The Effect of Subsidies on the Offer of Sea Transport
Učinak subvencija na ponudu u pomorskom prometu

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DOI 10.17818/NM/2017/2.3
UDK 656.61:338.47
Review / *Pregledni rad*
Paper accepted / *Rukopis primljen:* 6. 11. 2016.

Summary

The main goal of this academic discussion is to study the effect of subsidies on the offer of sea transport. Research results are based on the method of microeconomic analysis. The knowledge obtained through this academic discussion may prove to be of assistance to managers in the area of sea transport in deliberating on more efficient and market-oriented business models. The results of this work reveal that subsidies in sea transport make sense if they contribute to the improvement of the quality of transport or are of help to those for whom they are intended.

KEY WORDS

sea transport
offer
subsidies
shipping companies
passengers

Sažetak

Temeljni je cilj ove znanstvene rasprave istražiti učinak subvencija na ponudu u pomorskom prometu. Rezultati istraživanja temelje se na metodi mikroekonomske analize. Dobivena saznanja u ovoj znanstvenoj raspravi mogu koristiti menadžerima u pomorskom prometu u funkciji promišljanja efikasnijeg i više tržišno orijentiranog poslovnog modela. Glavna je spoznaja ovoga rada da subvencije u pomorskom prometu imaju smisao ako pridonose poboljšanju kvalitete prijevoznih usluga ili pomažu onima kojima su namijenjene.

KLJUČNE RIJEČI

pomorski promet
ponuda
subvencije
brodari
putnik

1. INTRODUCTION / *Uvod*

Governments apply profit and income taxes, value added tax, taxes on property and games of chance, and often also special taxes – excise taxes (on petroleum and petroleum products, tobacco products, alcohol, non-alcoholic drinks, personal automobiles and other motor vehicles, watercraft and aircraft, luxury products) and taxes on insurance policies for the liability of road vehicles. Tax is paid for every product unit that is purchased or sold. When the government pays the producer or consumer a certain amount of money for every purchased and sold product, this is called a subsidy. Mathematically speaking, subsidies are the negative function of taxes.

Pursuant to Article 4 of the Ordinance on the Conditions and Evaluation of Criteria for Granting Concession and Concluding Contracts on the Provision of the Public Service of Public Transport through Scheduled Coastal Transport Routes [1], ″for routes of general economic interest in cases when the profit generated from providing services cannot cover the expenses incurred by the provision of public services (not-for-profit routes), shipping companies are granted a compensation for providing public services″. In order for the modest offer for the less commonly used routes not to seriously endanger the mobility of certain populations (for example, the population that lives on the islands), and in order to reduce subsidies as much as possible, public tenders are issued for such routes. The Government, i.e. the Ministry of Transport sets parameters for each of the routes offered, and the speed and capacity of superstructure assets. Thus the Government, through subsidies, has at its disposal a sophisticated instrument for regulating market relations, i.e. regulating the offer of transport services [2].

2. THEORETICAL FRAMEWORK AND RESEARCH PROBLEM / *Teorijski okvir i istraživački problem*

Subsidies in transport can be understood as a form of financial aid by which the expenses related to consumption (in the case of users), or the expenses related to production and service (in the case of service providers) are reduced. By using subsidies as an economic instrument, the government aims to improve transport, i.e. ensure a sustainable offer of transport products and services [3]. The exemption of transport from certain taxes, or the introduction of different forms of tax relief has an effect identical to that of subsidies. The European transport sector is heavily subsidised by direct transfer as well as by tax reduction [4]. Europe needs to reduce the subsidies given to transport services [5]. The best way to do that are privatisation of transport industry and flexible labour market.

In the Republic of Croatia, large transport companies are largely state-owned (Hrvatske ceste, Hrvatske autoceste, Hrvatske željeznice-Putnički prijevoz, Hrvatska pošta, *Croatia Airlines*, Jadrolinija). These companies have been dependent on the state budget for years, thus impeding the faster development of the Croatian economy and transport system. In accordance with this, the importance of the

Table 1 Subsidies in the transport sector EU-25, in billions of EUR for 2005
Tablica 1. Subvencije u prometnom sektoru EU-25, u milijardama eura za 2005. godinu

Type of transport	Subsidies for infrastructure (EU-15)	Other transfers from the state budget	Fuel tax exemptions	VAT exemptions	Total
Road	110	7	0	9	125
Railroad	37	33	0-1	3	73
Air	0	1	8-16	18	27-35
Water	10	1	3-19	0	14-30
Multimodal	-	30	-	-	30
Total	156	73	11-36	29	269-293

Source: Adapted by the authors from: [7], p. 7.

good management of state-owned transport companies is an issue that is gaining prominence, all with the aim of turning these companies into a generator of development instead of a generator of insolvency, losses and the reduced competitiveness of the entire Croatian economy. According to the analysis conducted as part of the government's *Clean Start* project, though the sector of maritime affairs, transport and infrastructure that is under the control of the state receives HRK 5.7 billion in state subsidies per year, it nevertheless generates losses of HRK 1.2 billion per year, with debt amounting to HRK 68.8 billion. The most common beneficiaries of state subsidies are road transport, with HRK 3.04 billion (53.3%) and railroad transport with HRK 1.87 billion (32.8%). In comparison with other forms of transport (road and railroad), sea transport has a relatively low share of subsidies and other transfers, amounting to just 20.9% [6]. Up to this point, the majority of support for sea transport has been related to scheduled transport services pursuant to the Programme for Transport Connections Between the Mainland and the Islands, and Vice Versa. Thus, for example, sea transport was supported with HRK 3.2. billion between 2002 and 2009. The Croatian Government in 2017 is planning to subsidies public coastal liner shipping with HRK 310 million. Only for the coastal ferry line Rijeka-Dubrovnik 40 million HRK is needed.

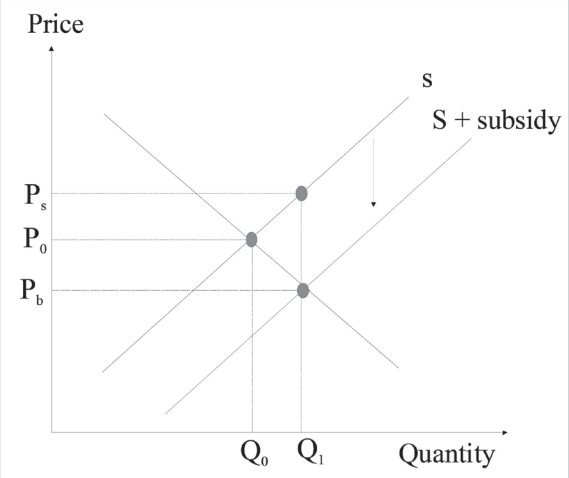
In accordance with the aforementioned, it is evident that transport companies are in need of a new business model that would be primarily oriented towards profits from the market, and less dependent on subsidies from the state. The situation is similar in the rest of the European Union, as well (cf. Table 1).

Based on the information in Table 1, it is evident that subsidies in EU-25 countries amount to over EUR 290 billion per year (the data includes only direct transfers and tax exemptions), and that the biggest users of these subsidies are road and railroad transport. By entering the EU, the Republic of Croatia also adopted the responsibility of applying the rules of the European Union that advocate ˝smaller, but better˝ subsidies.

Although transport subsidies sound good in theory, particularly when it comes to subsidising transport for seniors, the disabled, pupils and students, economists are increasingly of the opinion that subsidies undermine market relations in transport, and that it is difficult to get a clear image of all their positive and negative effects. The problem with subsidies becomes greater when they are inappropriately applied. If transport subsidies do not contribute to the improvement of the quality of transport or are of no help to those for whom they are intended, then they lose their point entirely. Furthermore, the granting of state subsidies[1], particularly when it comes to those subsidies that help only select companies, is accompanied by several pitfalls [8]: 1) such state subsidies do not include only direct expenses, but also indirect ones; 2) the state does not possess the information that is necessary to make a better selection of ˝winners˝ and/or ˝losers˝ than the market; 3) the state does not know when to terminate assistance, or how to resist lobbying groups; 4) state subsidies lead to disloyal competitors; 5) state subsidies may create problems in international trade and; 6) state subsidies encumber the state budget.

3. RESEARCH RESULTS AND DISCUSSION / *Rezultati istraživanja i rasprava*

The effect of subsidies on the offer of sea transport is vividly illustrated in Graph 1.



Source: Prepared by the authors according to: [9]

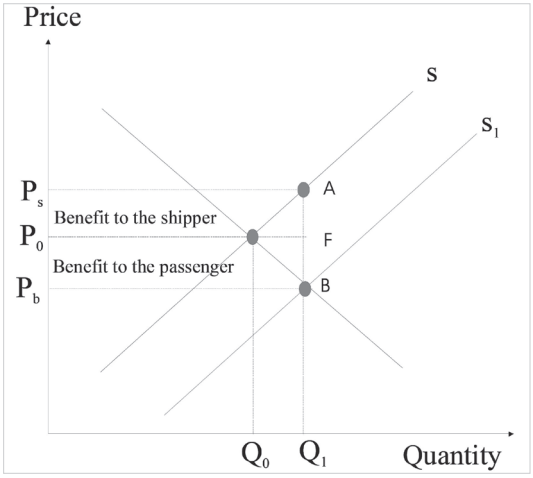
Graph 1 The effect of subsidies on the offer of transport
Grafikon 1. Utjecaj subvencija na ponudu u prometu

Based on Graph 1, it is evident that, after the introduction of subsidies, the offer curve moved down and to the right for the same amount. The effect of introducing subsidies is twofold: 1) prices for transport services become lower, and 2) the amount

[1] According to the EU's methodology, in addition to subsidies, government support also includes other instruments that are perhaps less obvious, such as: 1) state guarantees; 2) affordable loans granted by the Croatian Bank for Reconstruction and Development (HBOR); 3) loans granted by the Croatian Privatisation Fund (HFP) for the payment of salaries; 4) selling/renting state-owned land to entrepreneurs at a price that is more affordable than the market price; 5) entrepreneurs selling land to the state at a higher price than the market price; 6) allowing access to public infrastructure without the payment of contributions for the use of this infrastructure; 7) capital increases provided by the state to entrepreneurs through so-called risk capital, under terms that are more affordable than those offered by private investors, etc.

of transport services increases. When subsidies are introduced, the amount of money received by the ship company (P_s) is equal to the amount of money paid by passengers in sea transport (P_b), increased by the subsidy amount (S). The opposite also applies - the amount of money paid by passengers in sea transport (P_b) is equal to the amount of money received by the ship company (P_s) reduced by the subsidy amount (S).

Here, the issue of the shifting of economic benefits from subsidies imposes itself. To whom the economic benefits of subsidies go, you can see from Chart 2.

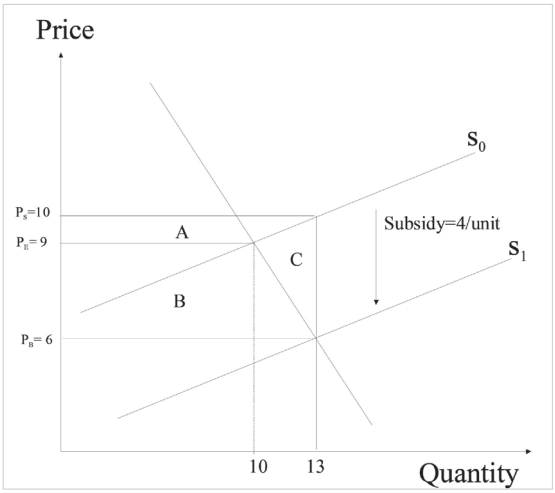


Source: Prepared by the authors according to: [10]

Graph 2 The benefits of introducing subsidies
Grafikon 2. Prednosti uvođenja subvencija

As can be seen in Graph 2, the state budget expenses related to the introduction of subsidies are depicted by rectangle P_sABP_b. The benefits for passengers in sea transport do not correspond to the full amount of the subsidy, as the price for users is reduced merely from P_0 to P_b (benefit per unit), thus the total benefit for passengers is depicted by rectangle P_0FBP_b. Benefits for ship companies due to a price increase merely from P_0 to P_s (benefit per unit) also does not correspond to the full amount of the subsidy, but only to the part marked with rectangle P_sAFP_0.

In accordance with this, we shall now consider the following example (cf. Graph 3).



Source: Prepared by the authors according to: [10]

Graph 3 Initial and subsidised offer curves
Grafikon 3. Početne i subvencionirane krivulje ponude

Due to the importance of the operation of scheduled coastal transport routes, regional authorities have decided to subsidise tickets from urban centres to islands. Subsidies allow ship companies to reduce expenses related to passenger transport by sea and to increase their offer from S_0 to S_1. Graph 3 depicts the difference between the initial offer curve and the subsidised one. This difference is equal to the subsidised amount of EUR 4 (EUR 10 - EUR 6). The effect of the subsidy is the increase of the daily offer from an equilibrium amount of 10 to 13 departures, which corresponds to the demand for tickets priced EUR 6. Passengers now pay EUR 6 for tickets instead of the equilibrium price of EUR 9, while ship companies now receive EUR 10 instead of EUR 9.

Graph 3 also illustrates the elasticity of the supply and demand curve. Due to the flatness of the curve, the ship company receives a smaller subsidy amount (marked with area A) than the passenger in sea transport (marked with area B). The amount received by ship companies can be determined by calculating the area of the trapezium (P = m×h). As m is a central line that is parallel to the bases, it is calculated as m = (a+b)/2, while h is the height. Therefore it can be determined that the benefit to the providers of transport services is EUR 11.50, and that the benefit to the users of transport services is EUR 34.50.

The total subsidy amount can be determined by calculating the area of the rectangle, which amounts to EUR 52 (13×4), while area C signifies subsidy losses and is calculated as the difference between the total subsidy amount of EUR 52 and the sum of the benefits for the users of transport services (EUR 34.50) and the benefits for the providers of transport services that amount to EUR 11.50 [C = 52-(34,50+11,50) = 6]. This sum can also be calculated from the area of the triangle (P = $(a \times v_a)/2$).

4. CONCLUSION / *Zaključak*

The offer of transport services is a function of the prices of transport services, transport infrastructure, transport superstructure, the type of goods being transported, the goals of the state and of transport companies, the technical equipment of transport companies and human resources. With the help of subsidies as an economic instrument, the state aims to improve sea transport activities, i.e. ensure a sustainable offer of transport services. Although economists are increasingly of the opinion that subsidies undermine market relations in sea transport and say that it is difficult to get a clear image of all their positive and negative effects, it seems appropriate to stress that subsidies in sea transport lose their point entirely if they do not contribute to the improvement of the quality of transport or are of no help to those for whom they are intended. The practical example presented proved the positive effect of subsidies on the offer of transport, while the benefits from subsidies are divided between ship companies and passengers depending on the elasticity of supply and demand. In this, it is important to note that economic indicators are, as a rule, not the only indicators of the success of a subsidised route. Establishing efficient transport connections along the coast and between the mainland and islands often yields benefits to society in general and significantly improves quality of life, thus also contributing to one of the fundamental developmental aims-

the even development of all regions. Therefore, these factors also ought to be taken into consideration when discussing the needs and models related to the connection of certain transport routes.

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