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SIMULATION OF SITUATION AT THE BRATISLAVA AIRPORT AFTER APPLICATION OF CREATED REGULATION FORMULA OF ECONOMIC REGULATION OF AIRPORT CHARGES

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In March 2009 the European Parliament and the Council issued the Directive on Airport Charges-Directive 2009/12/EC, which is a common framework regulating the essential features of airport charges. EU presents the necessity of economic regulation of airports and airport charges in Europe, but is the economic regulation the right way for Bratislava Airport and airports in the similar position? This paper explains the situation of Slovak airports and their approach to economic regulation of airport charges. The paper describes the simulation of situation at the Airport Bratislava after application of a regulation formula of economic regulation of airport charges considered as the most appropriate for Slovak airports especially Airport Bratislava. The regulation formula is based on the research of the authors.

Keywords: *directive of EU, airport charges, simulation, regulation formula, Slovak airports*

1. EU Directive on Airport Charges

This paper focuses on economic regulation of airports in the Slovak Republic after the introduction of Directive 2009/12/EC (‘the Directive’ hereafter) on airport charges. EU recommends regulating airport charges of 69 European airports. In order to do that, it was necessary to establish a common framework regulating the essential features of airports charges and the way they are set, as in the absence of such a framework, basic requirements in the relationship between airport managing bodies and airport users may not be met. Such a framework should be without prejudice to the possibility for a Member State to determine if and to what extent revenues from airports’ commercial activities may be taken into account in establishing airport charges. The Directive sets common principles for the levying of airport charges at Community airports. It shall apply to any airport located in a territory subject to the Treaty and open to commercial traffic whose annual traffic is over five million passenger movements as well as to the airport with the highest passenger movement in each Member State which enjoys a privileged position as a point of entry to that Member State. It is necessary to apply the Directive to that airport in order to guarantee respect for certain basic principles in the relationship between the airport managing body and the airport users, in particular with regard to transparency of charges and non-discrimination among airport users. The ICAO Council has considered that an airport charge is a levy that is designed and applied specifically to recover the cost of providing facilities and services for civil aviation, while a tax is a levy that is designed to raise national or local government revenues which are generally not applied to civil aviation in their entirety or on a cost-specific basis. Airport charges should be non-discriminatory.

The Directive stipulates that a compulsory procedure for regular consultation between airport managing bodies and airport users should be put in place with the possibility for either party to have recourse to an independent supervisory authority whenever a decision on airport charges or the modification of the charging system is contested by airport users. In order to ensure impartial decisions and the proper and effective application of the Directive, an independent supervisory authority should be established in every Member State. Member States shall guarantee the independence of the independent supervisory authority by ensuring that it is legally distinct from and functionally independent of any airport managing body and air carrier.

Further, it is vital for airport users to obtain from the airport managing body, on a regular basis, information on how and on what basis airport charges are calculated. Such transparency would provide

air carriers with an insight into the costs incurred by an airport and the productivity of an airport's investments. To allow an airport managing body to properly assess the requirements with regard to future investments, the airport users should be required to share all their operational forecasts, development projects and specific demands and suggestions with the airport managing body on a timely basis. Member States shall take the necessary measures to allow the airport managing body to vary the quality and scope of particular airport services, terminals or parts of terminals, with the aim of providing tailored services or a dedicated terminal or part of a terminal. The level of airport charges may be differentiated according to the quality and scope of such services and their costs or any other objective and transparent justification.

Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive by 15 March 2011. [1]

2. Airport Charges in the Slovak Republic

The airport charges of the airports in the Slovak Republic are published in Aeronautical Information Publication (AIP SR). The comparison of Slovak unregulated airport charges and British regulated airport charges is very interesting. In the Slovak Republic airport charges are divided into traffic within Slovak Republic and international traffic. This separation between domestic traffic and international traffic is in contradiction with the European law – Article 72 and 81 (1)d of EC Treaty, however European Court of Justice in Case C-92/01 has declared the specific situation in which such a separation is permissible, i.e. the costs of domestic flights must be legitimately lower than the costs of international flights.

Table 1. Rates per each tonne (even initiated) of the maximum take-off mass (MTOM) of the aircraft-traffic within the Slovak Republic (domestic traffic)

Traffic within the Slovak Republic	
Airports	euro/tonne
Košice	10,963
Bratislava	5,145
Nitra	0,332
Piešťany	4,647
Pievidza	0,332
Poprad-Tatry	4,647
Sliac	4,647
Žilina	4,647
Trenčín	1,327

Source [2]

Table 2. Rates per each tonne (even initiated) of the maximum take-off mass (MTOM) of the aircraft- International traffic

International traffic	
Airports	eur/tonne
Košice	14, 107
Bratislava	13,111*
Piešťany	12,447
Poprad-Tatry	12,447
Sliac	12,447
Žilina	12,447

Sources [2]

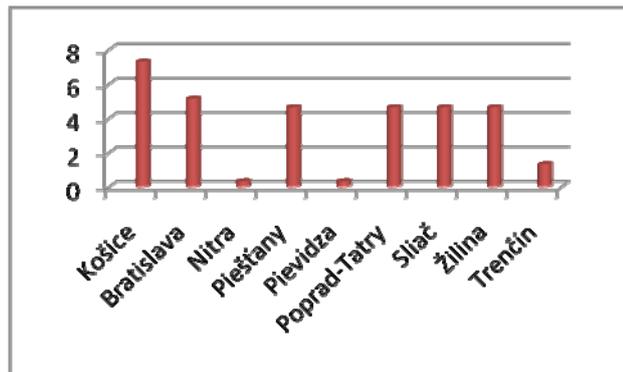


Figure 1. Rates per each tonne (even initiated) of the maximum take-off mass (MTOM) of the aircraft- traffic within the Slovak Republic (domestic traffic)

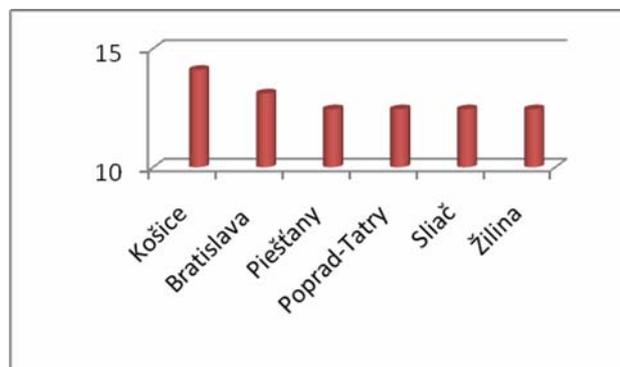


Figure 2. Rates per each tonne (even initiated) of the maximum take-off mass (MTOM) of the aircraft- International traffic

- * On the Bratislava Airport are three categories of maximal take-off mass (MTOM):
 - ✓ first 150 t, included aircraft landing charges are 13,111 euros per tonne
 - ✓ each next 151 to 250 t – aircraft landing charges are 9,294 euros per tonne
 - ✓ each next 251 t – aircraft landing charges are 6,638 euros per tonne.

3. Airport Charges at Representative Regulated British Airports

The airport charges at regulated British airports are divided into peak and off peak traffic and into four categories of maximal take-off mass (MTOM).

Table 3. Aircraft landing charges at regulated British airports – Domestic traffic/ International traffic

Aircraft landing charges at regulated British airports						
	London Heathrow		London Gatwick		London Stansted	
Aircraft categories (t=tonnes)	Peak Euros per aircraft	Off-peak Euros per aircraft	Peak Euros per aircraft	Off-peak Euros per aircraft	Peak Euros per aircraft	Off-peak Euros per aircraft
MTOM < 16 t	686,760	291,000	429,814	128,040	110,580	98,940
16>MTOM < 50 t	686,760	291,000	429,814	128,040	165,288	122,220
50>MTOM < 250 t	686,760	494,700	429,814	145,500	268,884	152,484
MTOM > 250 t	686,760	494,700	429,814	145,500	465,600	465,600

Source [3]

Table 4. Average rates per each tonne (even initiated) of the maximum take-off mass (MTOM) of the aircraft at regulated British airports– Domestic traffic/ International traffic

London Heathrow	London Gatwick	London Stansted
11,1661 euro/tonnes	6,2802 euro/tonnes	2,946775 euro/tonnes

Source: authors

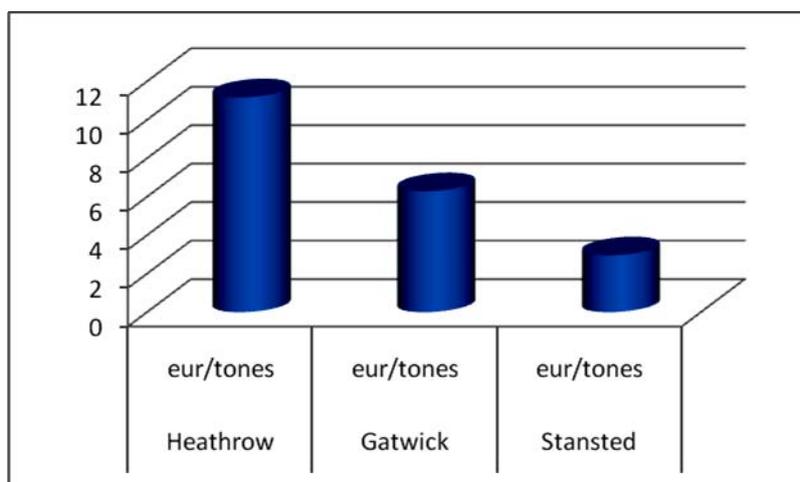


Figure 3. Average rates per each tonne (even initiated) of the maximum take-off mass (MTOM) of the aircraft at regulated British airports – Domestic traffic/ International traffic

4. Comparison of Airport Charges at Slovak and British Airports

The large differences between Slovak and British aircraft landing charges are shown in Tables 5. The most expensive airport in Great Britain – London Heathrow is cheaper than the cheapest Slovak international airport Poprad-Tatry.

Table 5. Comparison of aircraft landing charges at Slovak and British airports

Heathrow	Gatwick	Stansted	Bratislava	Košice	Poprad-Tatry
11,1661 euro/tonnes	6,2802 euro/tonnes	2,946775 euro/tonnes	13,111 euro/tonnes	14,107 euro/tonnes	12,447 euro/tonnes

Source: authors

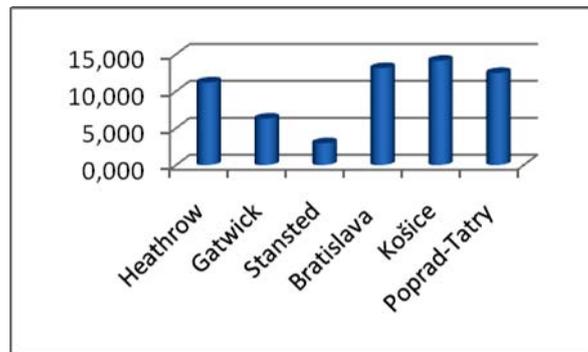


Figure 4. Comparison of aircraft landing charges at Slovak and British airports

Table 6. Comparison of parking charges at Slovak and British airports

Comparison of parking charges on Slovak and British airports (Euros per MTOM)						
Airports	London Heathrow	London Gatwick	London Stansted	Bratislava	Košice	Poprad-Tatry
Parking charges (Euros/tonnes MTOM)	0,536	0,348	0,844	0,298	1,327	0,298
Fixed parking charges	8,241	5,61	3,422	0	0	0

Source: authors

Slovak airports do not have fixed parking charges. Parking charges per tonnes of MTOM are in average higher than British. The most expensive is Košice airport, but airports in Great Britain have two components of parking charges and the total parking charges are higher at British airports.

The level of airport taxes is described in Table 7. The most expensive is London Heathrow and the second one is Košice airport.

Table 7. Comparison of airport taxes at Slovak and British airports

Comparison of airport taxes at Slovak and British airports (Euros/pax)						
Airport	London Heathrow	London Gatwick	London Stansted	Bratislava	Košice	Poprad-Tatry
Domestic traffic	15,633	8,555	7,112	6,306	10,455	4,315
International traffic	26,737	13,048	10,790	16,265	16,265	14,339

Source: authors

Following this analysis we can identify some important parameters for economic regulation of airports. The tables show that economic regulation is beneficial, because it results in airport charges that

are on average lower, but it is not the only aspect. For implementation of economic regulation the capacity of the regulated airport is important parameters. Airports which can not increase their capacity have to be regulated since they have a specific market position and the regulator must eliminate their monopolistic position and the associated disproportionate profits.

5. Economic Regulation of Airports in Slovak Republic

The situation in Slovakia and at the Slovak airports demonstrates some differences from those in other Member states. Airports are in a special and problematic position. After research of theoretical models commonly used in Europe, Latin America and Australia a matrix or portfolio of various possibilities of alternative approaches to the application of economic regulation of the Slovak airports has been compiled and is evaluated on Figure 5.

Mechanism of Economic regulation of airports		Approaches of ERoA		
		Single till	Dual till	Hybrid
Hard regulation	RoR			
	Price cap	✓	✓	
	Hybrid RoR a Price cap			
	Default regulation			
Soft regulation	Light handed		✓	

Figure 5. Portfolio of various possibilities of alternative approaches to the application of economic regulation at Slovak airports

Out of a total of 8 international SK airports (Bratislava, Košice, Poprad-Tatry, Žilina, Sliač, Piešťany, Nitra and Prievidza), only two, Bratislava and Košice, could be relevant for economic regulation of airport.

Košice airport is a small regional airport, but has great local position. This airport can be defined as a geographic monopoly, i.e. a natural monopoly. However it is too small for regulation as the Directive applies to airports that are above a minimum size (5mil. pax), because management and the funding of small airports not calling for the application of the Community framework.

Regarding Bratislava Airport, the Directive requires regulation of this airport as the biggest airport in Slovakia. However, experts on economic regulation believe that it is unnecessary, because this airport is not a local monopoly and is located close to the Vienna Airport (only 60 km by highway). So what we can do? We have to respect principles of EU and the Directive and regulate airport charges there, but it can be the end. Bratislava airport aspires to compete with Vienna Airport, but currently does not have a sufficiently large passenger flow. The situation on the air transport market during the current economic crisis complicated and some airlines have stopped operating from and to Bratislava airport.

6. Simulation at Bratislava Airport after Application of Created Hard Regulation Formula of Economic Regulation of Airport Charges

Simulation of situation at the Bratislava Airport after the introduction of the hard regulation formula – price cap single till – is one of the opportunities how to analyse the situation and choose the best method of regulation. On the other hand, the research illustrates the possibilities of economic regulation, which of the regulation mechanism is the best.

Price cap single till mechanism was considered the most appropriate for Airport Bratislava. The regulation formula is based on the research of the authors. Simulation is set for the five years period from 2010 till 2014. Data are from Airport Bratislava. [4]

The fundamental parameters of regulation formula are planned revenue, real revenue, planned passengers, real passengers, quality of service, CPI, average interest, trigger and the investments towards the new Terminal 2 at Bratislava airport.

The maximum permitted revenue per passenger for the regulatory period 2010 (P_{2010}):

$$P_{2010} = [P_{2009} + T_{2010}] * QS_{2010}$$

Where:

$T2_{2010} = X * (\text{number of days, when Terminal T2 is opened in the year 2010}) / 365$

X is set on the investments to the new Terminal 2

QS_{2010} = represents a Quality of Service adjustment that takes a value between 0 and 1 depending on Quality of Services, which are provide by Airport Bratislava.

$$QS_{2010} = 1 - \sum_{x=1}^n QS_x$$

→ this coefficient QS_{2010} has more monitor parameters of quality n

The rules establish for QS_{2010} :

- number of days in 2010 when passengers in a terminal that is open have to queue for more than thirty minutes to pass through passenger security, subject to this sum never exceeding (QS1)
- number of days in 2010 when access to the outbound element of the baggage handling system is denied to an airline or airlines for more than thirty consecutive minutes due to a single event system failure (QS2)
- number of quarters in 2010 when the incoming element of the baggage handling system is available for less than 99% of operational hours (QS3)
- number of quarters that Bratislava airport breaks the rule of ACI 'ease of way-finding through airport'(QS4)
- number of quarters that Bratislava airport breaks the rule of ACI 'flight information screens' (QS5)
- number of quarters that Bratislava airport breaks the rule of ACI 'cleanliness of airport terminal'(QS6)
- number of quarters that Bratislava airport breaks the rule of ACI 'cleanliness of washrooms' (QS7)
- number of quarters that Bratislava airport breaks the rule of ACI 'comfort of waiting/gate (QS8)
- number of quarters that Bratislava airport breaks the rule of ACI 'courtesy/helpfulness of airport staff (excluding check-in & security)' (QS9)
- number of quarters that Bratislava airport breaks the rule of ACI 'courtesy/helpfulness of security staff'(QS10)
- number of quarters that Bratislava airport breaks the rule of ACI 'all passengers' overall satisfaction with the airport' (QS11)
- number of quarters that Bratislava airport breaks the rule of ACI 'communications/telecommunications/e-facilities' (QS12)

The maximum permitted revenue per passenger for the regulatory period 2011 (P_{2011}):

$$P_{2011} = [(P_{2010} + T2_{2011} + Trigger_{2011}) * (1 + CPI_{2010}) + k_{2009} + w_{2009}] * QS_{2011}$$

$T2_{2011} = X * (\text{number of days, hen Terminal T2 is opened in the year 2011}) / 365$

$Trigger_{2011} = \sum$ sum of special coefficients

- sum of special coefficients, which depend on the special situations, conditions and changes in the legislation
- Where:
- this data depend on the expanses of passenger and investments to the runways (the runway trigger)
- a week in 2010 when demand for aircraft stands was greater than xy (the apron development trigger)
- legislation requires an upgrade of the Bratislava airport baggage security equipment prior to the end of 2011

CPI_{2010} is the percentage change (whether of a positive or negative value) in the consumer price index between those published in October 2009 and October 2010 by National bank of Slovakia¹

k_{2009} is a correction per passenger to be made in the regulatory year 2011 on account in the regulatory year 2009. It is derived from the following formula:

$$k_{2009} = (Y_{2009f} - Y_{2009}^*) * \left(\frac{Pax_{2009}}{Pax_{2009f}} \right) * \left(1 + \frac{I_{2009}}{100} \right) * \left(1 + \frac{I_{2010}}{100} \right)$$

Y_{2009f} is the forecast average revenue per passenger collected from airport charges levied at Bratislava airport in 2009

Y_{2009}^* is the actual average revenue per passenger collected from airport charges levied at Bratislava airport in 2009

Pax_{2009f} is the forecast number of passengers using Bratislava airport during 2009

Pax_{2009} is the actual number of passengers using Bratislava airport during 2009

I_{2009} is the average year interest rate between 1 October 2008 and 1 October 2009²

I_{2010} is the average year interest rate between 1 October 2009 and 1 October 2010, which is set in the forecast for the next period³

W_{2009} is a correction per passenger to be made in the regulatory year 2011 on account of any difference for the year 2009 – actual costs and expenses and budgeted costs and expenses that are recoverable through airport charges levied at Bratislava airport. It is derived from the following formula:

$$w_{2009} = [WA_{2009} - (WF_{2009} * (1 + CPI_{2009}))] * \left(\frac{1}{Pax_{2009f}} \right) * \left(1 + \frac{I_{2009}}{100} \right) * \left(1 + \frac{I_{2010}}{100} \right)$$

WA_{2009} – real costs, which are paid from airport charges

WF_{2009} – forecast costs, which are paid from airport charges

This correction is very important, since the correction renders the formula more realistic, however at this moment its value is set at 0 because Bratislava airport could not estimate this value and coefficient. The maximum permitted revenue per passenger for the regulatory period 2012, 2013 and 2014 can be evaluated and set on the same basis and formulas with actual data and values.

Table 8. Simulation parameter values at Bratislava airport after application of hard regulation formula – price cap single till

Parameter	ROK						
	2008	2009	2010	2011	2012	2013	2014
Forecast revenue per pax [Yn]	14,88 €	12,94 €	13,38 €	13,89 €	14,28 €	15,04 €	15,32 €
Real cost paid from airport charges [WAn]	–						
Forecast cost paid from airport charges [WFn]	–						
Correction coefficient per pax [wn]	–	0,00 €	0,00 €	0,00 €	0,00 €	0,00 €	
		0,00 €	0,00 €	0,00 €	0,00 €	0,00 €	
Correction coefficient [kn]	–	-4,65 €	-4,49 €	-2,45 €	-0,91 €	-0,30 €	
		-11,01 €	-13,48 €	4,35 €	24,03 €	13,99 €	
Trigger n	–	0	0	0	0	0	0

¹ <http://forecasts.org/cpi.htm> zo dňa 17.5.2010, http://portal.statistics.sk/showdoc.do?docid=15694_17.5.2010

² www.nbs.sk 15.5.2010

³ <http://forecasts.org/5yrT.htm> 18.5.2010

Continuation of Tabl.8

Parameter	ROK						
	2008	2009	2010	2011	2012	2013	2014
Quality coefficient– Quality of Services [QSn]	–	–	0,965	0,945	0,935	0,935	0,935
Costs per pax in T2 [Tn]	–	–	1,80 €	2,13 €	2,41 €	2,29 €	0,96 €
Revenues per pax [Pn]	16,02 €	19,94 €	20,98 €	17,99 €	15,73 €	15,49 €	15,53 €
			20,98 €	11,44 €	0,34 €	6,53 €	29,47 €
Revenues per pax [Pn] [kn=0 a wn=0]	16,02 €	19,94 €	20,98 €	21,84 €	22,67 €	23,34 €	22,72 €
Total airport revenue /pax forecast	14,88 €	12,94 €	13,38 €	13,89 €	14,28 €	15,04 €	15,32 €
Total airport revenue /real pax	16,02 €	19,94 €	23,28 €	24,18 €	24,14 €	24,23 €	23,55 €

Source: authors

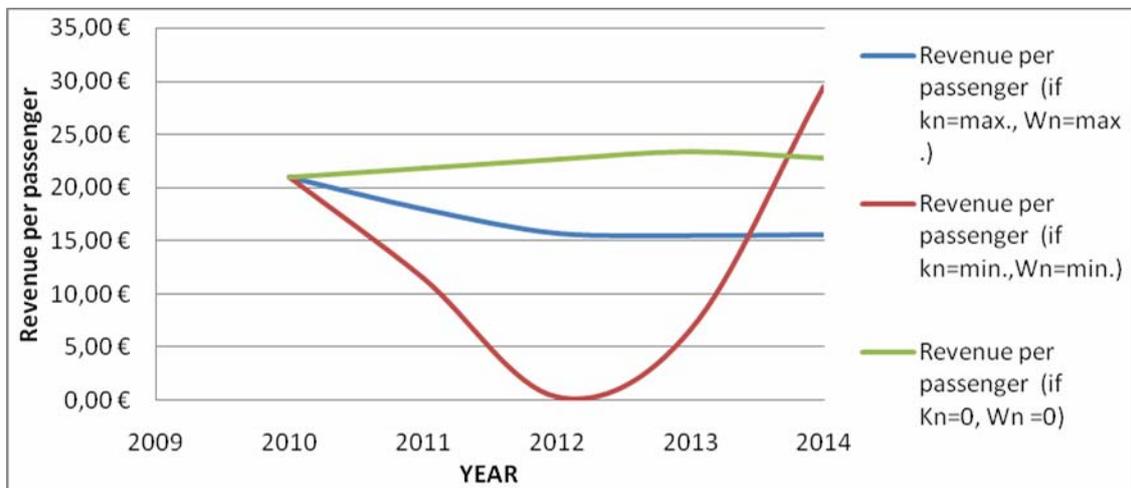


Figure 6. Hypothetical variants of maximum permitted revenue per passenger for the regulatory period based on the authors' regulation formula

7. Conclusions

Based on the fundamental theoretical knowledge and the special practical analyses and research in Slovak Republic, especially the Bratislava airport, the authors created a hard regulation formula, which could be introduced at the Bratislava airport after the 11th of March, 2011. The regulation formula has many positive and negative aspects. The main negative aspect is the problem with the quality of data that can be provided by the Bratislava airport. We do not have enough data for a correction coefficient which can be used to adjust the formula and make the maximum permitted revenue per passenger for the regulatory period more realistic.

Research indicates that the model of „hard regulation“ in Slovak Republic – revenue price cap single till – is not suitable for this kind of airports, because it is overly complicated and Slovak Republic does not have enough experiences with economic regulation of airports to carry it out. Bratislava airport wants to increase the passenger flow and the number of airlines with base in Bratislava, so the goal is to have airport charges at the lowest possible level. After analysis and selection of relevant parameters we hope to demonstrate in further research that the best way for Bratislava airport is the light handed regulation (monitoring of prices).

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