

METHODOLOGICAL PRINCIPLES OF FORMATION OF TARIFFS FOR RAILWAY

Authors' contributions

This work was carried out in collaboration between all authors. Author DA designed the study and defined the motivation for the paper as well as the research objectives. Author MYTAD wrote the literature. Author MA did the analysis and discussions. All authors took part in the writing of the conclusions and discussions, read and approved the final manuscript.

Article Information

ABSTRACT

Aim of this paper is to research the approaches that affect the efficiency of government regulation of tariff for railway transportation industry in both sectors in scientific and methodological way.

Study Design: The study uses an Exploratory Design.

Place and Duration of Study: Ukraine, between the periods 2015 to 2016.

Methodology employed was the Narrative Textual Case Study (NTCS) method, while non-probability and convenience sampling technique was used to select the sample size.

Results: The study found that in the current economic conditions the implementation of administrative regulatory infrastructure component makes use of unilateral restriction that allows the cost recovery fees for services infrastructure and determine the volume of necessary financial support in case of unprofitable rates. Regarding the operational component, the creation of tariff conditions for competition requires bilateral limit, which allows to determine the economically justified the lower and upper boundaries within which the price depending on the factors set fees sphere of operation. This approach to pricing regulation in potentially competitive sector allows carriers to limit the boundaries of flexibility to respond to changing conditions of transport markets, consider the price elasticity of demand, positive trends in the use of the laws of the market economy. Sharing unilateral restrictions to justify the fees for services natural monopoly and bilateral - in potentially competitive services sector is a competitive motivational method of pricing, which meet the requirements of effective functioning of natural monopolies in the market environment, and provides irreversible monopolization of potentially competitive sectors.

Conclusion: Motivating the price competitive regulation will establish market-oriented competitive tariffs for freight and passenger transportations, and also promote creation of conditions for adaptation of railway transport to enhance competition in the transport market.

Keywords: monopoly; railway industry; pricing regulation; production volume; competition; natural monopoly; potentially competitive sector.

1.INTRODUCTION

The transition to market economy requires adaptation of government regulation of tariff on passenger and freight rail transport of Ukraine to the current requirements. Necessity of government regulation on tariffs for railway caused in the first place, the distribution of the railway industry in natural monopoly and potentially competitive sectors, and secondly, the monopoly position of railways in the market of railway transport, and thirdly, establishing high monopoly prices for services rail transport in natural monopoly sector. In particular, the use of government regulation of railway tariffs due to the need to enhance competition and ensure a smooth transition to free pricing in the sector of operation, and to prevent the establishment of unjustified levels of tariffs for natural monopoly sector.

As market conditions rate is an important factor affecting both the financial condition of railways, and the performance of individual sectors and the economy, as a whole. Railways set a high tariff levels, requiring constant regulation of pricing in order to balance the interests of all participants in the transportation process.

Meanwhile, existing methods for regulation of tariffs for railway transportation in conflict with the requirements of market economy, holding back market reforms in the railway sector, reducing the effectiveness of its functioning and slowing economic growth in the country.

Increased competition in the transport market requires constant adaptation to the railway industry market environment, which necessitates the use of competitive motivational method of regulating tariffs for railway transportation of Ukraine for the effective functioning of the industry and the economy as a whole.

2. LITERATURE REVIEW

The study of government regulation of tariff for railway very important today. Ukrainian researchers like Kolesnikova (2015), Bulgak(2009), Ilyin, (2012) work devoted to this issue

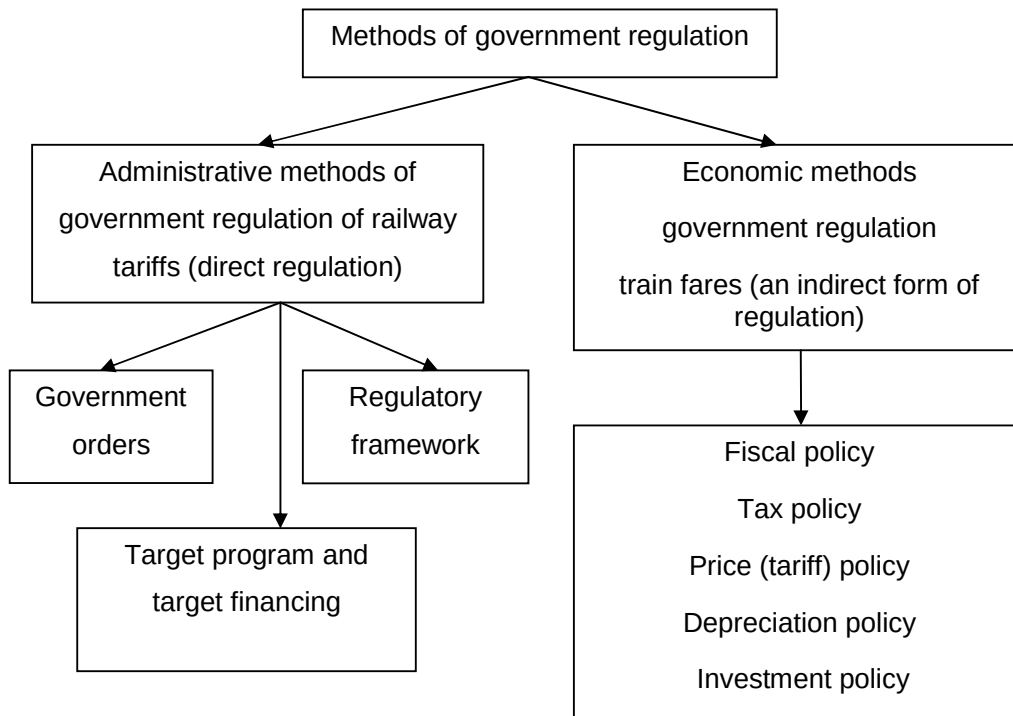
64 but none of these authors did study the scientific and methodological approaches to the
65 government regulation of tariff for freight and passenger rail transportation. tariff

66 **3. METHODOLOGY**

67 The main purpose of Railways in the conditions of development market relations is obtaining
68 the maximum possible profit and satisfaction of consumer needs in full. Lower profits in the
69 industry reduces its capacity and maintenance in proper condition of material-technical base,
70 and the complete disappearance of profit will cause the removal of capital from the industry.
71 It is therefore considered necessary to conduct a study of scientific and methodological
72 approaches to government regulation of tariffs for railway transportation, with the aim of
73 achieving goals that are different for both sectors of the railway transport.

74 Tariff policy in respect of transport services mostly depends on the government approach to
75 the system of tariff setting. Government regulation of tariffs on railway transportation should
76 be carried out by administrative and economic methods of regulation, and this classification
77 is given in fig. 1.

78 The administrative method of government regulation of tariffs for the services of the railways
79 is a regulation using the tools of the regulatory framework and government influence on the
80 regulation of tariffs for transport services. The use of this method of regulation for the
81 services sector of the railway infrastructure caused by natural phenomena and is due to the
82 fact that this sector, according to the Law of Ukraine "On natural monopolies", is the subject
83 of natural monopoly (The Law of Ukraine "On natural monopolies", 2013) [4]. The tools of
84 the administrative method of regulation of tariffs for services of railways are government
85 orders, regulatory framework, target program and target financing.



86

87 Figure 1. Classification of methods of government regulation of tariff for railway services

88 3.1 Statement of the Problem

89 Providing the necessary legal framework is a priority for the operation of any entity.
 90 Currently, legislation on price regulation for services not both sectors is systemic and needs
 91 improvement. Therefore, to improve the competitiveness of the railway sector and improve
 92 its functioning should be divided natural monopoly and potentially competitive sectors of
 93 railways, and appropriate legal framework for government regulation of pricing the services
 94 sectors both railways. This, in turn, requires changes in existing regulations and laws (in this
 95 case, some of them will be the same for both sectors of railways, and some will be different,
 96 and can be used to regulate only one of the sectors).

97 Developed and introduced new legal framework will set fees for the use of infrastructure in
 98 the form of regulated tariffs and sector of operation to promote the transition to free prices
 99 from active competition between carriers for the provision of services. In the infrastructure
 100 sector always operate instruments of government regulation of tariffs as railways
 101 infrastructure is the subject of natural monopoly. But the sector operated by means of
 102 government really necessary for monopolistic competition in which entities set
 103 monopolistically high prices which do not conform to society's ability. Therefore, the

104 transition from monopoly to free competition in the area of operation will increase the
105 efficiency of rail transport.

106 Targeted funding and public contracts as tools of government regulation of tariff
107 transportation service mark its influence on regulation freight and passenger rail
108 transportation. According to the Law of Ukraine "On Railway Transport" targeted funding to
109 be provided by the government budget of Ukraine(5). The need for public funding in
110 infrastructure sector is the result of government regulation, since the government insists on
111 setting too low tariffs for infrastructure sector to meet the needs of society. But given the
112 government level of tariffs does not provide the normal reproductive process of the railway
113 infrastructure and railway transport losses are at regulated tariffs.

114 Therefore financing of natural monopoly railway sector should be provided as fees for the use
115 of infrastructure and by grants from the government and local budgets. The infrastructure
116 sector is under the supervision of the government, and the fee for the use of railway
117 infrastructure is regulated by the government and budget financing should ensure the
118 implementation of the government control infrastructure, support for rail infrastructure
119 transport system and target subsidies to unprofitable shipments.

120 Target program for the development of railways are divided into medium and long-term
121 government program not only for reconstruction, but also in some cases new construction of
122 rail lines. Targeted funding requires addressing the issue of public funding in infrastructure
123 construction which are protective, national and regional importance do attract funds from
124 national target programs, budgetary subsidies for infrastructure development, providing
125 transportation for government needs and socially important transportation. Solving these
126 problems will have a positive impact on the establishment of fees for the use of railway
127 infrastructure, since in this case there is the possibility to reduce the level of the tariff for its
128 use.

129 Government orders represent a change for the infrastructure at the lower of cost and provided
130 by the public administration financed from the government budget and designed to meet
131 national needs. Government financial incentives, orders and purchases under the economic
132 program have a significant impact on profitability, sustainability and competitiveness of the
133 railways, which positively affects the economy and increases the purchasing power of users
134 [6].

3.2 Model Specification

Government regulation of tariffs for passenger and freight transportation in sector of operation through economic method is very efficient, because railroads continue to occupy a monopoly position in the market of railway transport. If the operation of monopolistic competition in the operational sector by virtue of objective economic laws (monopolization, concentration, centralization), the relevant entities will be combined to form a monopoly associations enabling them to establish high monopoly prices. Creating a monopoly associations make medium and small carriers redirect their activities to other sectarian economy. Factor countering this trend is only government regulation based on economic methods. Government regulation of tariffs in its sectarian operation with the objective economic law of competition should force entities competes with one another in response to changing market conditions. If the active promotion of competition in the sector operation considered appropriate gradual shift from direct government influence on the process of tariff for the services sector, said the railways. But the need for indirect government influence on fares is because it is necessary to gradually start using economic methods of regulation of tariffs [7].

The tools of economic methods of government regulation of tariff for the services of the railways are appropriate budget, tax, depreciation, investment and pricing policies.

Fiscal policy should include government funding losses from unprofitable railway transport, and the financing of reconstruction and modernization of the infrastructure sector. Tax policy should be aimed at the implementation of preferential taxes which will boost competition in the potentially competitive sector. The use of fiscal and tax policies in the sector caused by the operation of the need to ensure equal competitive conditions for all participants in the traffic, without creating undue competitive advantage to individual entities.

Depreciation policy aims to target the accumulation of money and use them to pay worn assets and carrying value of fixed assets gradually worn on the cost of services provided by the railways. The government determines the order of depreciation, and the entity through accelerated depreciation reduces the amount of income subject to taxation, stimulating the rapid introduction of new technology [8].

One reason for high costs of maintaining the railway infrastructure is the lack of additional investment. Therefore, the main objective of the investment policy of government regulation of tariff for the services of railways is developing and enforcing mechanism to attract necessary funding for compensation as fixed costs in the process of transportation and investment into the infrastructure. In the absence of rail infrastructure investment from the budget, railways continue to carry unprofitable social traffic and work at a loss.

The main role in the whole system of government regulation of the economy plays to maintain an appropriate level of prices, because the imbalance price mechanism leads to devastating consequences. It is clear that pricing is the main hub of action for government regulation of tariffs for rail transportation. On reaching the free competition in the potentially competitive sector of the market will force independent of the carriers to reduce their costs, improve the quality of service provided by railways.. which is a necessary condition for the transition to free competition. In the result of the interaction of supply, demand, and competition set the market price, which should provide coverage of businesses and profits [9].

In the implementation process of freight, transport is used as an infrastructure sector and sector of operation. In particular, in the area of operating with the method of administration need to move from monopoly to free competition, which will contribute to the introduction of free pricing in this sector. Freight transport is a continuation of the process of production, and the passenger meets the needs of consumers. Therefore, tariffs for freight transport should take into account the competitiveness of freight and passenger fares should focus on the effective demand of the population.

The process of passenger transportation sector provided the infrastructure and operation, but competition in the sector is no operation and 100% of the market belongs to the railways. Government intervention in the infrastructure sector with the administration method aims assumptions not setting high tariffs and the creation of conditions in which the rail tends to reduce their costs.

Any decline of paying for the use of railway infrastructure on condition of government control is possible only at a complete compensation to the infrastructural company of the received less profits, that it is envisaged by the legislation of Ukraine. In turn, the current legislation of Ukraine in area of establishment and adjusting of paying for services to the sector of infrastructure and sector of

exploitation does not answer principle of the system and principle of publicity and openness, that does not allow effectively to function to the subjects of manage and provide the normal process of recreation. The size of sponsorship of infrastructure of railway transport in case of establishment of subzero tariffs, that will not provide the simple recreation of railway infrastructure, is determined after:

$$\Delta F_p = (T_b^i - T_d^i) V_{tr}^{bb} \quad (1)$$

where is T_b^i - base tariff for the use of infrastructure of railway transport during realization of transportation;

T_d^i - operating tariff for the use of infrastructure of railway transport during realization of transportation;

V_{tr}^{bb} - volume of transportations that come true for to the tariffs, below base value.

Methodological bases of determination of paying for services of managing subjects, that function in the field of exploitation, includes determination of low and overhead bounds of change of level of paying for services to the sector of exploitation. The subjects of manage, that render services in the sector of exploitation of railway transport, can set the very subzero paying for services potentially competition to the sector on routes, where a competition is, getting profits adequate to providing of necessary level of functioning here. Establishment of paying for services on the base of excessive internal subsidies causes discrimination of passengers and owners of goods of monopolistic routes the sector of exploitation, for this reason it is necessary to develop a healthy competition in the sector of exploitation that will allow to set the reasonable paying for services to the sector of exploitation.

Level of lower limit of paying for services on freight transportations it is determined after the sector of exploitation:

$$T_e^{l(f)} = C_e^p + \Delta I_e^p \quad (2)$$

where is C_e^p - economically reasonable prime price of paying for services to the sector of exploitation on freight transportations;

222 ΔI_e^p – an income of subjects of manage is in the sector of exploitation on freight
223 transportations, the size of that provides a simple recreation.

224 Based on the conditions of competitiveness of freight transportation, as well as from the fact
225 that the fee for the use of railway infrastructure is determined on the basis of the base rate, the upper
226 limit of charges for freight transport is determined by the formula:

227
$$T_e^{u(f)} = \Delta DS - T_i^{b(f)} \quad (3)$$

228 where is ΔDS the difference between the demand price and supply price.

229 Passenger railway transportations must take into account, firstly, publicly necessary charges of
230 railway transport on the process of transportation, secondly, upgrading of service on the draught of
231 journey, and, thirdly, competitiveness and profitability of passenger transportations by a railway
232 transport in comparing to other types of transport.

233 Level of lower limit of paying for services on passenger transportations it is determined the sector of
234 exploitation after a formula:

235
$$T_e^{l(p)} = C_e^p + \Delta I_e^p \quad (4)$$

236 where is C_e^p – economically reasonable cost of fee-for-service sector operation of passenger
237 transport;

238 ΔI_e^p – profit entities for passenger transport, which provides a simple reproduction process
239 sector operation of rail transport.

240 Having regard to the stated, the top limit of paying for passenger railway transportation will be
241 determined on formulas:

242
$$T_e^{u(p)} = I_{aa} \alpha - T_i^{b(p)} \quad (5)$$

243 where is I_{aa} – the average annual income per one person;

244 α – the proportion of annual income which can be spent on transportation costs.

245 At the managed paying for services to the sector of exploitation authorized public organs
246 must in detail analyze, or sufficient size of profit (or indemnifications) and depreciation

decrees for providing of normal reproductive process to the subjects of manage, that render services in the sector of exploitation. The mechanism of government control of paying for services to the sector of exploitation realization of such analysis and grant must envisage after a necessity to railway industry of corresponding sponsorship that is envisaged by the state budget.

Thus, regulation of tariff for the services sector as infrastructure for freight and for passenger transport should be treated equally, and government regulation of tariffs for freight and passenger traffic in potentially competitive sectors of railways will be different.

4. RESULTS AND DISCUSSION

To improve the actions of government regulation of tariffs for railway should consider the impact of administrative and economic methods of regulating the installation of infrastructure fees and the establishment of tariffs for operation in the sphere of passenger and freight rail transportation.

Consider the impact of economic instruments method for operating activities sector separately for freight and separately in rail transportation. Budget policy should be improved, to ensure the normal process of reproduction as a priority improvement are: reduction of budget funds aimed at directly subsidizing unprofitable rail traffic by profitable since unprofitable railway transport limit the ability to update the material and technical base; increasing use of budget financing of investment projects involving the private capital that will upgrade old and build new infrastructure on the basis of budget financing and involved the participation of private investment funds. Brought financial resources contribute to the development of infrastructure and provision of normal reproductive process; budget planning expansion, reflecting the strategic direction of transport, production capacity will keep repair facilities and provide the necessary amount of repair rolling stock in terms of increasing rail traffic [10].

Given the above, it can be noted that fiscal policy significantly affects the regulation of passenger transport, as the impact of fiscal policy on them is determined by the necessity of their funding from the government because they are unprofitable. To create competition in the field of passenger transport it is necessary at the legislative level to make a decision on liquidation of unprofitable passenger terminals and to determine the feasibility of bringing

the tariffs on passenger transportation services to the **most economical** due to cost and the allocation of budget funds for compensation of losses **in** passenger transport, in connection with the exercise of their price regulation.

The first priority of tax policy is to develop programs that will contribute to building and enhancing an appropriate competitive environment, the long-term existence of free competition between operators on the basis of free prices.. Instruments of tax policy aimed at creating equal competitive conditions for participants of the transport process, allowing **increasing** the competitiveness of Railways on the transport market.

In the absence of legal documents defining the clear ideology of the tariff policy, it is not possible to exercise effective tariff regulation in the sphere of freight transportation on the railway transport. Pricing policy should aim at decision-making on the introduction, modification or cessation of regulation of railway tariffs in certain market segments of Railways.

Depreciation policy **makes** a significant impact on passenger and freight transportation. The high degree of depreciation of fixed assets that require large expenses for their current detention threatens the loss of technological stability railways and identifies the need for investment. The purpose of the investment policy updates and technical re-equipment production base process, transport, development of technological and social opportunities for the development of public transport demand increasing, and must ensure the formation of sources of financing of investment programs.

5. CONCLUSIONS AND POLICY RECOMMENDATIONS

As, all the tools of administrative methods of government regulation of tariff for services in the application infrastructure are important, but every tool of influence occurs at some point, that the first legal framework, public order and national target programs and targeted funding. Also, it is clear that economic methods of government regulation of pricing on service areas of operation of railway transport **aim** at enhancing competition and did not have any impact on the infrastructure sector since the establishment in natural monopoly sector competition is not possible. Records obtained in the course of study in the development of government regulation of pricing on the railways will make it effective that today is very important for both the rail industry and to the economy [10].

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Kolesnikova, N. (2015). Creation of an effective mechanism of government regulation of pricing for rail transport: problems and prospects. Proceedings of HNADU: Economy of The Transport Sector, p. 122-128.
2. Bulgak, V.A. (2009). On Increase of The Effectiveness of The Government Regulation On Tariffs Transport Services. Journal of Transport Information, vol.5-6, p. 3-40.
3. Ilyin, I. (2012). For Common Approaches To Targeted regulation in Rail transportation. Journal of Transport Information, vol. 59, p. 3-24.
4. The Law of Ukraine "On natural monopolies" (2013). Supreme Council of Ukraine (official publication), vol. 30, p. 552-559.
5. The Law of Ukraine "On Railway Transport" on July 4, 1996 №274 (96-VR.9). Voice of Ukraine, vol. 169 (1419).
6. Gladkih, D (2001). Government Regulation of The Economy With Cost-Push Factors. Economy of Ukrain, vol. 1, p. 47-52.
7. On the Principles of State Regulatory Policy in The Sphere of Economic Activity: law of Ukraine from 11.09.2013 (2014). Bulletin of the VRA, vol. 9, p. 79.
8. Slepov, V (2002). Regarding State Regulation of Tariffs on Transport. Finance of Ukraine, vol. 4, p. 67-69.
9. Wenger V (2005). State Regulation of Prices for Products of Natural Monopolies. Finance of Ukraine, vol. 3, p. 82-89.
10. Revutska O (2006). The Prerequisites of Perfection of State Regulation of Tariffs for Passenger and Freight Transport. Bulletin of Kharkov national University V. N. Karazin, vol. 719, p. 107-111.