.

You may choose to postpone your decision. To do this, click "yes" on the drop-down menu next to the option marked "I prefer to postpone my choice of an airline ticket to the next day".

	Flight Number	Departure Time	Arrival Time	Departure Airport	Layover	Total flight time	On-Time performance	Leg room	In-flight entertainment	Total price (USD)	Cancellation fee	Available seats	
DELTA	269	00:40	05:30	JFK	Direct flight	11:50	76%	L (32")	Shared TV	1,738.00	Non-refundable	4	v
EL AL	027	10:40	15:55	EWR	Direct flight	12:15	26%	L (32")	Personal TV	2,078.99	Free	2	v
EL AL	001	01:00	05:40	JFK	Direct flight	11:40	36%	L (32")	Personal TV	1,830.89	Free	10+	v
UNITED	085	11:25	16:35	EWR	Direct flight	12:20	68%	M (30")	Personal TV	1,378.99	Non-refundable	10+	v
AIR CANADA	085/762	13:10	07:58 (next day)	EWR	Toronto, 12:00	25:48	68%	L (32")	Shared TV	2,782.69	Free	10+	v
AIRFRANCE	222/006	08:10	16:10	JFK	Paris, 01:45	15:00	95%	L (32")	Personal TV	1,695.99	$200	10+	v
BRITISH AIRWAYS	162/189	08:05	18:55	EWR	London, 04:35	17:50	95%	M (30")	Personal TV	1,748.19	$100	1	v
Lufthansa	691/760	05:00	14:00	EWR	Frankfurt, 02:50	16:00	82%	M (30")	Personal TV	1,359.89	$240	10+	v
Lufthansa	691/400	05:00	12:50	JFK	Frankfurt, 01:50	14:50	77%	M (30")	Personal TV	1,189.19	$240	10+	v
I prefer to postpone my choice of an airline ticket to **the next day**													v

Source: Own elaboration, based on Freund-Feinstein (2015)

3.2.3 Part three: Personal data

The third part of the questionnaire consisted of three sections. The first section included socioeconomic questions which contained variables listed in Table 4. The second section is a shortened version of a standard personality questionnaire, Big-Five, which was formulated and tested by Gosling, Rentfrow, and Swann (2003). In general, the Big-Five personality questionnaire is frequently used in academia, is a well-established test of human personality in various scenarios, and thus suitable for this study, as shown by Costa, Terracciano and McCrea (2001); Lönnqvist, Verkasalo and Walkowitz (2011); Mehmetoglu (2012); Lehmann *et al*. (2013). The third section was designed to investigate the respondents' assigned level of importance to itineraries' service attributes, using a 5-point Likert type scale. It is important to note that only the first and second sections' answers were intended to be used in choice modeling, while the third part answers are used under the scope of this research for answers quality testing.

Table 4. Socioeconomic Variables

Variable	Levels
Gender	Male, Female
Age (groups)	Under 18 years old, 18-21, 22-25, 26-34, 35-44, 45-54, 55-67, 67+
Education	High school or less, Student, B.A./B.Sc., M.A./M.Sc./Ph.D
Household size (respondent included)	Single person, Two persons, Three persons, Four persons, Five persons, Six persons or more
Monthly income level	Above average, Slightly above average, Same as average, Slightly below average, Below average

Source: Own elaboration, based on Freund-Feinstein (2015)

3.3 Survey distribution

Following the completion of the questionnaire pretests, which led to a questionnaire improvements phase, a comprehensive distribution strategy was planned and executed, during the first quarter of 2014.[6] The objective of the questionnaire distribution was to reach a significant number of respondents of various types, which was assumed to result in obtaining a large number of completed questionnaires. Three distribution methods were chosen in order to achieve this objective. The first method was mass distribution of the questionnaire using electronic mailing lists. The second method was using two types of social media allows also the distribution of the questionnaire to a wide variety of potential respondents. Although the two methods seem to be similar, there are a few fundamental differences between them. These include the degree of homogeneity of the target audience, and the ability to create a snowball effect. The third distribution method was distribution of emails to friends and colleagues' and personal face-to-face requests from participants in social events, all of them was conducted by the authors of this study. In all three distribution methods, potential respondents received a participation request of a standardized format, which included a link for the questionnaires. The only difference between them was that on method one and two the participation request was sent directly, and on method three the potential respondents were first asked to provide their email address so they will receive the questionnaire link afterwards. Questionnaires distribution was planned to be carried out during a period of few months with repeated requests to those who didn't respond when first approached.

Distribution was estimated to reach at least 10,000 persons. The main distribution channel consisted of electronic mailing lists with 6,212 entries of employees in several Israeli business entities and public organizations as well as the local academic communities. The latter included students, faculty and staff from all seven Israeli universities. The second distribution channel consisted of social media websites. These included Facebook and six popular Israeli internet forums managed by Tapuz.com, which is a major Israeli internet content provider. The use of such internet activity centers is considered to be a cost effective way to mass distribute questionnaires, since they attract numerous persons to view and share content and thoughts, sometimes on a viral scope. It is important to note that the exact number of persons exposed to this questionnaire through the second distribution channel is not known due to the anonymity of most persons viewing posts. However, it is estimated that at least 2,000 persons were exposed to participation requests, which could be considered a conservative estimation.[7] The third distribution channel was regular email communications, used for distributing individual requests to persons outside the abovementioned mailing lists. The number of persons contacted through this channel is rather low, consisting of a total 317 persons. More than two-thirds (217) of these persons were mainly friends and relatives and former colleagues of this study's researchers. Although the usage of choice data obtained from such respondents (i.e., the third distribution channel) could be argued to be a source of potentially biased results, the small number of participants (compared to the total number of respondents) is assumed to significantly reduce the magnitude of such outcome in this study. A third of these persons were recruited using personal face-to-face requests to participate in this research. These requests were distributed during cultural activities of the Technion Alumni Organization (i.e., the authors' academic institute). The authors of this study was allowed in three occasions to position a promotional booth in the foyer of the Eretz Israel Museum conventions theater in Tel Aviv, where these activities took place, and

[6] There is a time gap between gathering of itinerary data, and when the questionnaires were distributed. Such gap is explained by several issues, such as technical difficulties with the questionnaires preparation, bureaucratic issues and gathering of respondents details for the electronic distribution list. However, such a gap is not a problem in terms of validity of results, because the itinerary data is used to for choice games which can be formulated with pure hypothetical data.

[7] Exposure estimation was based on the number of the participation's request posts views counters at each internet forum and on Facebook and from Qualtircs logs. This method does not include any exposure due to snowball effect which did materialize on a small scale.

approach the organization's members on their arrival. Every approached person was given a short oral description of the research and was asked to give his or her email address for a later delivery of further instructions, information and a link to the questionnaire itself. In addition, email addresses of Technion Alumni Organization members were obtained during these events without interaction with the author by self-filling forms left around the convention hall and collected later by the author. This interaction led to exposing around 100 persons to these participation requests. Finally, further distribution of the questionnaire link was achieved thanks to partial snowball effect. All persons receiving the request to participate in the research were asked also to forward the questionnaire link to whichever person(s) they know and feel comfortable to suggest participation. Although this request was included in all questionnaires distribution, it attracted a very limited response rate.

Based on the literature findings, and given the complexity of the questionnaire used in this research, an appropriate incentive scheme was needed. Such plan was intended to ensure high participation levels, especially of persons with high value of time (e.g., business-travelers, etc.) and increase retention levels which lead to completing the questionnaire, as well as increasing the accuracy of answers from all participants. The chosen incentive was five round-trip domestic airline tickets, which were to be raffled when the research is completed. Airline tickets might be labeled by respondents as a lucrative prize, and could help increasing participation rate and minimize the abovementioned methodological problems. However, valued at an average of 120 USD each, the actual cost of a domestic flight in Israel is relatively cheap due to increased competition with airlines selling tickets as low as 100 USD for round-trip flight. It is important to note that such value levels are relatively similar to other studies which offered attractive prizes in the range of 50-350 USD (Bosnjak & Tuten, 2003; Tuten, Galesic & Bosnjak, 2004; and Bowling *et al.*, 2006).

4. RESULTS

4.1 Response rates

Due to the questionnaire distribution method which, in the case of social media channels and snowball effect, does not communicate the request to participate to a fixed set of persons, it is not possible to estimate an accurate response rate. Although the main body of respondents reacted positively to the requests to participate which were sent using mailing lists, a major distribution source, as mentioned above, is social media sources (e.g., Facebook, etc.). In the case of these media sources, an open request to participate was posted allowing the respondents to forward the participation request to others, adding uncertainty of the total number of participants. As listed in Table 5, it is estimated that at least 10,000 persons were exposed to the participation request. This estimation is based on the actual numbers of persons that were contacted directly, the number of participation requests posts views indicated in the online forums, and the estimated number of persons that were contacted due to partial "snowball effect". Filling out of questionnaires was initiated by 2,236 respondents, which represents an estimated response rate of less than (or equal to) 22.4%.

In terms of valid questionnaires, only 914 questionnaires were found to be usable for data analysis and models calibration, which represents 58.4% out of completed questionnaires.

Table 5. Questionnaires distribution, filling-out numbers, response and response rate

Survey stage	Questionnaires	Response rate
Estimated distribution of questionnaires	>10,000	-
Total questionnaire initiated	2,236	≤22%
Questionnaires proceeded after filtering questions	2,172	≤21%
Completed questionnaires	1,564	≤15%
Valid questionnaires	914	≤9%

Source: Own elaboration, based on Freund-Feinstein (2015)

4.2 Descriptive statistics

The sample is composed of 57% males and 43% females. Most respondents are between 26-34 years old, followed by the 35-44 years old group (60.4% and 20.6%, respectively). Over 93% of the respondents in this study have at least a university degree. The distribution of all respondents' across various household sizes was found to be similar to that of the general population in Israel. Almost half of the respondents (45.8%) earn higher than average income.

Air travel serves, traditionally, two major trip purposes – business and leisure, which were both chosen for this study. Vacation was found to be the most prevailing trip purpose indicated in the questionnaire, accounting for 69% of the respondents. The rest of the respondents (31%) indicated that their last trip was for business purposes. Note that the vacation-business proportions are different in comparison to other studies. For example, according to NHTS data (NHTS, 2009) business-travel and leisure travel accounts, each, for almost half of air travel in the USA. On the other hand, according to the UNWTO (2012) calculated in 2012 that business and professional travel accounts for 15% of the global air passengers, so difference can be found on regional basis.

The identity of the entity paying for the travel expenses provides insights regarding the consumers' willingness to pay. Results indicate that most trips were paid by the respondents themselves or someone from their family (74%), while the rest of the trips were funded by the respondent's employers (26%). An interesting result is the difference between business-trip proportion (31%) and the proportion of trips funded by the before mentioned workplace. Generally it is assumed that all business-trips are paid by the employer of the person who travels. However, in this study *business-trip* is defined as "work related trip", which includes other activities such as conference participations, which is argued to explain this difference.

Two marketing channels of airline itineraries were designated, which are the contemporary main distribution channels of airline itinerary. The first channel is airlines websites which sell to consumers their own offerings.[8] The second channel is OTAs' websites which markets itineraries of more than one airline per destination. Results indicate that the OTAs' websites are the preferred sources for airline itineraries (66%), compared to airline websites (34%) for searching itineraries of both vacation and business trips alike.

Note that although both marketing channels are using the same infrastructure (i.e., the internet), such differences in preference between both channels is explained by the OTAs' greater convenience because it enable consumers to search for both itineraries and other trip related products (e.g., hotels, car rentals, etc.).[9] OTAs' websites provide for tourists and business-travelers the ability to view and compare multiple itineraries at the same time, as opposed to airline websites where the consumer needs mostly to search for itineraries individually on several airline websites, and only then to be able to compare results. Furthermore, many tourists, as they are being considered to be price sensitive, are

[8] This is true in most cases, although certain airlines market other airlines' offerings on their website (e.g., KLM's tickets are distributed also on Air France's website following the two airlines merger in 2004). In this study, however, all airlines market their own itineraries only

[9] During the time that passed since the completion of this study, airlines has become more and more active in adding offerings of these trip related products, however not all airlines do that. Those who entered this field have mostly limited selection and scope of products than OTAs.

looking for the cheapest fare. The ability to receive on a single screen all itineraries offered by an OTA can help them achieve that goal more easily. Business-travelers can benefit from such itinerary search results presentation characteristics because they must follow their employer's travel rules. Such rules sometime requires providing more than one itinerary option to the business-trips authorizing entity (i.e., employee's boss and/or human resources representative, etc.) in a way that simplifies alternatives comparison and can explain the results of this study.

The proportions of respondents reporting which single FFPs memberships they have was found to be similar to those of airlines market share at Tel Aviv International Airport, in an aggregated form according to alliances (Civil Aviation Authority Israel, 2013). In the case of the local Israeli airline (El Al), where the highest proportion of respondents indicated that they solely hold its FFP card (18.9%), this result is expected. An explanation to this result is the power of this airline's brand among the Israeli population. In the case of the Star Alliance airlines FFPs, which were found to be second in terms of membership among respondents (5.8%), this result was expected as well. We explain this result by the power of this alliance compared to that of its rivals SkyTeam and Oneworld (which came second and third in terms of proliferation among this study's respondents). The Star Alliance, at the time of the study and today as well, is the worlds' major airline alliance in terms of operational and service characteristics, compared to its rivals and therefore can provide some greater advantages to travelers.

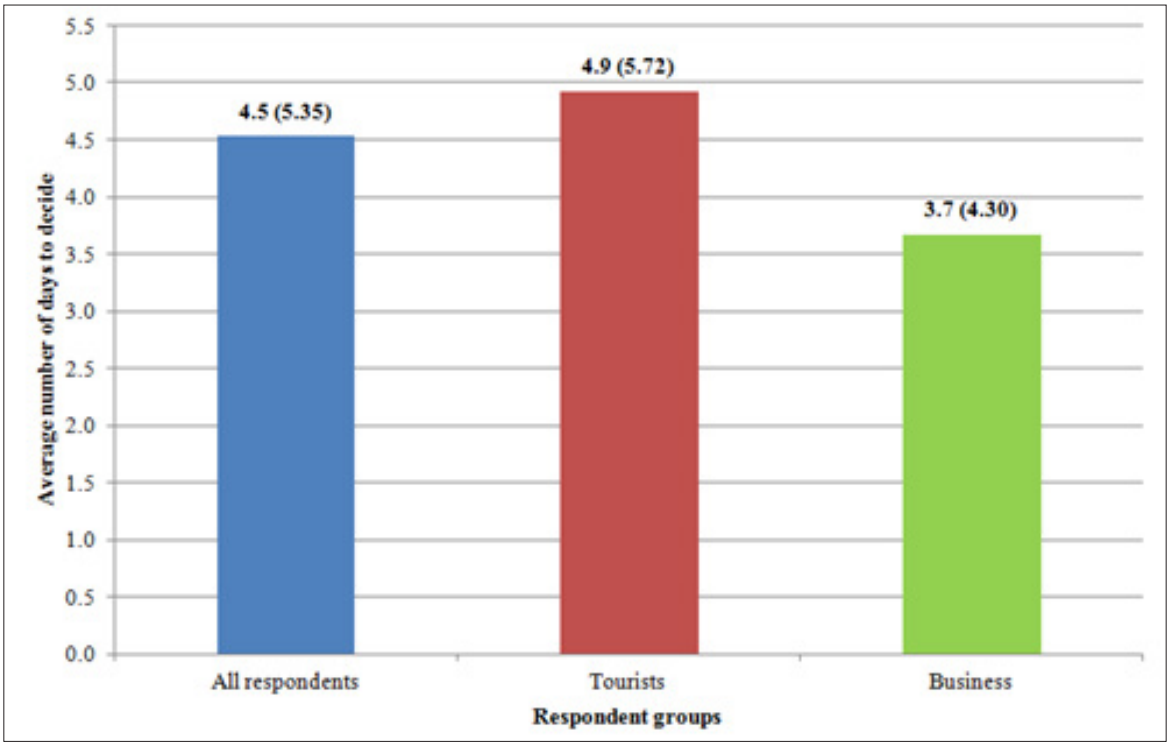
4.3 Choice duration

When choice is treated as a continuous event, the consumer assumed to conduct his search and evaluation process during the itineraries sales period in an iterative manner. For example, when an itinerary is offered for sale during a period of 30 days, the consumer can occupy himself in the choice process for not longer than this period. Therefore, when various numbers of itineraries searches are being executed they provide the consumer with various numbers of choice sets. On the other hand, of course, choice could be an instantaneous decision, as it is traditionally treated in the literature. In both cases it is assumed that the consumer behavior is intended to reach the highest utility. The choice duration available for such search and evaluation activities might change between consumers based on many factors, such as trip purposes and passenger type, fear of not being able to afford air travel and length of choice period (the latter is explained in the next section).

It was found that the ability to defer choice is indeed used to some extent, with an average of almost four-and-a-half days among the general sample of respondents. However, the time needed for this choice activity was found to be different between tourists and business-travelers. Tourists were found to defer choice slightly longer, compared to business-travelers (4.9 days and 3.7 days, respectively), as shown in Figure 4 (with standard deviation in parentheses). Such differences between passengers are expected, based on two possible explanations which are interconnected. In the case of tourists, the general convention is that these passengers are more sensitive to price, compared to business-travelers (Gillen, Morrison & Stewart, 2003). Such sensitivity might imply that higher utility will arise to tourists from finding a bargain fare, with lower (or none) cancelation fees which represents a monetary risk for the tourist. In order to achieve such result a more extensive and time consuming itinerary search might take place by these passengers in the endeavor of finding the lowest cost/risk itinerary. The opposite is argued in the case of the business-travelers, as they are regarded as less sensitive to travel cost and cancelation fees since they do not pay for these expenses out of their own pockets. The second possible explanation for these results is the time available to each passenger group to conduct their itinerary search. In the

case of touristic travel, the consumers normally plans their vacation long in advance which allows them to spread their arrangements over a long period of time, and thus a long period could be dedicated for itinerary search. Business-travelers, on the other hand, are sometimes asked to travel on a short notice, or do not have much time to invest in in-depth search. Both reasons might lead business-travelers to a relatively short search periods, while the opposite might be true in the case of tourists.

Figure 4. Itinerary choice period, according to passengers' groups (average number of days, standard deviation)



Source: Own elaboration, based on Freund-Feinstein (2015)

The effect of available time length for the consumers to make their choice, on choice duration was analyzed, as depicted in Figure 5. This analysis was conducted on the data received from all respondents, as well as on the data received from those assigned to vacation and business trips. It was found that respondents who received longer period of time to find and choose an itinerary tended to defer choice longer, compared to those who received shorter time periods for the same activity. This finding is expected, since when longer time is available for decision making the consumer can invest in this activity - an ability that is reduced as the itineraries sales period nears its end.

It is important to note that although consumers can sometimes utilize their ability to defer choice for a long period of time, it is also shown in Figure 5 that most consumers do not choose to do so and prefer to make their itineraries choices after shorter periods (i.e., lower number of deferred days). As mentioned earlier, choice deferring was allowed in this study to be up to 30 days prior to departure date. However, 85% of the respondents were found to defer their choice for shorter periods; tourists deferred choice up to nine days, while business-travelers did the same for up to six days. This behavior is explained by the assumed consumer's subjective balance between the strive to find the itinerary which maximizes ones utility on the one hand, and the increasing risk of having to choose from new choice sets which include diminishing variety with increased fares which represents

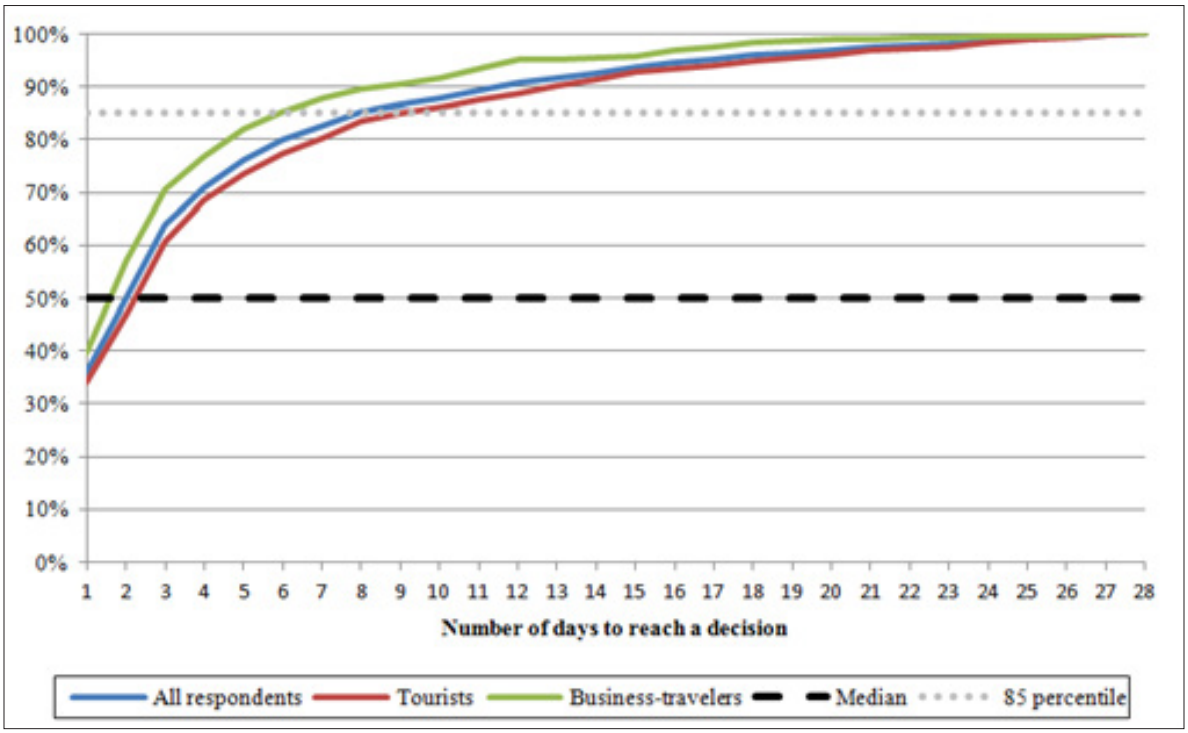
diminishing utility levels on the other hand. In such instances, when the consumer is starting his choice process long in advance (as illustrated in the choice model which was formulated in Figure 1), capacity is relatively high and fares are relatively low, and therefore the risk for having to choose an itinerary which provides lower utility (or finding that all tickets were sold) could be considered low during most of the sales period. However, the consumer which still tries to maximize his utility is facing a knowledge a-symmetry regarding the airlines revenue management practices in terms of pricing (i.e., the rate of raising or lowering fares, switching capacity to other selling channels or to business-persons, etc.) on the one hand, and other consumers' choice decisions which leads to capacity being reduced and fares being raised on the rest of the unsold itineraries. Such phenomena where a firm has a much more comprehensive knowledge regarding current product or service attributes and planned changes in such attributes during a sales period, while the consumer is less informed on these issues, was investigated in the past (Teo, Wang & Leong, 2004; Hwang, Lee & Kim, 2014). Under this explanation a consumer will try and find a balance to the two contradicting requirements. These are finding an itinerary which maximizes one's utility, and not continuing with these efforts for a perceived too long time in order to lower the risk of getting stuck without a ticket altogether or with less-preferred possibilities when itinerary choice is compared to what he/she received in the initial search. In addition, quicker decision making is assumed when the departure date is close because the length of the sales period is by itself short enough. In such case the consumers might still defer choice to a certain extent but their ability and willingness to continue their search will probably be limited.

As could be expected, this phenomenon affects both tourists and business-travelers but its manifestation in each population is different. The differences in the average choice period between tourists and business-travelers, which were found in this study, are in line with the above general explanations. Four aspects of tourists and business-travelers characteristics are assumed to be relevant in this case. First, price sensitivities aspect should be considered. Tourists which are assumed to be relatively more price sensitive compared to business-travelers have a higher incentive to defer their choice for longer periods of time in an effort to find lower priced itineraries which maximizes their utility. Contrary to business-travelers, which their expenses are covered by their employers, tourist pay for trip expenses out of their own pockets and thus need to make more efforts to achieve a utility maximizing outcome. A second possible explanation for to the longer choice periods conducted by tourists is their assumed lower knowledge with airline practices due to lower number of trips involving the use of air transportation during a given period, i.e., business-persons which fly frequently has a better understanding of airlines behavior in this field. Finally, a possible third explanations is the longer time tourists can start their itinerary search in advance prior to a planned departure date. Most vacation and other touristic air travel are conducted in certain known periods of the year which tourists can prepare themselves for such activity well in advance. However, business-travelers trips might take place in a shorter notice, which results in a much shorter itinerary searches period.

A final finding regarding choice duration is the preference to choose an itinerary from the initial choice set, which received after the first search. Although it was found that choice deferring does occur, a significant proportion of all respondents (36%) were found to choose their itineraries from the initial choice-set (i.e., not deferring at all). Such behavior is regarded as instantaneous. However, differences are visible between tourists and business-travelers also on this issue. It was found that a higher proportion of business-travelers tend to make such instantaneous itinerary choices compared to those performed by tourists (40% and 34%, respectively). In this case, these findings are in line with the above mentioned explanations. Tourists' lower proportion of instantaneous choice indicates the tendency to defer choice in order to search for itineraries which maximizes their utility. In regard to

business-travelers, a relatively lower tendency to defer choice at all is explained by the fact that these passengers are not paying for their travel expenses by themselves and therefore can choose the best offer that they initially receives. In addition, as it is known as one of the main characteristics of business-persons, these travelers has high value of time (VOT), which will dictate lower allocated time to clerical tasks such as searching an appropriate itinerary. Such combination of high VOT and travel cost covered by the employer could indeed provide a sound explanation to this finding.

Figure 5. Respondents choice duration



Source: Own elaboration, based on Freund-Feinstein (2015)

Another issue related to choice duration is the number of days consumers defer their choice. Here we omit all the respondents which choose instantaneously, and look at those who deferred their choice once, or more. The proportion of consumers which preferred to defer choice is shown in Figure 6. It is shown that the proportions of respondents' preference to defer choice is a down slope curve with significant proportion of respondents preferring to defer choice up to three days, while diminishing proportions indicating a preference to continue such choice behavior for longer periods is recorded. When comparing the two segmented passenger groups, it is shown that the proportion of respondents deferring choice once among business-travelers is relatively higher compared to tourists (17% and 13%, respectively). However, the proportion of tourists deferring choice for two days or for longer periods is a bit higher in most cases than the proportion of business-travelers, but the behavior is similar between both groups.

4.4 Choice decision time frame

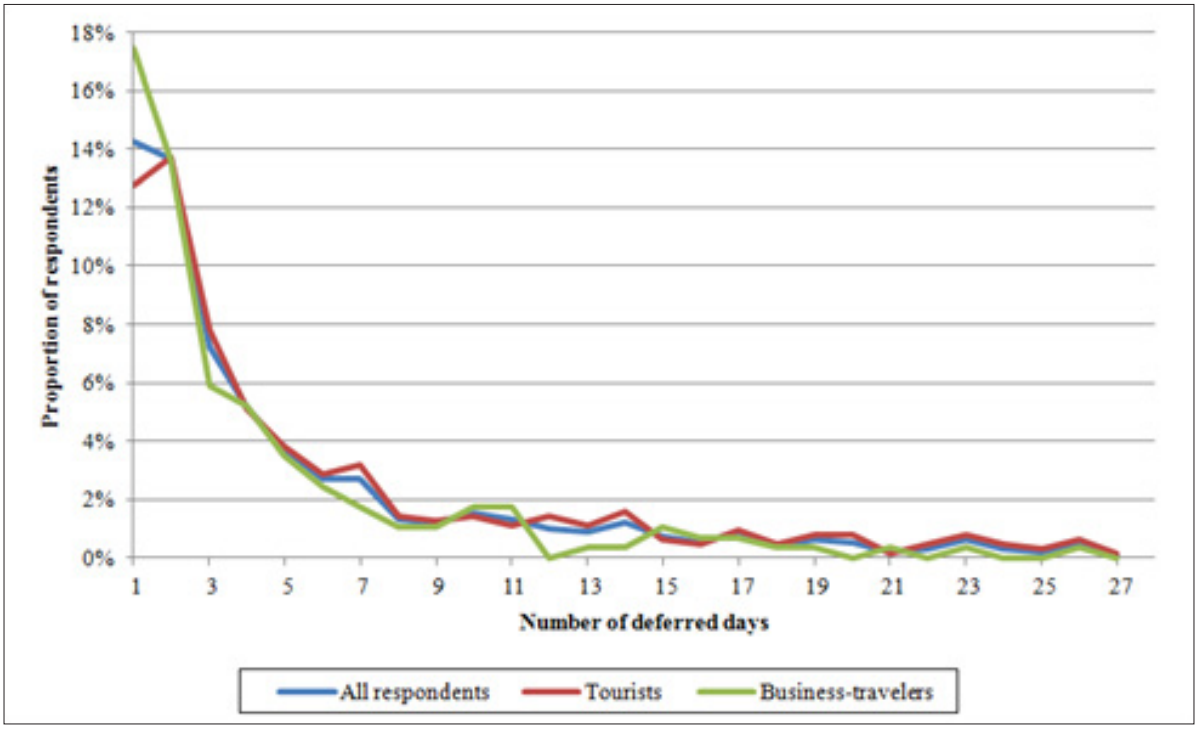
The duration it takes a consumer to choose an itinerary might be affected by the time frame available to conduct such activity. Certain consumers (e.g., tourists) can plan their trip long in advance before their departure date, which might lead to initial search a long time in advance. Others might need to travel in a short notice, so their available time period for

similar choice task is shorter. Given the fact that capacity diminishes over time and prices might increase as the end of the sales period approaches, it might lead to different levels of urgency to make a choice before a preferred airline's (or all airlines) capacity(ies) is totally depleted and fares reach their peak.

Descriptive analysis of the effect of various available time frames on the consumer's choice period is showed in Table 6 and Figure 7. Due to limited number of respondents this analysis is conducted on the complete sample of respondents only and not on segmented population as well. Five choice starting points were arbitrarily chosen, out of 30 points available, to provide evidence on the effect on choice behavior of long and short time frames on itinerary choice.

It was found that as the time frame available for itinerary choice gets shortened, a larger proportion of the respondents made their choice based on the initial choice set. However, another evidence is that large proportion of the respondents were still postponing their choice, although the risk to be left without a seat, or using an itinerary that they prefer less and pay a higher fare is supposed to increase. Such findings seem to support the argument proposed in section 4.3 of this study. It is stated that consumers are balancing their efforts to maximize utility by continuous searching of an itinerary which best suit their needs, while on the other hand taking into consideration that they are facing knowledge a-symmetry. Under this argument, it is expected to have increased proportion of consumers deciding to choose instantaneously as the maximum decision time is reduced given the fixed departure date in this study.

Figure 6. Number of deferred days



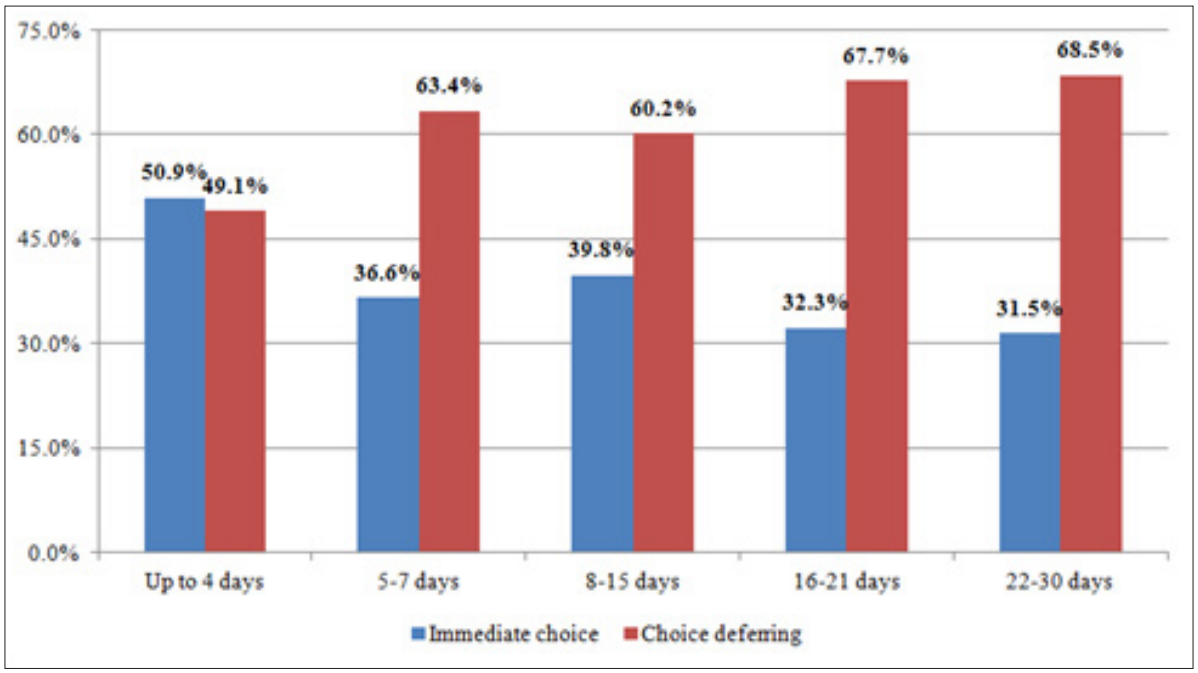
Source: Own elaboration, based on Freund-Feinstein (2015)

Table 6. Choice decision time

Days	All participants	
22-30 days		
1 day	90	31.5%
2-7 days	116	40.6%
8-15 days	39	13.6%
16-30 days	41	14.3%
Total	286	100%
16-21 days		
1 day	60	32.3%
2-7 days	84	45.2%
8-15 days	26	14.0%
16-21 days	16	8.5%
Total	186	100%
8-15 days		
1 day	113	39.8%
2-7 days	134	47.2%
8-15 days	37	13.0%
Total	284	100%
5-7 days		
1 day	37	36.6%
2-7 days	64	63.4%
Total	101	100%
4 days		
1 day	28	50.9%
2-4 days	27	49.1%
Total	55	100%

Source: Own elaboration, based on Freund-Feinstein (2015)

Figure 7. Choice proportions with various choice periods - immediate choice and choice deferring, all participants



Source: Own elaboration, based on Freund-Feinstein (2015)

5. CONCLUSION

In this paper the effect of the consumers' ability to defer choice on itinerary choice behavior is analyzed. Two issues related to the effects of the time frame available for the consumers to make their itinerary choices were discussed. The available choice duration on decision making affect the respondents' choice to a certain extent. Choice deferring took place in this study for several days, on average, and was found to be higher among tourists than among business-travelers. However, as a significant number of respondents made their decisions based on the initial itineraries choice set, and preferred not to defer their choice, the deferring durations could take place up to twice as long among 85% of the respondents.

The difference in the length of choice duration between tourists and business-travelers was explained based on the characteristics of each passenger group. These include price sensitivities and employing choice deferring in an effort to increase utility maximization, the entity which pays for the travelers' itinerary as a factor for choosing quicker or slower, and the available time on the first place to conduct itinerary search.

Focusing on the consumers' choice behavior in a dynamic situation, investigating the ability to defer choice, it provides a novel framework and methodology for similar research efforts. These include various products and services, such as hotel rooms, rented cars and other items which are marketed online while suppliers are using yield management practices to maximize their revenues and profits. In such cases the consumer is faced with uncertainty regarding pricing and availability and is affected by information a-symmetry while trying to maximize his/her utility.

Although this methodology has promising qualities in modeling choice behavior of airline passengers, several limitations were found in this study. First, the use of stated preferences (SP) methodology has its known limitations, which include some possible inconsistencies with the expressed preferences and the real choices made by the same person. In the future it is recommended that a similar study is conducted using revealed preferences technique which eliminates the SP techniques' disadvantage. A second limitation lies with the composition of the study's respondents. We asked a significant number of persons which are students and faculty members from all universities in Israel to participate. In the future it is recommended that the same (or similar) study will be performed among a more balanced respondents group. A third and final limit arises from the choice of the air transportation market in Israel. Although this market expands rapidly in recent years, and such trend is expected to continue in the coming years due to the Israel-EU open skies agreement signed in 2012, it is still a relatively small market with its own constraints and limitations (e.g., income rates, very limited connecting flights in TLV, etc.). It is recommended that in the future similar study is performed on other markets such as EU, the US and Asian countries.

The methodology described in this paper could be regarded a useful approach for investigating similar dynamically changing choice scenarios. In relation to consumers' behavior while using online websites, the ability to defer choice could be regarded as part of a much more sophisticated choice strategy employed to increase utility. Understanding such behavior and its economical implications are important to both academics and practitioners.

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Appendix A: List of Acronyms

AB - Air Berlin
AC - Air Canada
AF - Air France
BA - British Airways
DL - Delta Air Lines
EWR - Newark Liberty International Airport
JFK - John F. Kennedy International Airport
LH - Lufthansa
LHR - London Heathrow Airport
LTN - London Luton Airport
LY - El Al Airlines
SXF - Berlin Schönefeld Airport
TXL - Berlin Tegel Airport
UA - United Airlines
U2 - EasyJet
YYZ - Toronto Pearson International Airport
4U - German Wings