

Behaviours of Bus Operators in the Regulated Competition Market—on the Example of Silesia Region of Poland

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Abstract The purpose of this chapter is the analysis of behaviours of operators in the regulated competition market. The subject of study is the public transport market, which is organized by KZK GOP (Municipal Transport Union of the Upper Silesian Industrial District) in Katowice. This chapter contains analyses of: concentration of bus transportation market, results of tendering proceedings and action strategies of operators. This chapter in particular tackles the issue of the process of merging entities into consortia. The main conclusions of the performed analysis concern three issues. Firstly, municipal carriers have the dominant position in the market and usually do not compete with each other. Secondly, there is large pressure from private carriers. Thirdly, the phenomenon of cooptation occurs frequently; depending on the situation, carriers either compete or cooperate in the field of winning transportation orders. Cooperation manifests itself mainly in the process of establishing consortia, which allows the involved entities to meet the requirements specified in the terms of reference.

Keywords Public transport · Market behaviours · Bus operators

Introduction

The public transport market is characterised by natural monopoly. However, in the case of public transport market characterized by a considerable operational work value, market mechanisms can be applied. The model in which operation work is contracted by a public transport organiser through tendering proceedings is referred to as ‘regulated competition’. This model assumes competition between public transport operators in the field of executing transport in particular communication routes. The purpose of this chapter is the analysis of behaviours of operators

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providing bus services in public transport in the regulated competition market. The analysis covers the market of KZK GOP (Municipal Transport Union of the Upper Silesian Industrial District), which is the largest public transport market in Poland characterised by market competition. This chapter discusses the specific character of public transport markets, characteristics of the analysed market and analysis of behaviours of operators in 1999–2015. For this purpose, the following issues have been analysed:

- market concentration, on the basis of cumulative and discrete measurements,
- tendering proceedings,
- behaviours of entities, with special regard to the phenomenon of coepetition.

As a result of the analysis, it has been determined that municipal operators have the dominant share in the market, there is a price pressure on the part of private entities and the phenomenon of coepetition occurs.

Models of Public Transport Organization

The municipal transport market is a fragmentary market whose basic specification is determined by [1]:

- transport services in the field of passenger transport as the object of exchange,
- municipal transport companies as service producers and households as purchasers of these services,
- local spatial range limited to the area of one or several cities forming agglomeration with the related suburban areas.

The municipal transport market is characterized by the occurrence of natural monopoly. Natural monopoly is a situation in a goods and services market when occurrence of more than one producer would not be economically justified [2]. This is due to high infrastructural costs and other market entry barriers, which means that the first supplier in a particular market gains a significant competitive advantage over his potential competitors [3]. Natural monopoly is strictly related to the market size [4]. In the case of small towns reporting demand for a relatively low volume of operation work, there might be a situation in which one transport company can be able to satisfy the entire demand. Moreover, this may be more effective than in the event of implementing pro-competitive solutions in such a market.

By adopting the criteria for distinction of the organizer and demonopolization in the field of transport, four organization models can be distinguished (Table 1). Taking up a discussion concerning behaviours of market entities is relevant only in the case of demonopolization of the operator market. Two models which meet the above criterion can be distinguished: transport deregulation and competition regulated by the transport authority. The first of them is not applied in Polish conditions; therefore, the further analyses are focused on the regulated competition model.

Table 1 Models of public transport market organization

		Demonopolization criterion	
		Operator monopoly	Demonopolization of operator market
Separation of functions criterion	Consolidation of functions	Dominating operator	Deregulation of municipal transport
	Separation of functions	Dominating operator controlled by the transport authority	Competition regulated by the transport authority

Source [5]

Due to e.g. occurrence of entry barriers or the functioning of public entities, the municipal transport market is among poorly liberalised markets, which causes domination of oligopolistic structures. The regulated competition market consists in appointing transport authority performing the function of organizer, who commissions operators to perform specific operation work through competitive proceedings. This solution brings economic benefits resulting from market pressure imposed on operators. In order to maintain their market position, they aim at providing services which meet the expectations of purchasers. Purchaser is a transport organizer who is enabled to verify the cost level of operators and select the most favourable offer submitted through tender proceedings thanks to the competition in the market. Reduction of expenses manifested by lower costs of operation work unit is a tangible result of competition between operators. The model of municipal public transport organization, based on regulated competition, has a number of advantages. The main advantages include [6]:

- market verification of unit prices—orders can be won by different operators in terms of entity size, organizational and legal forms of conducting business, as well as ownership and country of entity capital origin,
- impact of public authorities on the size and parameters of transport offer, as well as performance of public control of the organization of municipal transport and cash flows,
- possibility of privatization of public municipal transport operators.

Market Characteristics

The process of economic transition had an impact on significant changes in public transport organization. During the period of centrally planned economy, public transport was provided by special public companies—Wojewódzkie Przedsiębiorstwa Komunikacyjne (WPK, Provincial Municipal Transport Company). During the system transformation, those entities were divided into smaller companies which were either privatised, or became a property of local

self-governments. In 1990, the obligation to organise public transport was transferred to municipalities. In the further part of this chapter, the author focuses on the public transport market organized by the Municipal Transport Union of the Upper Silesian Industrial District (KZK GOP). This choice results from the fact that it is the largest market organized in accordance with the regulated competition model [7].

KZK GOP is an inter-municipal association established in 1991 in order to organise public transport in the area of the associated municipalities. Currently, the area of association activity covers 29 municipalities located in the central part of the Silesian Province. KZK GOP organises public transport on 336 bus lines and 28 tram lines. In the case of tram transport, there is one monopolistic operator, whereas in the case of bus transport, regulated competition has been implemented. In this case, KZK GOP contracts transport services based on the results of tendering proceedings. Tenders are announced for one or several lines. Both municipal carriers (originating from former WPK companies) and private entities are functioning in the bus operator market. Since the establishment of KZK GOP, the number of municipalities has changed. In particular, the first few years of functioning of the association were characterised by a dynamic increase of the number of associated municipalities. This was caused by public transport integration in the area of the Association, which increased its attractiveness for passengers and facilitated its organisation. The implementation of market mechanism in the process of public transport organisation required time. The figure presents the formation of the volume of operation work and number of entities functioning in the market in 1999–2015 (Fig. 1).

During the analysed period, the volume of operation work commissioned by KZK GOP was relatively constant—67 million vehicle-kilometres per year on the average. The number of operators in the presented period ranges between 25 and 40. It shall be noted that the number of entities is not directly correlated with the market size. Therefore, the appearance of new players in the market does not result from its increase.

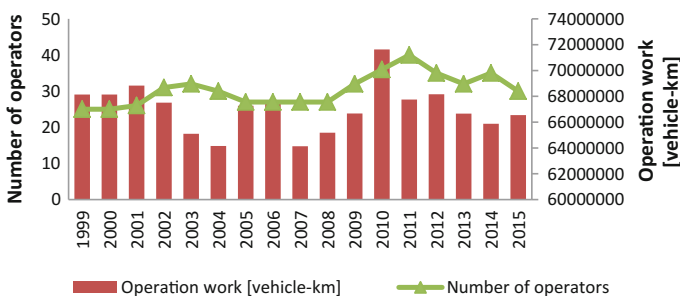


Fig. 1 Volume of operation work and number of KZK GOP operators in 1999–2015. *Source* Own study based on the data of KZK GOP

The market structure, including its concentration level, may have an impact on the behaviours of entities. The notion of concentration, within the meaning of economic sciences, may be defined as a situation in which a small number of companies have a significant share in the market in terms of sales volume, asset value, employment level, etc. In the process-based approach, concentration is defined as an increase of the economic power of business entities. The problems of measuring concentration level are inseparably linked with the analysis of market structures, as well as with efficiency and behaviours of business entities, especially those functioning in the markets with limited competition. With reference to the problems of measuring transport market concentration, the key issue is to define the object of measurement. In the case of contracting services in the regulated competition market, the measurement should be based on the criterion of volume of operation work performed by operators. The application of value indicators for the evaluation of the structure of market share may not be objective, e.g. due to different parameters of operation velocity, or operated routes (empty run) [8].

For the purpose of precise determination of the specific character of the market, the level of concentration was measured on the basis of cumulative and discrete measurements [9]. The values of two indicators were specified: concentration ratio for 4 largest entities [CR(4)] and Herfindahl-Hirschman Index (HHI) [10]. In mathematical expression CR(4) is a sum of shares of four the largest entities and HHI is a sum of squares of shares of all market players. The results have been presented in Table 2.

Table 2 Concentration ratios of KZK GOP market

Year	Number of operators	CR(4)	HHI
1999	25	81	1887
2000	25	81	1863
2001	26	80	1828
2002	31	78	1773
2003	32	76	1697
2004	30	77	1712
2005	27	78	1727
2006	27	70	1584
2007	27	73	1777
2008	27	72	1695
2009	32	70	1602
2010	36	67	1440
2011	40	67	1595
2012	35	71	1597
2013	32	72	1628
2014*	35	78	4454
2015*	30	79	4571

Source Own study

*Consortium of 3 largest carriers was established in 2014

The analysis of the results indicates high market concentration. The value of CR (4) ranges between 67 and 81, which indicates the presence of oligopoly [11]. The HHI index is widely applied by anti-trust agencies and easy to calculate, therefore, it is one of the most popular market concentration indicators [12]. The values of this indicator in 1999–2013 range between 1584 and 1887, which indicates moderate concentration, according to the interpretation of the Federal Trade Commission of the SUA [13]. Additionally, the value of Pearson correlation coefficient between the number of entities in the market and the values of indicators CR(4) and HHI was determined for the data presented in the table. The following results were obtained: -0.69 and -0.65 respectively, which indicates relatively strong inverse relationship between the number of entities and the level of market concentration. In 2014, a consortium of three largest entities was established, which caused a surge of HHI index to the values indicating that the operator market was monopolized (this process was more widely described in the following chapter).

Market Behaviours of Bus Operators

Price is the dominating criterion for offer selection in tendering proceedings announced by KZK GOP. All operation and quality parameters are described in detail in the terms of reference. Therefore, the operators apply price competition between each other, to a large extent. The policy of KZK GOP is focused on gradual improvement of the quality of rolling stock. In the following years, the requirements imposed on the operators have increased, especially with reference to rolling stock—the emphasis has been put on using modern low-floor vehicles, meeting increasingly strict emission standards. The high cost of purchasing modern buses and the necessity of waiting for vehicle supply constitute a market entry barrier. Leasing has been a form of obtaining suitable rolling stock permitted by the ordering party. The operators who want to participate in tenders do not have to possess means of transport at the moment of its announcement; at this stage, they can submit a certificate (from the manufacturer or lessor) confirming the supply or lease of rolling stock in the case of winning the tender. Despite these solutions, having an own vehicle fleet is an important factor in building a competitive position in the market of public transport operators.

When analysing the participation of particular operators in operation work performed by order of KZK GOP, we should pay attention to municipal operators. In 1999–2006, all four largest operators in the market were municipal companies: PKM Katowice, PKM Sosnowiec, PKM Gliwice and PKM Bytom. The main shareholders in those companies were municipalities where the seats of the operators were located. Since municipal companies were distributed within the large area of KZK GOP, there were no conflicts of interest between them. The total market share of the above-mentioned four companies in 1999–2006 gradually

decreased from 81 to 70%. PKM Bytom was liquidated in June 2006. As a result of the operator liquidation, there was an increase in the activity of private entities. Since 2007, the group of the largest entities has included a private operator. The described phenomena: downfall of a municipal company, increased activity of private entities and gradual (though minor) decrease of market concentration indicate that the market mechanisms are functioning.

A tendency to form consortia can be noticed in the activities taken by operators. This enables the optimisation of use of rolling stock of operators and combination of technical potential in order to increase their competitiveness. The development of consortia and their market share have been presented in Table 3.

Since 2007, consortia consisting most frequently of two operators have appeared in the market. A systematic increase of the number of consortia acting in the market can be noticed in 2007–2015. This also translates to an increase of their share in the market according to operation work. In 2013, KZK GOP announced a large tender for providing services on 181 bus lines. No single operator was able to guarantee a sufficient number of buses. The requirement was met only by a consortium consisting of three largest municipal operators. This consortium won the tender, due to which more than 65% of the market was taken over by one entity. The signed agreement is valid from January 2014 until the end of 2021. This event halted the previous activities towards the development of market mechanisms. Consortia were mainly established by private entities. Those entities implemented the cooperation strategy by competing and cooperating with one another at the same time. Until 2014, such strategy of private operators would result in limiting market concentration. Municipal entities which had the dominating share in the market were acting on its own account and did not form consortia either with each other or with private entities. It was only the necessity of meeting the requirements of a large tender that induced them to cooperate within a consortium.

Table 3 Share of consortia in the market

Year	Number of operators	Number of consortia	Total share of consortia in the market according to operation work (%)
2007	27	1	6.16
2008	27	3	8.17
2009	32	6	10.47
2010	36	10	15.31
2011	40	13	12.55
2012	35	11	12.92
2013	32	12	10.81
2014	35	16	77.18
2015	30	15	80.25

Source Own study

Conclusions

This chapter presents the development of situation in the market of bus operators acting by order of KZK GOP. This market is organized on the basis of regulated competition model. The implementation of market mechanism has resulted in an increase of market competition and gradual decrease of its concentration. Since 2008, private operators have begun to form consortia, which enabled them to provide strong competition for the dominating municipal entities. By establishing consortia, private operators would implement the cooperation strategy. They took part in certain tender proceedings as individual entities and competed with each other. However, in the case of a lack of sufficient rolling stock reserve, they established consortia in various configurations, cooperating with each other. In consequence, those entities were partly competitors and partly co-operators for one another within one market. Due to their locations, municipal entities would not compete with each other. The impulse for cooperation was the willingness to win a large tender and dominate the market entirely for the period of 8 years. Therefore, it can be concluded that the market structure has an impact on the behaviours of entities. The municipal carriers who had the dominating share in the market have maintained the leading position in the market by forming a consortium. The formation of a consortium was partly forced by the activity of private entities, which would form consortia increasingly frequently, thus implementing the cooperation strategy.

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