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**Performance and Risks in the European Economy**

**The Shift of the Demand for  
Air Transport Services when Prices Change**

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**Abstract:** The decrease of the charge/unit price determines the extension of demand, as well as the increase of the amount of a product/service required on the market. The relationship between the evolution of charge/unit price (the independent variable) and the market demand of a good/service (the dependent variable) can be illustrated in a table, a function or a graph. The causal relationships between the change of the charge/unit price of a good/service and the change of the amount required represent the essence of the general law of demand. This law is not fully valid when it comes to services. There are situations which apparently contradict the general law of demand: there are buyers who mostly use the services of a company even if this asks for higher prices on the grounds of saving time, which reflects the relationship between the price and the quality of the service offered. Price increase can be accompanied by the increase of the quantity required when the difference in price can be compensated for by the growth in quality. The increase or decrease of demand can be determined, at a certain offer, by the change of the charge/unit price of a good/service. The following paper deals with the limits of the demand shift under the conditions of a price change. The direct competition between the airlines offering full services (classical companies) and those that do not offer any auxiliary services (low cost) is increasing in the entire world.

**Keywords:** full services carriers; low cost airlines; pessimistic criterion; the criterion of equiprobability; the optimistic criterion

## **1 Introduction**

The American or European companies which offer full services have lost a great part of their passengers to the low cost companies and this situation is happening now on the Romanian market. This paper is attempting to find the answer to the questions:

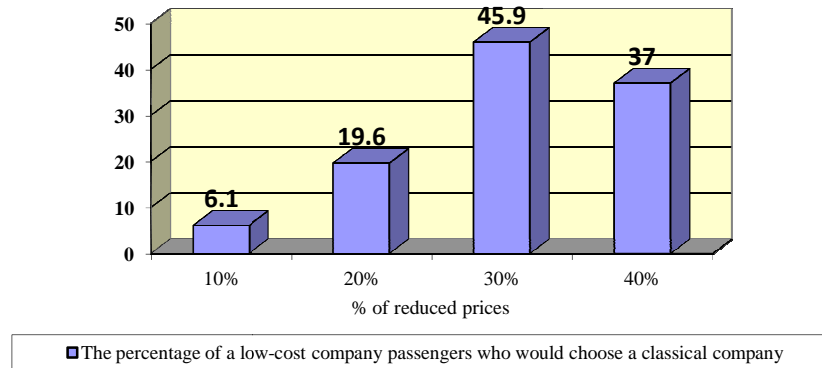
- What is the percentage of the passengers carried by low cost companies that shift to the national airline when the latter gradually decreases prices?
- How could a national airline offering more services encourage passengers and regain the share of the internal market lost to the benefit of a low cost company?

## **2 The Case Study**

The parameter of using the airplanes' capacity is directly influenced by the on spot price, this being the main way of selecting the services of a company. However, it is obvious that a great number of

passengers who use the classical airlines is also influenced by other factors in addition to the price they pay.

An attempt has been made (O’Connell & Williams, 2005) in order to evaluate the flexibility of demand in classical and low cost airlines. Chart 1.11. offers data about the percentage of a low-cost company passengers who would choose a classical company if this reduced its prices by 10%, 20%, 30% or 40%.



**Figure 1. The percentage of a low-cost company passengers who would choose a classical company if this reduced its prices**

*Source: John F. O’Connell, George Williams, Passengers’ perceptions of low cost airlines and full service carriers - A case study*

Results show that if a classical company reduced its prices by 10%, then an average of 6.1% of the passengers of a low-cost company would choose the classical company. A larger discount – 20% – would convince 19.6% of the passengers, 30% would convince 45.9%, and a 40% discount would make 37% of the passengers stay with the low-cost company.

This is due to a combination of factors, such as brand development, prices, timetables, simplified website, holiday packages, etc.

This information offers an indication of the amount of flexibility of the price offered by classical airlines and it identifies the moment when passengers would start to switch airlines for a low-cost one. Given the fact that classical airlines offer full services, including the connection with other airlines, the servicing of big airports, business class, loyalty promotions etc, some passengers are willing to pay more for these benefits.

The consequences of these discounts would be the maximum values presented as following:

- C1 – if the classical company reduced its prices by 10%, then an average of 6.1% of the passengers of a low- cost company would choose it.
- C2 - if the classical company reduced its prices by 20%, then an average of 19.6% of the passengers of a low- cost company would choose it.
- C3 - if the classical company reduced its prices by 30%, then an average of 45.9% of the passengers of a low- cost company would choose it.

C4 - if the classical company reduced its prices by 40%, then an average of 37% of the passengers of a low-cost company would choose it.

The situations presented before are average data of the consequences.

The possible situations that can be predicted for the Romanian market are interesting under the conditions of the decrease/increase with one percent out of the average of the average of the percentage of low cost company passengers who would choose a classical company according to the consequences presented above.

The research is structured in the following table:

**Table 1.1. Combinations against the average consequences (S2) under the conditions of a decrease/increase with one percent of a low-cost company (Blue Air) passengers who would choose a classical company (Tarom). Decision situations.**

stages options	S1	S2	S3	S4
	The low-cost company passenger decrease by % out of the total number of passengers carried in 2009			
C1 -10%	7,1 %	<b>6,1 %</b>	4,1%	3,1%
C2 -20%	20,6 %	<b>19,6 %</b>	17,6 %	16,6,%
C3 -30%	46,9 %	<b>45,9 %</b>	43,9 %	42,9 %
C4 -40%.	38 %	<b>37 %</b>	35 %	34 %

Source: processed by author

The decision situations result from the multiplication of the percents with the number of passengers carried in 2009 by the low-cost company (Blue Air – 1.7 million passengers carried in 2009 and 145 million euro turnover), the results being presented in the following table.

**Table 1.2. Determination of decision situations**

stages options	S1	S2 medium consequences	S3	S4
<b>C1</b> <b>10%</b>	0,12141	<b>0,10431</b>	0,07011	0,05301
<b>C2</b> <b>20%</b>	0,35226	<b>0,33516</b>	0,30096	0,28386
<b>C3</b> <b>30%</b>	0,80199	<b>0,78489</b>	0,75069	0,73359
<b>C4</b> <b>40%.</b>	0,6498	<b>0,6327</b>	0,5985	0,5814

Source: processed by author

The economical combinations expected for each combination are identified. In order to determine the decisions under these circumstances, we use the following criteria.

**2.1. Pessimistic Criterion (Wald criterion)**

It is the one maximizing the “minimum gain”, and it guarantees minimum losses. The performance function is:

$$(1) \quad F = \max_j \{V_{\min}^c\}$$

Where:  $V_c$  **min** – column vector of the minimum values from the estimated losses matrix of player “j”.

$$(2) \quad F = \max_j \min_i a_{ij}$$

So, applying this criterion means excessive caution. For Tarom, if it reduced prices, the criterion would lead to the values in the following table:

**Table 1.3. The consequences of decreasing ticket price by Tarom, determined by Wald criterion**

stages options	S1	S2 medium consequences	S3	S4
C1 10%	0,12141	<b>0,10431</b>	0,07011	0,05301
C2 20%	0,35226	<b>0,33516</b>	0,30096	0,28386
C3 30%	0,80199	<b>0,78489</b>	0,75069	0,73359
C4 40%.	0,6498	<b>0,6327</b>	0,5985	0,5814

*Source: processed by author*

As we can see, Tarom can choose the course of action which would allow it to obtain a maximum and certain result without taking into account the decrease of ticket price. Applying this method consciously limits the possibility of obtaining superior results, which are given up for the desire to obtain complete safety.

In this situation option C3 is chosen – the decrease of prices by 30%, which corresponds to 73,359% of the total number of passengers carried by Blue Air, which would represent 1.254.438,9 extra passengers for Tarom. The market share of Tarom increased from 18, 92 % to 32, 7% (in 2009 the number of passengers carried by Tarom was 1.72 million out of a 9.09 million in total).

**2.2. Laplace – Bayes criterion** (the criterion of equiprobability – the criterion of maximum indeterminacy)

It is applied when the event’s probability of occurrence is not known. The best solution is considered to be the one which ensures an average maximum gain, starting from the hypothesis that the economical environment (nature) is neutral and indifferent, each of its states being possible with the same probability.

$$(3) \quad F = \max_j \left\{ \frac{1}{n} \sum_{i=1}^m a_{ij} \right\}$$

where  $n = 4$ , and  $\sum C1 = 0,31464$ ;  $\sum C2 = 1,23804$ ;

$\sum C3 = 3,03696$ ;  $\sum C4 = 2,4282$ ;

option 1 =  $\frac{0,31464}{4} = 0,07866$ ; option 2 =  $\frac{1,23804}{4} = 0,30951$ ; option 3 =  $\frac{3,03696}{4} = 0,75924$ ; option 4 =  $\frac{2,42826}{4} = 0,60705$ ;

$$F = \max \begin{pmatrix} 0,07866 \\ 0,30951 \\ 0,75924 \\ 0,60705 \end{pmatrix} = 0,75924, \text{ that means option C3, to decrease prices by 30\%, this}$$

proportion being translated into the number of passengers who give up Blue Air company for Tarom, that is 1.298.300,4 passengers. Comparing the two values, we can reach the conclusion that under conditions of risk, on a market whose share is decreasing, the criterion of maximum indeterminacy ensures an average maximum gain if Tarom airline decreases prices by 30%. Its total market share is 33,2%.

### 2.3. Hurwicz criterion (the optimistic criterion – max. Max related to a strategy)

It is applied when the optimism of the person making decisions can be represented by a rate (K), normalized to a scale (0, 1) and whose value offers information regarding the attitude to risk:

$K \rightarrow 1$ : the person making decisions is willing to take risks (accepts the risk),

$K \rightarrow 0$ : the person making decisions objects to risk,

For  $K = 1$  the optimism is total, and for  $K = 0$  caution is excessive.

For maximum criteria:

$$(4) \quad F = \max \tilde{x}_j \quad \text{where : } \{ \tilde{x}_j \} = K \cdot a_{\max} + (1 - K) \cdot a_{\min}$$

We assume two situations: one when the person making decisions accepts the risk, and then  $K = 0,3$ , and the second when the person making decisions objects to risk, and then  $K = 0,7$ .

#### Case 1. The person making decisions objects to risk $K = 0,3$

$$\tilde{X}1 = (0,3) 0,12141 + (0,7) 0,05301 = 0,036423 + 0,037107 = 0,07353$$

$$\tilde{X}2 = (0,3) 0,35226 + (0,7) 0,28386 = 0,105678 + 0,198702 = 0,30438$$

$$\tilde{X}3 = (0,3) 0,80199 + (0,7) 0,73359 = 0,240597 + 0,513513 = 0,75411$$

$$\tilde{X}4 = (0,3) 0,6498 + (0,7) 0,5814 = 0,19494 + 0,40698 = 0,60192$$

$$F = \max \begin{pmatrix} 0,07353 \\ 0,30438 \\ 0,75411 \\ 0,60192 \end{pmatrix} = 0,75411$$

**Case 2. The person making decisions accepts the risk  $K= 0,7$**

$$\check{X}1 = (0,7) 0,12141 - (0,3) 0,05301 = 0,12141 + 0,015903 = 0,137313$$

$$\check{X}2 = (0,7) 0,35226 - (0,3) 0,28386 = 0,246582 + 0,085158 = 0,33174$$

$$\check{X}3 = (0,7) 0,80199 - (0,3) 0,73359 = 0,561393 + 0,220077 = 0,78147$$

$$\check{X}4 = (0,7) 0,6498 - (0,3) 0,5814 = 0,45486 + 0,17442 = 0,62928$$

$$F = \max \begin{pmatrix} 0,137313 \\ 0,33174 \\ 0,78147 \\ 0,62928 \end{pmatrix} = 0,78147$$

In this case two alternatives were presented related to choosing a decision about the way of transferring a part of the transport demand of a low cost company to a classical company, while the latter accepts the risk of decreasing more or less the price of tickets. The criterion of the equal optimist or the rule of Hurwicz balances the consequences of the two values.

The risk mentioned earlier represents the probability of gaining more passengers, between 75,411%, when Tarom objects to risk, and 78,147%, when it accepts the risk. Both values represent the gain of Tarom from Blue Air's market share. If the rate (K) has extreme values, the conclusions are reduced to the values related to one of the two methods presented earlier.

In a paper written (Prousaloglou & Koppelman, 1995) in 1995 on the demand of air traffic services, the conclusion was reached that the selection of the carrier is based on a combination of factors, among which the presence of the air company on the market, low prices, punctuality, reliability, flexible timetable, connection with other flights, safety and the policy of the company of making their customers loyal.

One of the main reasons for choosing an airline is the range of available services. Taking into account these conclusions, we can estimate that the main motivation for shifting from one company to another under the conditions of price decrease is the complexity of services offered.

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