The Risk Analysis in Public Passenger Transport

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Abstract The paper deals with the risks related to providing public passenger transport. The risks are divided into two groups: cost and revenue risks. The paper describes possibilities of risk allocation among contracting parties when providing transport services.

Keywords transport, financing, risk, factor, region, public

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1. Introduction

Under current conditions in terms of general economic interest, the public passenger transport services cannot be provided on a commercial basis. Therefore, the mechanisms arise by which the services in public transport are provided in order to ensure the access to basic population's needs such as work, health, and education particularly in the time of low demand. At present, the following mechanisms are used: the award of exclusive rights to public service operators[1], and the grant of financial compensation to public service operators. The mentioned principles are also incorporated in EU legislation (Regulation (EC) No 1370/2007 on public passenger transport services by rail and by road), but also in national legislation of SR (Act No 56/2012 on road transport and Act No 514/2009 on the transport on railroads). The problem is the determination of financial compensation which includes a share of reasonable profit. The reasonable profit must depend on level of risk-taking. However in practise, it is determined as a percentage of economically justified costs. But this method is not correct because the operator who efficiently manages and achieves lower costs, also achieves a lower level of reasonable profit in comparison with the operator who provides comparable performance but at higher costs. Therefore, the aim of the paper is to point out the existence of business risk in public passenger transport.

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[1] the public service operator is considered to be a person who performs transportation, operates the means of transport; in some regulations the term "carrier" is used.

2. The Risk Analysis in Public Passenger Transport

There are several papers dealing with the risks and their allocation between operators and authorities (e.g. Stanley and van de Velde, 2008; Hensher and Stanley, 2003; van de Velde, Veeneman and Shipholt, 2008) according to which it is necessary to divide the risks into two groups - cost and revenue risks.

2.1. Cost Risks

The cost risks are associated with a cost calculation when contracting in public economic interest. In public service contract, it is necessary to agree on a price for realized performance which consists of the costs and profits of public service operator. In the case that the operator assumes the cost risk; it is necessary to agree on a scope of realized performance for the contract period and economically justified costs per unit of the realized performance between operator and authority. The cost risks can be divided into two groups (van de Velde, Veeneman and Shipholt, 2008):

- operational cost risks which are related to the difference of the anticipated costs calculated and the actually observed costs after performance realization. The reasonable profit must depend on an allocation of this risk. When the operator does not assume the risk and after realization of performance he proves eligibility of costs to authority for the purpose of compensation, the operator takes no cost risk for the performance realization. In the case that the agreed unit costs in public service contract are final, the operator assumes the cost risk and this should be reflected in appropriate level of reasonable profit.

The operational cost risks can be further divided as follows:

o external operational cost risks - the risk that cannot be influenced by the operator at all (e.g. cost increasing due to flooded streets in the event of natural disasters). This group can also include the risk which can be influenced by operator indirectly or only in a small extent (e.g. changes in energy prices during the contract period, change of employees' costs, etc.)

o internal operational cost risks – the risk that can be influenced by the operator, e.g. the costs of maintaining the vehicle fleet (the operator can decide on the maintenance process in order to avoid failure of vehicle and higher costs)

• investment cost risks are related to the difference of the anticipated life of the fixed assets of the operator. While providing public passenger transport it is primarily the means of transport and infrastructure (e.g. bus and tram stops, tram tracks, etc.). The reasonable profit must depend on which party assumes the risk of the difference of actual net book value of fixed assets at the end of a contract period compared to anticipated net book value.

2.2. Revenue Risks

The revenue risks are associated with the difference between expected revenues from operation of public passenger transport and actually achieved revenues at the end of contract period. These risks may be taken either by authority or operator and in this regard there must be appropriately set a profit level of the operator. When the authority assumes the revenue risk, then a contractual relationship between the authority and the operator which sets a compensation for realized performance is based on the following formula:

$$K = (NJ + PZ) \cdot RV - V$$

where:

K   – compensation of the authority for the operator
NJ   – costs per unit of realized performance,
PZ   – reasonable profit for the operator expressed per performance unit
RV   – the realized performance,
V   – revenues achieved when realizing performance.

When there are agreed final costs per unit in public service contract, which cannot be changed during a contract period, the cost risks are fully borne by the operator. The revenue risks are borne by the authority. This means that if operator's revenue is decreasing, the compensation from authority's party is increasing.

When the operator assumes the revenue risk, in the contract there is determined in addition to realized performance also absolute amount of compensation which cannot be changed during a contract period. The compensation is based on anticipated costs and revenue while changes in costs and revenue pose a risk of the operator. A part of the compensation is a reasonable profit of the operator resulting from cost and revenue risk of realized performance.

The cost risks are not usually related with interventions of public authorities (with an exception of changes in tax burden of the operator), and currently they are usually transmitted to operators. In the case of revenue risks, it is possible to define influence of public authorities on revenue risks; the risks can be divided into two groups:

• revenue risk associated with a decrease in demand - it is a risk related to the changes in number of passengers carried when providing public passenger transport. In the case that the authority bears the revenue risk, it is necessary to appropriately involve the operator in compliance with required quality because the amount of the compensation in this case does not depend on the number of passengers carried (van de Velde, Veeneman and Shipholt, 2008). In SR this risk is very significant because the demand for public passenger transport expressed in passenger-kilometres (pskm) is decreasing annually in road and railway transport.

When it comes to the revenue risk associated with a decrease in demand, it is necessary to distinguish territories in which the transport services are operated. The development of number of passengers carried depends to some extent on the interventions of public authorities which can indirectly influence the number of passengers carried through fulfilling their strategic objectives. The strategic objectives of public authorities can be divided to (Stanley and van de Velde, 2008):

o economic - maximizing the effectiveness and efficiency of resource use (e.g. limitations of unused connections, fare increase for less used connections, taxation of passenger cars as a source of compensation for losses of public passenger transport, etc.);

o environmental - minimizing the impact of transportation in a served area (e.g. limiting access of cars at defined time intervals in a serviced territory);

o social - ensuring possibility of mobility for all people, particularly for vulnerable groups of passengers (lower fares for students, pensioners, etc.);

o public - planning transport policy and other policies in a region (e.g. deployment of schools raises a demand for carriage, etc.).

• revenue risk associated with a change of passenger structure - it is the risk of revenue change because of a change of passenger structure. For example, when the selected groups of passengers (students, pensioners) travel with special fares, an increase in number of those passengers while keeping the total number of passengers causes a decrease in total revenue for providing transport services. The good solution is setting an appropriate pricing policy of transport services. However, it is important to monitor the impact of price changes on the demand, which varies considerably for particular groups of passengers (Gnap, Konečný and Poliak, 2006). In the Slovak Republic, the discounted fares known as saver tickets (half price of a full fare ticket) are for young people aged 6 to 15 and students to 26, and fares known as "other fares"[2] are for: senior citizens

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[2] Decree of Office of Rail Regulation No 654/2005 lays down the scope of price regulation for railway transport and

over 70 (€ 0.20 per every 50 km, severely disabled people (half fare travel), parents travelling to visit their physically or mentally disabled, chronically ill children nourished in special facilities in Slovakia (half fare travel). The public passenger transport fare is regulated by public authorities that decide which specific groups of passengers will be entitled to reduced fares; and, therefore, the revenue risk associated with the change in passenger structure can be classified as the risks associated with interventions by public authorities.

3. The Risk Allocation between the Contracting Parties

There are several possibilities how to allocate the risk which are based on general forms of contractual relationship between authority and operator (van de Velde, Veeneman and Shipholt, 2008):

First of all, operator bears no risk - cost and revenue risk is borne by authority that pays the economically justified costs to operator. Those costs are accounted in the end of period. This means that the risk from difference between anticipated and actual costs is borne by authority which bears also the risk from difference between anticipated and actual revenue. In this case, the level of reasonable profit of operator should relate only to numb capital during providing transport services because he bears no risk. The reasonable profit, in this case, must include, in addition to the numb capital, also a reward for assuming the cost risk.

Secondly, operator bears cost risk- the operator bears the risk from difference between anticipated and actual costs in the end of period and the authority bears the risk from difference between anticipated and actual revenue.

Thirdly, operator bears cost and revenue risk- in this case the operator bears the risk from difference between anticipated and actual costs/revenue, which are identified in the end of contract period. The authority pays only compensation which is agreed before realized performance to operator. This means that the authority bears no risk.

The analysis of the risk allocation between operator and authority in selected regions of Great Britain, Norway, Sweden, Finland, Denmark, Netherlands, Italy, USA, Australia, and New Zealand shows that in practise all the mentioned ways of the risk allocation can be found (Hensher and Wallis, 2005). For example, the risk can be also divided between contracting parties in a certain share regardless of whether there is cost or revenue risk. This can be realized in several ways: either by full allocation of complete risk to one of the parties (risk of entire difference between anticipated and actual costs/revenue is allocated to one of the parties) or sharing risk by contracting parties (a specific share of risk from difference between anticipated and actual

costs/revenue, is assigned to one of the parties, e.g. each party bears the cost risk of 50%). Finally, it can be the sharing of risk between the parties, taking into account specified constraints; this represents risk-sharing proportionally up to a certain limit (e.g. the operator bears revenue risk up to limit of 500 000 € and the risk over this limit is shared between contracting parties in the same proportion – 50%).

When contracting in public interest, the authority must decide on how to allocate the risks between contracting parties (van de Velde, Veeneman and Schipholt, 2008; Wallis, Bray and Webster, 2010). The risk can have a negative impact on the result of concluding contracts and, therefore, the authority should consider several facts such as: increasing risk increases surcharge to reasonable profit; the high level of risk borne by operator can cause a risk of operator's insolvency; and the higher risk, the lower number of candidates are interested in realization of transport services.

4. Conclusions

The reasonable profit for services which are provided in public interest must be based on the risk assumed by operator. There is a methodology, not only in SR but also in other countries, on the basis of which the reasonable profit is determined as percentage mark-up on costs. But in this case, the operator is not motivated to save up the costs and it is also contrary to the policy of the European Union. Until now in area of public passenger transport, there has not been developed any procedure for reasonable profit determination which would depend on the risk assumed by operator despite the fact that some authors define the risk existing in providing transport services in the form of cost and revenue risk. The goal of this paper was to process a risk analysis on the side of costs and revenue in the conditions of Slovakia and propose possible risk allocation between authority and operator with pointing to possible consequences of the allocation. The analysis was realised based on the works published abroad. The main contribution of the article is the processing of procedure for calculating the level of reasonable profit according to risk which is assumed by operator and the way of quantifying the risk. The procedure can be applied in practice in any European Union Member State because it is in line with current EU regulations.

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price quotations of self-governing regions which determine the maximum prices for national regular bus transport when the distance from origin to final bus stop exceeds 100 km

REFERENCES

[1]   ADAMS, M. O. – OSHO, G. S. (2006): Drugs Company Profits in the United States: Are They Excessive? Evidence From Public Administration Perspectives. Journal of Business & Economics Research, *4*, č. 2, s. 85 – 90.

[2]   BECK, A. (2011): Barriers to Entry in Rail Passenger Services: Empirical Evidence for Tendering Procedures in Germany. European Journal of Transport and Infrastructure Research, *11*, č. 1, s. 20 – 41.

[3]   BECK, A. – WALTER, M. (2010): Tender Price in Local Bus Transport in Germany – An Application of Alternative Regression Techniques. [Working Paper Series in Economics, No. 13, s. 1 – 32.] Karlsruhe: Karlsruher Institut für Technologie.

[4]   GNAP, J. – KONEČNÝ, V. – POLIAK, M. (2006): Elasticita dopytu v hromadnej osobnej doprave. Ekonomický časopis/Journal of Economics, *54*, č. 7, s. 668 – 684.

[5]   HENSHER, D. A. – STANLEY, J. (2003): Performance-based Quality Contracts in Bus Service Provision. Transportation Research, Part A, *39*, č. 37, s. 519 – 538.

[6]   HENSHER, D. A. – WALLIS, I. P. (2005): Competitive Tendering as a Contracting Mechanism for Subsidising Transport. Journal of Transport Economics and Policy, *39*, Part 3, s. 295 – 321.

[7]   LALIVE, R. – SCHMUTZLER, A. (2008): Exploring the Effects of Competition for Railway Markets. International Journal of Industrial Organization, *26*, č. 2, s. 443 – 458.

[8]   LALIVE, R. – SCHMUTZLER, A. (2008): Entry in Liberalized Railway Markets: The German Experience. Review of Network Economics, 7, č. 1, s. 37 – 52.

[9]   Nariadenie Európskeho parlamentu a Rady (ES) č. 1370/2007 o službách vo verejnom záujme v železničnej a cestnej osobnej doprave, ktorým sa zrušujú nariadenia Rady (EHS) č. 1191/69 a (EHS) č. 1107/70. Dostupné na: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri= OJ:L:2007:315:0001:0013:SK:PDF>.

[10] STANLEY, J. – VAN DE VELDE, D. (2008): Risk and Reward in Public Transport Contracting. Research in Transport Economics, 22, č. 1, s. 20 – 25.

[11] VAN DE VELDE, D. – BECK, A. – VAN ELBURG, J. – TERSCHUREN, K. (2008): Contracting in Urban Public Transport. Amsterdam: European Commission, 123 s.

[12] van de Velde, D. – Veeneman, W. – Schipholt, L. L. (2008): Competitive Tendering in the Netherlands: Central Planning vs. Functional Specifications. Transportation Research, Part A, 44, č. 42, s. 1152 – 1162.

[13] WALLIS, I. – BRAY, D. (2001): Competitive Tendering for Bus Services: The Improved Adelaide Model In: Thredbo 7. [7th conference on competition and ownership of land passenger transport.] Dostupné na: <http://hdl.handle.net/2123/6309>.

[14] Wallis, I. – Bray, D. – Webster, H. (2010): To Competitively Tender or to Negotiate – Weighing Up the Choices in a Mature Market. Research in Transport Economics, 29, č. 1, s. 89 – 98.

[15] Zákon č. 514/2009 Z. z. o doprave na dráhach. Dostupné na: <http://www.urzd.sk/legislativa/514-09-zakon_o_doprave_n a_drahach.pdf>.

[16] Zákon č. 56/2012 Z. z. o cestnej doprave. Dostupné na: <http://www.zbierka.sk/sk/predpisy/56-2012-z-z.p-34596.pd f>.