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## A Study of the Efficiency of Regional Railway Services: The Case of Poland

Efektywność kontraktowania usług kolejowych przewozów  
regionalnych na przykładzie Polski

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### Abstract

Regional railway transport is an alternative to individual transport that contributes to a reduction in external costs and is considered a public service obligation (PSO). A common way to measure the efficiency of regional railway transport is compensation for operational performance in train-kilometres. However, this metric does not accurately reflect the true efficiency of this kind of transport as it overlooks the main objective of engaging public funds. The goal is not merely to operate trains at the lowest possible cost, but rather to provide maximum societal benefits. Our analysis revealed a significant challenge in determining the actual efficiency of regional railway services. The nationwide railway company appears to employ cross-subsidisation of services to generate abnormal profits, thereby reducing its expectations in the face of potential competition and artificially improving its efficiency in areas where there is real competition. The current organisation of regional railway transport makes it difficult to assess its efficiency and, consequently, to select the optimal operator in economic terms.

### Streszczenie

Kolejowe przewozy regionalne stanowią alternatywę dla transportu indywidualnego, przyczyniając się do obniżenia kosztów zewnętrznych generowanych przez samochody. Są one traktowane jako powszechnie dostępna usługa przewozowa o charakterze użyteczności publicznej (PSO). Często wskazywaną miarą efektywności ich organizacji jest wysokość rekompensaty oczekiwanej przez przewoźnika za wykonaną pracę eksploatacyjną (pockm). Tymczasem nie odzwierciedla ona rzeczywistej efektywności tych przewozów, ponieważ nie uwzględnia podstawowego celu angażowania środków publicznych. Nie jest nim przejazd pociągu jak najniższym kosztem, lecz dostarczenie poprzez ten przejazd możliwie wielu korzyści społeczeństwu, dla którego jest on uruchamiany. Przeprowadzona analiza wskazała na poważne trudności w określeniu oceny rzeczywistej efektywności realizacji usług kolejowych przewozów regionalnych. Oszacowany wynik finansowy osiągany przez ogólnopolską spółkę Przewozy Regionalne w poszczególnych województwach dowodzi istotnych dysproporcji. Podmiot ten zdaje się stosować skrócone dotowanie usług w celu czerpania ponadnormalnych zysków, obniżania swoich oczekiwań w obliczu potencjalnej konkurencji i sztucznej poprawy swojej efektywności w tych obszarach działalności, gdzie występuje rzeczywista kon-

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kurencja ofert. Obecna formuła organizacji kolejowych przewozów regionalnych utrudnia więc ocenę jej efektywności, a w konsekwencji optymalny pod względem ekonomicznym wybór przewoźnika. To z kolei umożliwia podmiotowi dominującemu na rynku wykorzystywanie swojej pozycji.

## Introduction

Regional railway transport is a segment of railway transport covering the delivery of merit goods [Musgrave, 1973]. It functions as a key part of public transport in peripheral areas. The indisputable fact that the state must organise efficient regional railway transport has been repeatedly discussed in the literature [Qin, 2008; Maggio, 2009]. As an alternative to individual transport, it helps to reduce external costs generated by cars and counteracts transport exclusion in society. Therefore, it is treated as a universally available transport service that provides public utility, or rather fulfils a public service obligation (PSO).

The efficiency of the organisation of regional railway transport is an important issue that should be looked at from two perspectives: first, whether this kind of transport actually counteracts transport exclusion and, second, whether it is carried out without exceeding a reasonable amount of public spending. These aspects are contradictory because improving transport often requires an increase in public expenditure. At the same time, it is difficult to establish universal measures that unequivocally define the rationality of these expenses. Indeed, the level of spending that one might consider reasonable is relative – it depends on the different geotransport and demographic characteristics of a given area.

A frequently indicated measure of the efficiency of organising regional railway transport is the amount of compensation expected by the operator for operational performance in train-kilometres. This value is usually used by railway transport organisers. However, it does not reflect the actual efficiency of transport as it does not take into account the main objective of engaging public funds, which is to avoid running trains at the lowest possible cost, while providing as many benefits as possible to society.

This article attempts to define the measures used to evaluate the efficiency of contracting regional railway transport by considering the example of Poland. The main scientific methodology used was statistical analysis. Despite some simplifications (described later), the analytical indicators constructed here made it possible to compare individual regions and railway operators. A detailed analysis of the topic leads to serious methodological problems resulting from the incompleteness and inconsistency of the available empirical data, which may also explain the scant literature on the issue.

The analysis was carried out for all 16 of Poland's voivodeships, or regions, based on data from 2010 to 2019. Data for 2020 were not included due to significant distortions resulting from restrictions on public transport during the COVID-19 pandemic. At the time of writing, not all voivodeships had settled the organisation of transport in 2021, which resulted in a lack of data.

The novelty of the analysis is a balanced scientific methodology that provides sufficient transparency to enable a long-term comparison of individual voivodeships and operators based on publicly available data. In the author's opinion, this may be useful to transport organisers during their decision-making processes. Moreover, the resulting conclusions can be applied in any country with a similar system of organising regional railway transport.

The need for such analysis stems from the fact that both scientific and public debate on the efficiency of regional railway transport is dominated by the amount of compensation for train-kilometres.

## Problems of transport accessibility

It is difficult to establish a single universal definition of transport accessibility that is adopted by all researchers. Indeed, **Gould [1969]** notes that accessibility is one of those common terms that everyone uses but which no one can definitively define and measure. In the literature, various definitions and measures of transport accessibility are widely presented, which is also influenced by limited data availability. It is, among other things, understood as being the possibility of reaching a given goal using specific means of transport [**Warakomska, 1992**] as a result of both infrastructural (network density) and organisational and commercial conditions shaping the range of transport services [**Jurkowski, 2019: 43**]. **Vickerman [1974]** indicates that, in economic literature, accessibility is synonymous with minimising travel costs. The developed Intermodal Transport Accessibility Index is determined based on the sum of transport connections between centres and regions, with each connection taking into account both travel time between centres and their significance [**Komornicki et al., 2010**]. However, it does not take into account the frequency of public transportation services on a particular route. Meanwhile, according to **Handy and Niemeier [1997]**, understanding transport accessibility as travel times between major urban areas in the country does not reflect the broader context related to resource utilisation and mobility. **Spiekermann and Neubauer [2002]** point out that transport accessibility is of significant importance in transport policy, as it determines the advantage of a particular location over others. Improving transport accessibility obviously counteracts the social exclusion of peripheral areas [**Kenyon, 2011; Preston, Rajé, 2007**].

In terms of passenger transport, the main challenge faced in both larger cities and peripheral regions is the growing popularity of private car transport. A cross-sectional analysis of the number of private cars per population, carried out across many countries, clearly shows that the increase in economic prosperity translates into an increase in the number of cars up to the saturation level described by the Gompertz curve [**King, Manville, Shoup, 2007; Jamroz, 2012**]. Only restrictive regulations that take into account the external costs of owning and using a car can significantly limit this development, as exemplified by Hong Kong and Singapore [**Cameron, 2004**]. In an era of widespread individual motorisation characterised by the highest external costs, public transport, including regional rail transport, is an obvious tool for reducing them and thus achieving environmental and climate goals.

Previous research has focused on regional railway transport in terms of its geographical characteristics and the range of transport services, which is largely the result of the lack of access to broader data [**Chaberko, 2010**]. The number of connections and the timetable adapted to the needs of passengers are key influencing factors in the perception of the attractiveness of local public transport [**Lierop, 2018**]. The analysis of the actual traffic intensity in any conurbation indicates the occurrence of two periods of increased transport volume (transport peaks) over the course of a single day: a shorter, more intense one in the morning and a longer one in the afternoon. Therefore, regional public transport, in order to serve as an alternative to individual transport, should provide at least two trips in morning rush hour, three trips in afternoon rush hour, and at least one connection between peak hours and in the evening. In total, this amounts to seven pairs of connections per day, which coincides with the observations in the literature on the problem [**Majewski, 2006: 146**]. Therefore, financing traffic below the rational minimum of five to six pairs per day can even be treated as irrational spending of public funds [**Taylor, Ciechański, 2017: 234**]. It can be assumed that railway services with a frequency of less than seven train departures per day are only used by people who lack practical alternatives, a number that is shrinking in the era of widespread individual motorisation.

The issue of transport accessibility is widely described in the literature, but the assessment of the efficiency with which this accessibility is implemented is much less frequently discussed. For instance, a cross-sectional analysis of railway transport efficiency was carried out at three levels: the technical effectiveness of the use of resources during the transport performance (pass-km or tonne-km); the effectiveness of their operational performance (train-km); and the effectiveness of services during operational performance. This analysis was based on empirical data from 1995 to 2002 for 39 railway systems, primarily those in European countries. It was model

led on the basis of several basic quantitative factors. Due to the lack of available data, it ignored the impact of qualitative factors, although the authors themselves stipulated in the introduction that their absence significantly distorts the obtained results [Lan, Lin, 2006]. Unfortunately, the results obtained in this study are not applicable to the analysis of the efficiency of regional railway transport due to the level of aggregation of data for the entirety of railway transport in a given country as well as their historical time range. In the case of Poland, these studies covered the period before the transformation of the national rail company, Polish State Railways (PKP), into separate railway companies.

The issue of data availability also affected the limitations of the presented assessment of the efficiency of regional railway transport. For the clarity of analysis, the focus was placed on economic and organisational data. This leaves an open research field for further assessment of efficiency and transport accessibility based on demographic and geographic data.

### Organisation of regional railway transport in Poland

Public service obligation (PSO) transport is a widely available service in the field of public transport. It is performed by the operator in order to meet the transport needs of the community in a given area on an ongoing and continuous basis. In Poland, such transport is regulated by the Act on Public Transport [Act, 2010], which implements the regulations of the European Parliament [Rozporządzenie, 2007] on a national scale.

As a result of PKP's restructuring in Poland in 2001, the responsibility for the organisation of regional railway transport was transferred to voivodeship-level local government [Ustawa, 2003]. Currently, in Poland, contracts for PSO may be awarded in the following modes:

- Open tender [Ustawa, 2004] or concession award [Ustawa, 2009], which are different forms of open selection among the bids submitted by operators.
- Provision of services performed by an internal entity established to carry out public transport services [Ustawa, 2010: Art. 22]
- Direct conclusion of a contract with the operator [Ustawa, 2010: Art. 22].

In European Union (EU) countries, the selection by tender from among operators competing with what they offer was a common practice from the beginning of this century, for example in Germany [Jaster, 2004: 23], Sweden [Schöller, 2004: 188], and Denmark [Sengelov, 2004]. Formally, in Poland, such a selection procedure has also been in force since the beginning of PKP's restructuring in 2001. However, the lack of regulations meant that until 2007 it was a dead letter. In addition, voivodeship governments in fact had no choice due to the lack of rolling stock, the key barrier to market entry [Zajfert, 2016]. Initially, the only operator that had passenger rolling stock intended for regional trains was the state-owned company PKP Przewozy Regionalne, which at the time was part of the PKP company. In the face of its actual monopoly, it was not possible to objectively assess the costs of the transport service offered by this operator, so voivodeship governments were forced to agree to the implementation of transport services in accordance with its financial requirements. As a result, despite the introduction of contracting for transport services, their scope was determined by the operator rather than the contracting authority. The contracting authority often opted out of the tender selection procedure, choosing instead to assign transport services directly to the operator. The reforms introduced by the Polish railways were dependent on state policy and aimed at avoiding short-term problems, such as protests and strikes by workers. This often led to an increase in the cost of railway transport services in Poland and did not stop the decline in the number of passengers [Zajfert, 2016].

The inability to choose other operators prompted voivodeship governments to start creating their own new transport companies. In 2004, the government of the Mazowieckie Voivodeship established its own company, Koleje Mazowieckie, based on the rolling stock taken over from the national rail company PKP. The possibility of obtaining significant support from EU funds enabled other voivodeship governments to intensively purchase rolling stock. Consequently, from 2009 to 2013, five voivodeship governments established their own railways [Zajfert, 2016].

Since 2007, the government of the Kujawsko-Pomorskie Voivodeship has been announcing tenders for regional transport services divided into separate packages. One of them covered the operation of local lines with diesel traction, and the tenderer was provided with 13 railbuses owned by the voivodeship government. This enabled the Arriva PCC consortium to submit an offer, which proved to be more advantageous than the competing bid of Przewozy Regionalne [Arriva, 2013]. This operator was the first, and remains the only, independent provider of regional passenger services.

Since Poland's accession to the EU, the modernisation of infrastructure and rolling stock as well as the purchases of new rolling stock co-financed from EU funds, have covered numerous market segments in this transport sector. However, the ultimate efficiency differs fundamentally among these segments. The expected increase in passenger flows was achieved in the agglomeration and regional transport segment served by operators other than the Przewozy Regionalne company, the dominant market player. However, despite the investment projects carried out, both the scope of the transport offer and the level of services provided by Przewozy Regionalne were consistently diminishing.

## Evaluation of the efficiency of compensation provided to operators

### Compensation amount

The organisation of regional railway transport requires compensation for operators because revenue from the sale of tickets practically never covers the costs of providing this kind of transport. Data on the amount of compensation granted and the operational performance (train-km) for individual years were obtained in the form of public information from the voivodeship governments, and are presented in Appendix A. Comparing the total amount of compensation granted by individual voivodeships to operators makes little sense because a different range of transport services was performed in each voivodeship. However, comparing their size to the number of passengers allows us to assess the efficiency of financing these services. Data on railway transport are presented in Appendix B on the basis of reports published by the Office of Rail Transport (UTK), the regulator of the Polish railway market. Table 1 presents the amount of compensation granted to operators per passenger, sorted by the average value in the analysed period.

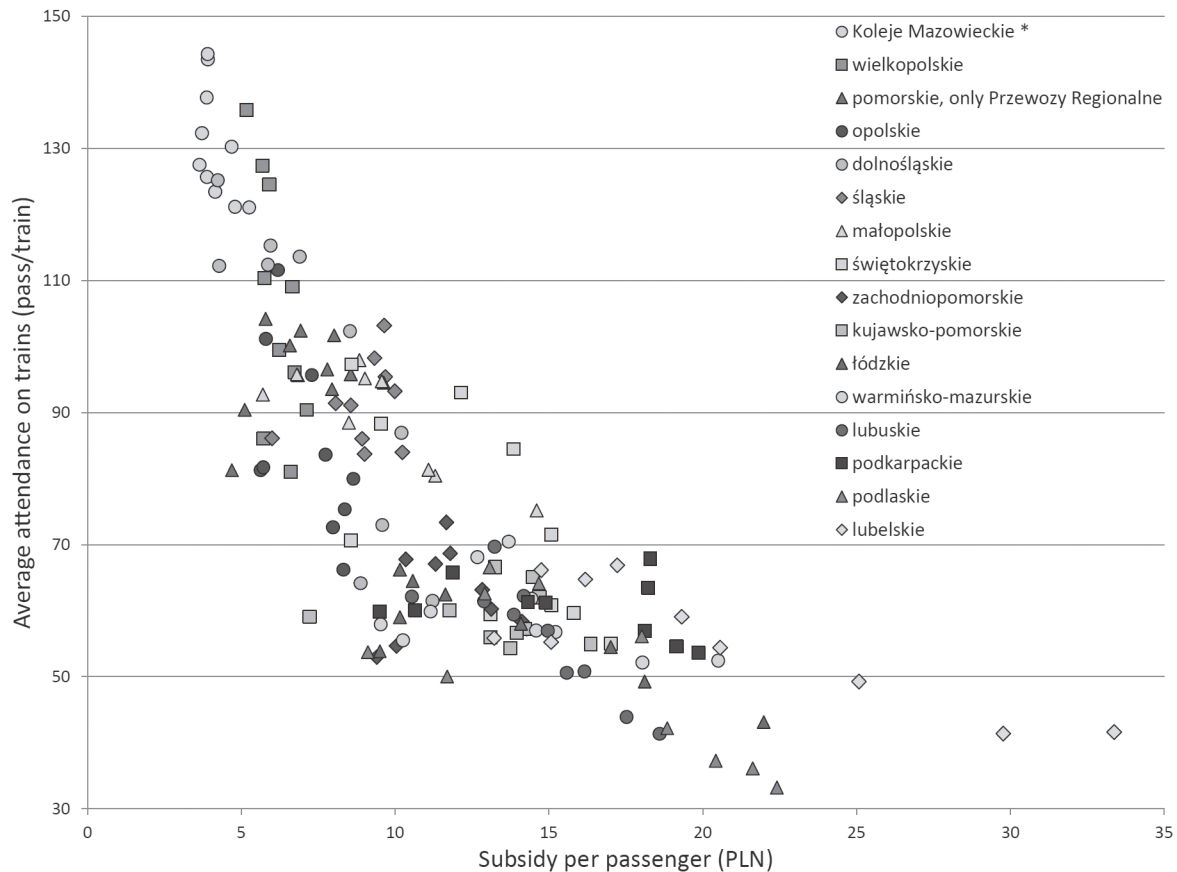
**Table 1. Amount of compensation granted to regional operators in voivodeships per passenger (PLN/1 passenger)**

Voivodeship – operator	Average	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Mazowieckie – Koleje Mazowieckie	4.18	3.64	3.89	3.72	3.88	3.91	3.90	4.69	4.15	4.80	5.26
Wielkopolskie	6.16	5.72	6.60	6.66	5.91	5.17	5.69	5.76	6.23	7.12	6.74
Pomorskie – Przewozy Regionalne	6.83	4.70	5.11	5.79	6.58	7.79	7.94	8.02	8.56	6.84	6.92
Opolskie	7.17	5.63	5.71	5.80	6.19	7.29	7.74	8.64	8.36	7.98	8.32
Dolnośląskie	7.66	8.88	11.22	9.58	10.20	8.53	6.90	5.95	5.86	5.19	4.24
Śląskie	8.95	6.00	9.01	8.56	8.93	9.65	9.68	10.24	9.99	9.33	8.07
Małopolskie	9.51	5.70	6.81	9.02	9.63	14.60	11.31	8.50	8.84	9.57	11.09
Świętokrzyskie	11.78	13.11	8.55	8.66	9.87	10.30	11.24	12.43	13.61	14.41	15.66
Zachodniopomorskie	11.89	9.40	10.05	10.35	11.31	11.67	11.79	12.83	13.13	14.13	14.28
Kujawsko-pomorskie	13.28	7.22	11.77	13.25	14.48	14.69	16.35	14.21	13.95	13.75	13.11
Łódzkie	13.61	9.51	10.16	12.92	14.10	17.01	21.98	18.11	11.63	10.57	10.16
Warmińsko-mazurskie	14.01	9.53	10.26	11.16	12.67	13.69	14.43	14.58	15.21	20.50	18.04
Lubuskie	14.75	10.54	12.89	13.23	13.86	14.18	14.97	15.58	16.16	17.52	18.60
Podkarpackie	15.49	9.50	10.65	11.87	14.32	18.23	18.29	14.90	18.10	19.15	19.86
Podlaskie	16.28	11.69	9.12	14.68	12.92	13.07	18.02	18.85	22.41	21.63	20.43
Lubelskie	20.46	13.22	15.07	14.75	16.18	17.22	19.32	20.57	25.08	29.77	33.38

Source: Author's own calculations based on reports on the performance of public service obligations in voivodeship railway passenger transport and UTK data.

Figure 1 shows a comparison of this value with the average turnout on trains, which was determined as  $H_t = W_t/W_e$ , where  $W_t$  is annual transport performance (pass-km) and  $W_e$  is annual operational performance (train-km).

**Figure 1. Amount of compensation per passenger in regional trains in relation to average turnout (by voivodeships in 2010-2019)**



Source: Author's own calculations based on reports on the performance of public service obligations in voivodeship passenger railway transport, annual reports of railway operators, and UTK data.

The relationship between compensation per passenger and the average turnout in trains, as presented in Figure 1, confirms the economies of scale achieved with an increase in passenger attendance on trains. On the one hand, for the high attendance on Koleje Mazowieckie trains, this translated into the lowest level of the necessary surcharge for each ticket in the country, which amounted to PLN 4 on average. On the other hand, the lowest average train attendance in Poland's Lubelskie and Podlaskie Voivodeships required the highest compensation per ticket. In Lubelskie Voivodeship in 2019, a record PLN 30 was paid there, up from PLN 13 in 2010. This indicates a drastic deterioration in the efficiency of financing regional railway transport. This is the result of a progressive decline in the number of passengers in this voivodeship.

Agreements concluded by voivodeship governments with railway companies specified definite operational performance (train-km)  $We^* = \sum n * Ln$  (where  $We$  stands for annual operational performance,  $n$  for the number of trains launched, and  $Ln$  for the length of the  $n$ th train route), as well as the unit compensation rate for this operational performance (PLN /1 train-km). Thus, it became natural to treat this rate as the basic criterion for evaluating the efficiency of the service provided. Individual voivodeship governments compared this amount to both the rates agreed with various operators and contracts concluded in other voivodeships. Table 2 shows the amounts of compensation granted to individual operators, sorted by the average value in the analysed period. For the Przewozy Regionalne nationwide company, the amount of compensation granted by individual voivodeship governments is also presented, with their standard deviation from the nationwide average.



These amounts indicate a similar level of rates in different voivodeships as well as in comparison to the compensation provided to local provincial government railways.

**Table 2. Amount of compensation granted to individual railway companies in voivodeships per operational performance (PLN/1 train-km)**

Operator	Average	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
SKM Trójmiasto	8.50	4.88	5.48	5.88	6.58	6.36	6.62	14.72	12.18	11.37	10.90
Koleje Dolnośląskie	12.99	14.92	16.74	13.40	15.51	13.79	11.78	11.40	11.69	10.86	9.77
Koleje Wielkopolskie	15.23	–	24.75	20.20	16.02	13.66	14.24	11.88	12.22	11.90	12.23
WKD	15.34	4.35	4.58	13.98	16.88	14.02	20.48	25.59	19.84	16.94	16.73
Koleje Mazowieckie	15.50	13.60	14.15	13.70	14.98	15.85	16.00	17.19	14.53	16.48	18.46
Koleje Małopolskie	16.49	–	–	–	–	–	20.08	11.74	15.11	17.38	18.15
Łódzka Kolej Aglomeracyjna	17.08	–	–	–	–	19.01	20.09	17.98	15.74	14.89	14.78
Koleje Śląskie	19.46	–	14.97	13.83	17.71	23.70	22.93	21.51	21.05	19.97	19.46
Arriva	20.00	12.70	19.69	20.03	21.16	18.61	18.89	22.28	22.31	22.20	22.13
Przewozy Regionalne	16.00	13.05	14.93	16.57	15.70	17.25	16.19	15.97	16.47	15.92	17.93
Voivodeship compensation:											
Pomorskie	12.82	9.87	10.50	11.71	12.23	12.97	13.17	15.25	15.60	12.70	14.21
Opolskie	13.56	10.74	13.04	13.68	14.21	14.12	13.22	13.72	14.10	14.46	14.34
Wielkopolskie	13.55	11.56	11.72	14.03	13.24	12.21	13.03	12.74	12.70	16.57	17.67
Zachodniopomorskie	14.36	11.70	12.48	13.61	14.07	14.76	14.35	15.16	15.05	16.01	16.38
Dolnośląskie	14.63	13.30	15.77	14.21	17.46	16.00	15.50	14.04	13.70	12.61	13.68
Podlaskie	15.05	13.74	11.13	18.26	14.99	14.99	17.92	14.87	14.16	15.15	15.26
Kujawsko-pomorskie	15.39	10.07	15.35	18.39	18.82	21.05	21.23	12.75	12.31	11.79	12.10
Lubuskie	15.74	15.23	18.00	17.89	15.26	15.20	15.10	14.75	15.62	14.93	15.42
Warmińsko-mazurskie	15.90	12.97	12.94	12.96	16.00	16.63	15.80	15.55	16.43	20.87	18.84
Łódzkie	15.98	12.02	13.62	15.54	15.17	16.07	17.21	17.11	16.50	17.06	19.46
Świętokrzyskie	16.12	15.15	13.90	16.35	16.15	16.51	16.83	16.64	15.75	16.68	17.26
Podkarpackie	17.84	13.14	13.63	15.14	16.27	19.95	21.99	17.07	19.62	20.28	21.33
Małopolskie	18.85	12.42	14.82	16.65	16.88	18.98	19.32	21.71	22.74	22.69	22.23
Śląskie	20.06	12.14	17.93	21.26	24.20	22.20	20.16	20.41	20.22	20.86	21.19
Lubelskie	21.09	17.35	18.93	18.93	19.41	19.85	20.21	20.92	23.51	23.92	27.84
Standard deviation of Voivodeship compensation:	2.34	1.96	2.46	2.55	2.82	2.89	2.93	2.75	3.34	3.66	3.97

Source: Author's own calculations based on reports on the performance of public service obligations in voivodeship railway passenger transport and UTK data.

## Revenue from transport services

Similarly, the fact that the level of compensation provided by different voivodeship governments is similar does not prove it is reasonable. By definition, its purpose is to cover the part of the operator's costs which were not financed by its revenues from ticket sales. Meanwhile, these revenues directly depended on the number of passengers on trains, which, as mentioned earlier, was diverse across voivodeships (cf. Figure 1). The change in the number of passengers on trains was a consequence of the range of transport services shaped by voivodeship governments. Therefore, to assess the reasonableness of the compensation provided, it was necessary to determine the income from tickets obtained by the operators. This includes a subsidy for the sale of discount tickets for students as specified under law [Ustawa, 1992] because it also constitutes revenue for the operator for the transport service. Data on the financial outcomes of railway companies based on their financial statements are presented in Appendix B. In order to compare the results obtained by individual railway companies, the data have been converted into 1 train-km, and it was considered that individual operators,

in their annual profit-and-loss accounts, accounted for the compensation received and the subsidy for discount tickets in different ways. They were included in either “revenues from sales and equivalent” or other operating revenues. Moreover, some operators changed their accounting method during the analysed period. Przewozy Regionalne operated in most voivodeships and most of the available data were aggregated for its total operations throughout the country. Therefore, the revenues from ticket sales obtained by the company in individual voivodeships were estimated with the assumption that they were proportional to the number of passengers –  $Itv = Qv * (Io - \sum Cv - Cg) / \sum Hv$  – where  $Itv$  is ticket revenue in voivodeship  $v$ ,  $Qv$  is the number of passengers in voivodeship  $v$ ,  $Io$  is the company’s operating income,  $\sum Cv$  is the sum of compensation from all voivodeship governments,  $Cg$  is the subsidy for discount tickets, and  $\sum Hv$  is the sum of passengers in all voivodeships. In order to broaden the observation perspective and highlight the differences in the scale of generated revenues, agglomeration railways were also taken into account, for example the Gdańsk-Gdynia Urban Railroad (SKM Trójmiasto) and Warsaw Commuter Railway (WKD). The Warsaw Urban Railroad (SKM Warszawa) was omitted because it is the only railway company that does not generate revenues from ticket sales, as tickets sold by the Public Transport Authority in Warsaw (ZTM Warszawa), to which it belongs, are also valid on its trains. The results were sorted according to the average value over the analysed period and presented in Table 3. The highest revenues were generated by agglomeration railways, which resulted from the highest attendance on their trains. Similarly, the lowest revenues were achieved by Arriva and Koleje Dolnośląskie, a consequence of the peripheral nature of the lines they operated.

**Table 3. Revenues from ticket sales generated by individual operators in voivodeships per operational performance (PLN/ 1 train-km)**

Operator	Average	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Arriva	7.71	1.11	8.97	8.82	8.88	10.44	9.03	7.06	6.95	7.31	8.52
Koleje Dolnośląskie	8.63	3.06	3.42	5.63	7.63	9.30	10.02	10.91	11.25	11.65	13.45
Łódzka Kolej Aglomeracyjna	11.28	–	–	–	–	11.67	8.52	9.89	11.67	12.40	13.55
Koleje Małopolskie	12.48	–	–	–	–	–	n.d.	13.28	13.83	11.21	11.59
Koleje Śląskie	13.76	–	16.87	14.41	11.85	13.72	13.81	12.70	13.24	13.34	13.90
Koleje Wielkopolskie	14.06	–	19.08	11.39	15.90	19.80	5.36	17.29	16.88	14.71	15.41
Koleje Mazowieckie	21.41	17.04	17.81	20.24	22.33	24.43	25.41	20.73	21.21	21.93	22.94
WKD	24.44	22.04	23.71	23.99	24.39	25.24	27.49	25.24	23.28	24.40	24.65
SKM Trójmiasto	30.55	21.85	25.77	33.42	31.86	32.42	32.76	23.37	30.59	34.08	39.38
Przewozy Regionalne	10.52	9.14	10.00	10.61	11.04	13.97	11.70	10.70	10.69	8.60	8.77
Estimated for voivodeships:											
Podlaskie	6.60	6.87	7.87	8.49	8.45	9.72	7.52	5.19	4.15	3.80	3.94
Lubelskie	7.26	7.68	8.10	8.76	8.73	9.77	7.91	6.69	6.16	4.36	4.40
Lubuskie	7.30	8.45	9.00	9.23	8.02	9.09	7.62	6.23	6.35	4.62	4.37
Łódzkie	7.43	7.40	8.64	8.21	7.83	7.98	5.80	5.28	8.07	7.30	7.74
Warmińsko-mazurskie	7.69	7.96	8.13	7.93	9.19	10.29	8.28	7.02	7.10	5.52	5.51
Podkarpackie	7.78	8.09	8.25	8.71	8.27	9.28	9.09	7.53	7.12	5.75	5.67
Zachodniopomorskie	8.07	7.28	8.01	8.98	9.05	10.72	9.20	7.77	7.53	6.15	6.05
Świętokrzyskie	8.85	6.76	10.47	13.01	12.33	11.52	9.19	7.26	6.86	5.72	5.35
Śląskie	9.65	11.83	12.22	11.78	7.48	15.40	9.33	7.79	6.80	6.52	7.40
Kujawsko-pomorskie	9.80	9.60	10.60	10.94	10.91	13.88	10.95	8.23	8.38	7.14	7.40
Opolskie	11.07	11.16	11.97	13.40	15.06	13.98	11.19	9.84	9.42	7.65	7.00
Małopolskie	11.54	12.74	14.03	12.60	12.76	10.96	10.85	11.16	12.23	10.28	7.80
Pomorskie	12.49	12.28	13.25	13.80	13.52	14.10	12.53	12.52	11.98	10.07	10.83
Wielkopolskie	16.11	11.83	12.17	15.48	20.24	23.72	20.38	16.34	14.91	12.32	13.71
Dolnośląskie	18.27	10.05	10.72	12.10	14.86	19.16	21.67	21.98	23.36	22.47	26.38

Source: Author’s own calculations based on reports on the performance of public service obligations in voivodeship passenger railway transport, annual reports of railway operators, and UTK data.



## Costs of services

In order to evaluate the efficiency of financing regional railway transport, it was necessary to determine the average costs of launching trains by individual railway companies. When estimating these costs, their operating costs minus depreciation were taken into account as opposed to their current operating costs. This was a result of the purchase of new rolling stock, which was often not financed by the operator but by voivodeship governments, the National Railway Fund, and EU funds. In addition, the amount of depreciation write-offs is not always proportional to the actual life of the rolling stock. In order to broaden the perspective on the costs, all passenger operators in Poland, including those outside the area of regional transport, were taken into account. Table 4 presents the unit costs of railway transport per 1 train-km, sorted by the average value in the analysed period.

In the case of operators who started their operations in the analysed period, the values of individual indicators in their first year tended to not be reliable due to the costs of entering the market and, at the same time, the initially relatively small transport operations. Therefore, for these operators, the first year of their operation was omitted when calculating the average cost.

**Table 4. Unit cost of launching a passenger train by railway companies, excluding depreciation costs (PLN/1 train-km)**

Operator	Average	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Koleje Dolnośląskie	20.67	18.24	20.36	20.09	21.69	21.94	20.36	21.10	21.07	21.02	20.82
ŁKA	25.06 *	–	–	–	–	48.45	25.37	25.65	24.28	24.56	25.45
Przewozy Regionalne	26.04	23.95	25.15	27.48	26.86	29.17	26.94	25.39	25.44	24.65	25.35
Arriva	26.15	14.82	25.70	26.47	28.36	28.47	27.61	29.12	26.85	28.16	25.94
Koleje Małopolskie	28.47 *	–	–	–	–	–	34.89	28.63	28.31	28.71	28.22
WKD	29.22	24.92	26.18	31.72	31.52	29.50	33.15	34.58	28.10	26.04	26.46
Koleje Wielkopolskie	30.51 *	–	50.73	33.14	31.75	33.43	33.81	28.84	29.56	25.93	27.82
Koleje Śląskie	31.11 *	–	36.17	30.43	34.73	32.13	31.98	29.82	30.50	30.86	28.45
Koleje Mazowieckie	32.91	31.42	31.10	30.12	30.59	32.31	33.65	33.33	33.30	36.47	36.83
SKM Warszawa	34.25	27.08	32.05	29.42	29.89	29.85	33.97	33.69	38.77	43.71	44.03
SKM Trójmiasto	37.34	30.85	34.46	38.43	35.41	36.91	35.50	34.48	37.47	42.99	46.86
PKP Intercity	39.02	40.56	39.32	38.84	39.82	40.67	40.05	36.40	36.99	37.95	39.58

\* Excluding the first year of operation.

Source: Author's own calculations based on reports and profit-and-loss accounts of enterprises.

The data gathered in Table 4 indicate that some operators incurred significantly higher unit costs of transport. However, it should be borne in mind that Koleje Mazowieckie, SKM Warszawa and SKM Trójmiasto served large urban areas, and that PKP Intercity was a long-distance operator. Their higher unit costs resulted from the fact that they launched longer trains, which affected the costs of their maintenance, energy for traction purposes, and infrastructure access rates. In addition, the rise in the unit cost for SKM Trójmiasto, observed since 2016, resulted from its assumption of responsibility for the operation of Pomorska Kolej Metropolitalna, which was provided with a more expensive diesel traction, a feature not previously used by this operator. Taking all this into account, a comparison of the costs of individual companies shows that their level was similar and that for most of them it did not change significantly during the analysed period. *Przewozy Regionalne* did not stand out from other operators, and it can be assumed that its average unit costs to launch a train were similar throughout the country. This was due to the same amount of cost components. The company *Przewozy Regionalne* used the same type of rolling stock throughout Poland (electric motor units on electrified lines and railbuses on other lines), and it has the same railway staff remuneration costs and rates for access to the track infrastructure of the national company Polish Railway Lines (PLK). Differences in electric energy consumption for traction purposes, resulting from the diverse profiles of railway lines (e.g., mountain-

ous or lowland) or the density of stops along the route, did not affect the costs. Electricity consumption was settled not according to actual consumption (e.g. kWh), but according to operational performance (train-km). Any differences in the consumption of diesel fuel were negligible, in part due to the low share of diesel traction in passenger railway transport.

### Results on transport activity

In order to compare the efficiency of individual operators based on financial data, their results on transport activity were determined. These were calculated as revenue from the sale of tickets + subsidy for discount tickets + compensation from the voivodeship government – (operating costs – depreciation). Separate ticket revenue data could not be obtained for some operators, in which case "revenues from sales and equivalent" were used. The obtained results were sorted according to the average value over the analysed period and are presented in Table 5.

**Table 5. Transport activity of railway companies per train-km**

Operator	Average	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Koleje Wielkopolskie	-1.88 *	–	-6.90	-1.56	0.17	0.03	-14.22	0.33	-0.46	0.69	-0.12
Przewozy Regionalne	-0.50	-3.74	-2.00	-2.70	-1.88	1.17	0.58	1.14	1.56	-0.30	1.16
Koleje Małopolskie	-0.39 *	–	–	–	–	–	n.d.	-3.61	0.64	-0.12	1.52
Koleje Dolnośląskie	0.95	-0.26	-0.20	-1.06	1.45	1.14	1.44	1.22	1.87	1.49	2.40
Arriva	1.56	-1.01	2.95	2.37	1.68	0.58	0.31	0.23	2.41	1.35	4.71
SKM Trójmiasto	1.71	-4.12	-3.21	0.87	3.04	1.86	3.88	3.61	5.30	2.47	3.42
Koleje Śląskie	2.30 *	–	-4.33	-2.05	-5.18	5.28	4.76	4.39	3.78	2.46	4.91
ŁKA	2.84 *	–	–	–	–	-25.68	3.25	2.22	3.13	2.72	2.88
Koleje Mazowieckie	3.99	-0.78	0.87	3.82	6.72	7.96	7.76	4.59	2.44	1.95	4.57
SKM Warszawa	8.35	6.60	11.44	14.31	15.75	12.23	2.86	6.45	3.40	5.20	5.26
WKD	10.57	1.47	2.10	6.25	9.74	9.76	14.82	16.25	15.02	15.30	14.93

\* Excluding the first year of operation

Source: Author's own calculations based on reports and profit-and-loss accounts of enterprises and UTK data.

The results on transport activity presented in Table 5 indicate significant differences between individual railway companies, which are largely due to different forms of settlement and accounting of investments. Some of the new rolling stock was purchased directly by voivodeship governments and then transferred or lent to operators, meaning its purchase was not reflected in their profit-and-loss account. However, other stock was purchased directly by operators, which resulted in the voivodeship government seeking compensation to cover not only current operating costs but also to enable the implementation of these investments. Despite this, the level of compensation provided was not significantly higher than that of other operators (cf. Table 2). Modern rolling stock is a crucial factor in developing an attractive range of regional railway services. It encourages residents to reduce their use of private cars in favour of public transport. However, a prerequisite for the existence of such a service is that the voivodeship government, in its role as the organizer, must incur the costs of purchasing new rolling stock. The best illustration of this is the last operator in Table 5, the WKD company. In 2011, this company replaced most of its fleet with new rolling stock, the purchase of which led to a significant change in transport activity. The decision by voivodeship governments to indirectly finance rolling stock purchases stemmed from a desire to provide local government railways with their own modern rolling stock in the face of the imminent launch of the Fourth Railway Package and the full opening of the regional railway transport market.

### Net financial result of operators

For the reasons stated earlier, the previously determined results on transport activity cannot be accurately compared across different operators. Therefore, a more objective comparative measure is needed: the net financial result achieved by each operator. The obtained results per train-km were sorted according to the average value in the analysed period and are presented below in Table 6.

**Table 6. Net financial result of railway companies per train-km**

Operator	Average	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Koleje Śląskie	-1.08 *	-	-7.23	-3.78	-8.28	1.14	0.51	0.69	0.59	0.21	0.30
Przewozy Regionalne	-0.24	-2.32	-0.75	-0.68	-0.96	-0.11	-1.78	1.05	1.62	0.99	0.55
ŁKA	-0.08 *	-	-	-	-	-22.22	-0.65	0.16	0.08	0.02	0.00
Koleje Wielkopolskie	-0.07 *	-	-	-0.92	-0.27	0.18	0.13	0.12	0.12	0.04	0.08
Koleje Małopolskie	0.27 *	-	-	-	-	-	n.d.	-0.90	1.00	1.04	-0.05
SKM Trójmiasto	0.30	0.01	0.23	0.21	0.28	0.47	0.35	0.75	0.52	0.16	0.05
Arriva	0.40	0.00	-0.70	-0.21	-0.36	-0.24	0.33	-0.85	2.11	0.52	3.45
Koleje Dolnośląskie	0.42	-0.04	0.98	0.96	0.47	0.99	0.30	0.36	0.29	-0.30	0.23
Koleje Mazowieckie	0.44	0.45	0.91	0.44	0.57	0.38	0.49	0.33	0.08	0.38	0.39
SKM Warszawa	1.01	0.97	1.91	1.68	0.70	1.17	1.01	0.73	1.20	0.10	0.66
WKD	1.36	0.34	0.00	0.00	1.00	1.04	1.79	2.88	2.25	2.15	2.10

\* Excluding the first year of operation

Source: Author's own calculations based on reports and profit-and-loss accounts of enterprises and UTK data.

The financial results of all the operators were similar, showing that the level of compensation received did not contribute to the achievement of excessive profits. The negative result of Koleje Śląskie was due to a number of organisational errors in the first three years of its operation [Report, 2013], while the high results of SKM Warszawa and WKD were attributable to the indirect financing of new rolling stock purchases by voivodeship governments.

Przewozy Regionalne generated different revenues from tickets in individual voivodeships as a result of varying attendance rates on trains (cf. Table 3). This made it difficult for each voivodeship government to determine a reasonable level of compensation, while the diversification of the expected compensation allowed the operator to either overstate or underestimate its financial result. This raises the question of whether the compensation provided by each voivodeship government was adequate to the transport services performed in a given voivodeship. In order to answer this question, the financial result of Przewozy Regionalne was estimated for each voivodeship. Due to the previously described cost structure of operations, which was the same throughout the country, it was concluded that the differences in the financial results in individual voivodeships were affected by the number of trains and the level of compensation provided by each voivodeship government. Hitherto, it was assumed that revenues from the sale of tickets in individual voivodeships were proportional to the number of passengers (see Table 3), while all the other cost and revenue components were proportional to the number of trains in operation and the length of their routes, which means operational performance. Hence, the company's financial result in voivodeship  $v$  was calculated as follows: revenue from the sale of tickets in voivodeship  $v$  + compensation of the voivodeship government  $v$  + (net financial result of company – the sum of revenue from the sale of tickets – the sum of compensations of all voivodeship governments)\* operational performance in voivodeship  $v$  (train-km) / the sum of operational performance in all voivodeships (train-km).

Table 7 shows the financial results estimated for these assumptions achieved by Przewozy Regionalne in individual voivodeships per unit of operational performance (PLN/1 train-km) as well as the standard deviation of this result. The company achieved a positive financial result only in 2016, when its economic condi-

tion stabilised. For this reason, the average values of the estimated financial result for individual voivodeships were determined for the 2016–2019 period, according to which the data presented in Table 7 were sorted.

**Table 7. Estimated net financial result of Przewozy Regionalne company in individual voivodeships per train-km**

Voivodeship	Average 2016–2019	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
On average for the whole of Poland	1.05	-2.32	-0.75	-0.68	-0.96	-0.11	-1.78	1.05	1.62	0.99	0.55
Standard deviation	4.26	1.86	2.97	2.83	3.11	3.87	3.66	3.86	4.51	4.39	4.86
Podlaskie	-5.14	-4.16	-6.19	-1.66	-4.40	-6.23	-3.69	-4.65	-6.19	-3.67	-6.06
Kujawsko-pomorskie	-4.88	-5.19	0.55	0.51	1.47	3.35	2.48	-4.25	-4.50	-4.34	-6.42
Lubuskie	-3.90	-1.15	1.72	-1.41	-4.49	-6.56	-6.42	-3.92	-2.89	-3.22	-5.56
Opolskie	-2.39	-3.02	-0.50	-2.15	0.31	-3.50	-5.33	-1.95	-1.84	-1.26	-4.51
Zachodniopomorskie	-2.22	-5.81	-4.71	-5.91	-4.82	-5.62	-5.86	-2.22	-2.48	-0.92	-3.24
Świętokrzyskie	-1.76	-2.85	-1.02	0.19	-0.02	-3.18	-3.39	-1.18	-2.34	-0.59	-2.92
Warmińsko-mazurskie	-0.43	-3.88	-4.14	-7.43	-2.77	-4.11	-5.17	-2.46	-1.46	3.43	-1.21
Łódzkie	-0.16	-5.36	-2.98	-4.61	-4.74	-6.63	-5.83	-2.34	-0.57	1.06	1.21
Pomorskie	0.25	-2.82	-1.86	-3.79	-2.95	-4.55	-4.27	1.81	1.80	-1.08	-1.55
Podkarpackie	1.42	-3.57	-3.34	-4.59	-3.27	-1.65	1.69	-0.52	1.75	3.03	1.41
Śląskie	3.01	-0.99	4.63	4.07	4.00	5.79	0.06	3.05	2.09	4.23	2.66
Wielkopolskie	4.81	-1.57	-1.64	-0.07	3.65	2.85	2.13	2.46	2.13	4.77	4.24
Lubelskie	4.98	0.23	1.82	-0.76	0.26	-1.33	-1.07	2.64	4.84	5.56	6.89
Małopolskie	7.35	0.17	3.18	0.15	1.07	-1.19	0.49	7.14	9.15	9.08	4.02
Dolnośląskie	9.29	-1.54	1.08	-2.71	3.39	2.78	5.68	8.44	9.42	8.80	10.48

Source: Author's own calculations based on reports and profit-and-loss account of Przewozy Regionalne and UTK data.

## Discussion

The collected data indicate that the diversification of the financial result obtained by Przewozy Regionalne in individual voivodeships increased over the studied period. This is well illustrated by the growing standard deviation of the financial result, as seen in Table 7. The visible growing differentiation of the result for individual voivodeships is difficult to justify with the imperfections of the adopted estimation method. Three groups of voivodeships can be distinguished: those in which the company obtained a clearly negative financial result (Podlaskie, Kujawsko-Pomorskie, Lubuskie and Opolskie voivodeships), those with a similar result to the total result of the company, and those with a clearly positive result (Śląskie, Wielkopolskie, Lubelskie, Małopolskie and Dolnośląskie voivodeships).

The low financial result in the Podlaskie voivodeship was the result of low revenues from ticket sales (cf. Table 3). This was a consequence of the limited range of transport services encouraging the local population to become independent of public transport, as shown in Figure 1. Against the background of the nationwide turnout, which was approximately 60 passengers on regional trains on average, the turnout in the Podlaskie voivodeship was around 20 passengers, with a strong downward trend.

The undervaluation of the compensation requested from the regional government in the Kujawsko-Pomorskie Voivodeship appears to be a result of competition with the independent carrier Arriva operating in the same voivodeship. The undervaluation of compensation in the Opolskie and Lubuskie Voivodeships seems to stem from the fear of these regional governments to establish their own railway similar to Koleje Dolnośląskie in the neighbouring voivodeship or to choose that carrier instead of Przewozy Regionalne. This indicates textbook monopoly behaviour in the face of potential competition.

A similar example is the Łódź Voivodeship. Presented in Table 7, the trend of the estimated financial result of Przewozy Regionalne indicates that until 2014 the level of compensation requested annually was gradually reduced so as to discourage the voivodeship government from creating its own railway. However, with the establishment of Łódzka Kolej Aglomeracyjna, the company's behaviour changed dramatically. The level of compensation increased every year, as a result of which in 2019 its value per operational performance (train-km) was almost 32% higher than in the case of Łódzka Kolej Aglomeracyjna.

In three voivodeships, Wielkopolskie, Małopolskie, and Dolnośląskie, the financial result of Przewozy Regionalne in 2010 and 2011 was almost equal to the average result of the entire company. This indicates that the level of compensation was proportional to the revenues from ticket sales at that time. However, in the following years it rose far above the average, allowing the company to achieve abnormal profits. This seems to be the result of the development of local government railways established by these three voivodeships. These rail carriers started their operations by reinstating local lines that were once abandoned by Przewozy Regionalne and which ran through areas with much lower population density. As a result, Przewozy Regionalne operated only lines with the highest frequency, leading to higher revenues from ticket sales compared to local government railways (see Table 3). Nevertheless, Przewozy Regionalne demanded higher compensation calculated per operational performance (1 train-km) than those railways (see Appendix A). In 2019, it was over 44% higher than in the case of Koleje Wielkopolskie, 40% higher than for Koleje Dolnośląskie, and over 22% higher than for Koleje Małopolskie. The presented behaviour of Przewozy Regionalne is a model illustration of the use of a dominant market position. Voivodeship governments could not entirely forego Przewozy Regionalne's services because their local government railways lacked sufficient rolling stock to take over the operation of all railway lines in the voivodeship.

In the Lubelskie Voivodeship, Przewozy Regionalne's financial result has been significantly higher than the average since 2016, yet the number of trains and revenues from ticket sales have dropped dramatically (see Table 3 and Figure 1). It seems that the growing compensation was justified by the falling revenue. However, with the structure of costs and revenues being unclear for the voivodeship government, the company was able to take advantage of its monopoly position and achieve abnormal profits.

From the formal perspective, it is unacceptable to obtain abnormal revenues from the provision of public services [Rozporządzenie, 2007]. However, the unit costs presented by Przewozy Regionalne to individual voivodeship governments were merely declarative, while the actual costs of operational performance (train-km) were similar throughout the country. The voivodeship governments were unable to verify them and refer to the rates in other voivodeships, a finding corroborated by other studies [Król, 2016: 44]. This practice allows the company to freely determine the requested amount of compensation.

## Summary

Our analysis demonstrates that determining the actual efficiency of regional railway services is highly challenging. This article outlines the various methods used to estimate efficiency, but these do not allow for unambiguous assessment and may lead to varied conclusions. On the one hand, this significantly hinders the optimal contracting of transport services. On the other hand, it allows the dominant company in the market to engage in monopolistic practices, which obviously reduces the efficiency of contracting. A clear example of this is the nationwide company Przewozy Regionalne. With a balanced result of its total activity throughout the country, the estimated financial result achieved in individual voivodeships indicates significant disproportions. The diversification of compensation rates expected from individual voivodeships led, in effect, to the cross-subsidisation of railway transport. This is a very short-sighted policy by Przewozy Regionalne designed to optimise profits in the nearest reporting period while maintaining the status of dominant market player. However, it also motivates voivodeship local governments to become independent from its services through further purchases of new rolling stock for their own local government railways.

Two decades have passed since the national rail company PKP started restructuring. During this time, voivodeship governments have become shareholders of Przewozy Regionalne, a company derived from PKP. The primary drivers for these changes appear to be the concern over social unrest prompted by railway workers' protests, the desire to preserve the company's dominant market position, and the fear of adverse consequences of opening this market.

The main barrier to accessing the regional transport market is capital-intensive rolling stock. The market dominance of Przewozy Regionalne resulted from the rolling stock taken over from the state-owned PKP, which created barriers that prevented other operators from accessing the market. For years, Przewozy Regionalne's rolling stock policy was limited to the gradual scrapping of its outdated rolling stock, while new vehicles were purchased almost exclusively by voivodeship governments, primarily for their own railways. This explains Przewozy Regionalne's behaviour. On the one hand, the company artificially inflated the level of compensation expected from voivodeships with their own local government railways, which could not take over the entire traffic due to insufficient rolling stock. On the other hand, it offered transport services for a relatively low compensation rate in those voivodeships which lent it a greater amount of new rolling stock. This is a model example of the behaviour of a dominant company in the face of potential competition in the market. The current organisation of regional railway transport makes it difficult to assess its efficiency and, consequently, to select the optimal operator in economic terms. This, in turn, allows the dominant entity to exploit its market position. This company employs cross-subsidisation of services to garner abnormal profits, lower expectations in the face of potential competition, and artificially enhance its efficiency in areas where there is real competition.

In the current system of contracting PSO services in Poland, real competition takes place only when the operator is selected. Thus, ensuring non-discriminatory and potentially wide access to the market at this stage is crucial for the development of regional railway transport. Meanwhile, transport organisers, represented by voivodeship governments, seem to be consciously foregoing this possibility, despite years of good practice in this area, as evidenced by the case of the Kujawsko-Pomorskie Voivodeship. In other voivodeships, the conditions of tenders and the time it takes to resolve them practically made access to them impossible for entities other than those dominant in the market, or regional governments opted out of tenders and entrusted the provision of services to the Przewozy Regionalne company.

In the face of the Fourth Railway Package, the conclusion of contracts for regional transport services without a tender procedure in most voivodeships froze the market until 2030. At the same time, the key market entry barrier posed by access to rolling stock was maintained. On the one hand, this hinders the development of the regional transport market. On the other, it limits the beneficial effects of many investments co-financed from EU funds throughout the country. The various ways in which regional railway transport has been transformed in Poland to date warrant an attempt to formulate recommendations in this area. In light of this, the subsequent transformations of Przewozy Regionalne, the dominant company in the market, enabled it to maintain its monopoly in individual voivodeships through long-term contracts without a tender, a practice that should be assessed negatively. Rising costs and a lack of choice in transport services result in limiting the range of transport and deteriorate its quality. One solution that would reduce high market entry costs would be to transfer all the rolling stock currently owned by the Przewozy Regionalne company to its co-owners, that is voivodeship governments. More specifically, this would allow the company to make independent decisions about modernisation and lend rolling stock to operators selected through open tenders. At the same time, it is necessary to transform the current practice of ordering from railway companies a level of operational performance (train-km) specified by the contracting authority, with an indicated number of trains on individual routes, and replace it with mechanisms motivating railway companies to shape their services independently in a way that maximises passenger flows. The role of the contracting authority should be limited to defining the minimum required scope of services on individual railway lines.



The potential for developing regional railway transport in Poland is reflected in how voivodeships have become involved in the development of their own local government railways. Despite the shortcomings arising from the lack of economic incentives to ensure operational efficiency, they have been able to offer an attractive range of transport services, resulting in an increased volume of transport. Therefore, it can be argued that implementing more favourable solutions through fostering real competition between operators would enhance the efficiency of regional railway transport, contributing to its revival in Poland.

## References

- Arriva [2013] *wygrała w Krajowej Izbie Odwoławczej*, Rynek Kolejowy, [http://www.rynek-kolejowy.pl/39835/Arriva\\_wygrała\\_w\\_KIO.htm](http://www.rynek-kolejowy.pl/39835/Arriva_wygrała_w_KIO.htm) (accessed on 10.05.2013).
- Cameron I., Lyons T.J., Kenworthy J.R. [2004], Trends in vehicle kilometers travel in world cities, 1960–1990: underlying drivers and policy responses, *Transport Policy*, 11 (3): 287–298.
- Chaberko T. [2010], Potencjał kolei jako miejskiego i podmiejskiego środka transportu w wybranych aglomeracjach Europy Środkowo-Wschodniej, *Prace Geograficzne*, 124: 59–71.
- Gould P. [1969], *Spatial Diffusion*, Resource Paper No. 17, Washington, DC: Association of American Geographers.
- Handy S.L., Niemeier D.A. [1997], Measuring accessibility: an exploration of issues and alternatives, *Environment and Planning A*, 29(7): 1175–1194.
- Jamroz K. [2012], Modelowanie wskaźnika motoryzacji na poziomie krajowym, *Zeszyty Naukowo-Techniczne Stowarzyszenia Inżynierów i Techników Komunikacji w Krakowie. Seria: Materiały Konferencyjne*: 111–120.
- Jaster G. [2004], *Konkurencja w przewozach kolejowych – doświadczenia na rynku niemieckim*, Conference Competition on Tracks – Opportunities and Threats, Railway Business Forum, Warszawa.
- Jurkowski W. [2019], Integracja zabudowy mieszkaniowej z infrastrukturą kolejową w strefach podmiejskich Krakowa, Łodzi, Poznania i Wrocławia, *Rozprawy Naukowe Instytutu Geografii i Rozwoju Regionalnego Uniwersytetu Wrocławskiego*, 43, Wrocław.
- Kenyon S. [2011], Transport and social exclusion: access to higher education in the UK policy context, *Journal of Transport Geography*, 19: 763–771.
- King D., Manville M., Shoup D. [2007], The political calculus of congestion pricing, *Transport Policy*, 14(2): 111–123.
- Komornicki T., Śleszyński P., Rosik P., Pomianowski W., Stepniak M., Siłka P. [2010], Dostępność przestrzenna jako przesłanka kształtowania polskiej polityki transportowej, *Biuletyn PAN. Komitet Przestrzennego Zagospodarowania Kraju*, 241.
- Król M., Taczanowski J. [2016], *Regionalne przewozy kolejowe w Polsce, Czechach i na Słowacji*, Oficyna Wydawnicza SGH, Warszawa.
- Lan L.W., Lin E.T.J. [2006], Performance Measurement for Railway Transport: Stochastic Distance Functions with Inefficiency and Ineffectiveness Effects, *Journal of Transport Economics and Policy*, 40(3): 383–408.
- Lierop D. van, Badami G.M., El-Geneidy M.A. [2018], What influences satisfaction and loyalty in public transport? A review of the literature, *Transport Reviews*, 38(1): 52–72.
- Maggio G., Cacciola G. [2009], A variant of the Hubbert curve for oil production forecasts, *Energy Policy*, 37(11): 4761–4770.
- Majewski J. [2006], Koleje regionalne w nowych warunkach społeczno-ekonomicznych w świetle badań potoków podróży, *Prace Komisji Geografii Komunikacji PTG*, 20(2): 31–42.
- Musgrave R.A., Musgrave P.B. [1973], *Public finance in theory and practice*, McGraw-Hill, Kogakusha.
- Preston J., Rajé F. [2007], Accessibility, mobility and transport-related social exclusion, *Journal of Transport Geography*, 15(3): 151–160.
- Qin Z. [2008], Improving public transit access to villages, *International Journal of Data Analysis Techniques and Strategies*, 1(2): 141–152.
- Raport [2013] z audytu finansowo-prawnego działalności dotyczącej świadczenia usług publicznych w zakresie wykonywania kolejowych regionalnych przewozów pasażerskich na obszarze województwa śląskiego przez Koleje Śląskie Sp. z o.o. w 2012 roku, Zespół Doradców Gospodarczych TOR Sp. z o.o., Warszawa.
- Rozporządzenie [2007] nr 1370/2007 Parlamentu Europejskiego i Rady z dnia 23 października 2007 r. dotyczącego usług publicznych w zakresie kolejowego i drogowego transportu pasażerskiego oraz uchylającego rozporządzenia Rady (EWG) nr 1191/69 i (EWG) nr 1107/70 (Dz. Urz. UE L 315 z 03.12.2007, s. 1).
- Schöller O., Borcherdig A. [2004], Elchtest. Die Reform des staatlichen Eisenbahnsystems in Schweden, *Internationales Verkehrs-wesen*, 5.
- Sengelov K. [2004], DSB Wants to Become Europe's Preferred Passenger Train Operator, *Railway Gazette International*, 12.
- Spiekermann K., Neubauer J. [2002], *European accessibility and peripherality: Concepts, models and indicators*, Nordregio.

- Starowicz W. [2004], Charakterystyka polskiej normy. Jakość usług w publicznym transporcie pasażerskim, *Technika Transportu Szynowego*, 9: 29.
- Taylor Z., Ciechański A. [2017], *Deregulacja i przekształcenia własnościowe przedsiębiorstw transportu lądowego w Polsce na tle polityki spójności UE*, IGiPZ PAN, Warszawa.
- Ustawa [1992] z dnia 20 czerwca 1992 r. o uprawnieniach do ulgowych przejazdów środkami publicznego transportu zbiorowego (tekst jednolity Dz.U. z 2012 r. poz. 1138 ze zm.).
- Ustawa [2003] z dnia 28 marca 2003 r. o transporcie kolejowym. Art.22 ust. 3–11, Art. 40. (Dz.U. 2003, nr 86, poz. 789).
- Ustawa [2004] z dnia 29 stycznia 2004 r. – Prawo zamówień publicznych, Dz. U. z 2010 r. nr 113, poz. 759, nr 161, poz. 1078 i nr 182, poz. 1228.
- Ustawa [2009] z dnia 9 stycznia 2009 r. o koncesji na roboty budowlane lub usługi, Dz. U. nr 19, poz. 101, z późn. zm.
- Ustawa [2010] z dnia 16 grudnia 2010 r. o publicznym transporcie zbiorowym, Dz.U. 2011 nr 5 poz. 13.
- Vickerman R. W. [1974], Accessibility, attraction, and potential: a review of some concepts and their use in determining mobility, *Environment and Planning A*, 6(6): 675–691.
- Warakomska K. [1992], Zagadnienie dostępności w geografii transportu, *Przegląd Geograficzny*, 64(1–2): 67–76.
- Zajfert M. [2016], *Transformacja sektora transportu kolejowego w Polsce*, INE PAN, Warszawa.

## Appendix A

## Profit-and-Loss Account, 2010–2019 (PLN in thousands)

The company *Przewozy Regionalne*

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
<b>Revenues from the sale of products and services, including:</b>	777 250,8	826 088,5	795 035,8	717 739,2	1 474 011,5	1 383 356,44	1 317 697,18	1 344 710,47	1 365 401,18	1 459 276,00
Revenues from sales of the passenger carriage services	540 266,0	548 370,0	534 464,1	478 478,3	552 411,3	478 465,6	432 114,9	437 248	351 954	376 712
Subsidy for the sale of statutory – reduced fare tickets	128 363,3	158 999,7	155 167,2	139 260,9	120 012,49	102 265,62	90 538,94	87 650,30	88 428,50	92 166,00
Compensation of the provincial government	-	-	-	-	788 237,8	785 268,4	773 197,1	801 076,3	806 040,4	948 111
<b>Other operating revenues</b>	971 933,8	1 078 376,3	1 060 291,2	819 147,2	38 663,5	69 527,29	84 761,31	62 225,18	78 606,38	65 683,00
Compensation of the provincial government	809 745,1	929 835,5	921 372,6	780 407,1	-	-	-	-	-	-
<b>Operating costs, including:</b>	1 805 762,5	1 836 148,0	1 843 835,9	1 560 138,5	1 461 404,6	1 396 046,81	1 305 375,15	1 318 377,28	1 358 048,44	1 446 647,00
Depreciation	53 564,1	57 220,1	57 319,1	56 726,7	57 126,9	58 596,86	65 344,41	68 845,84	96 338,65	91 894,00
<b>Net financial result</b>	-169 550,5	-52 706,0	-44 337,4	-54 008,1	-5 468,0	-88 421,05	51 238,33	79 679,56	50 930,30	29 378,00

Source: Annual Reports.

The company *Koleje Mazowieckie (Mazowieckie Railways)*

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
<b>Revenues from the sale of products and services, including:</b>	527 946,96	581 587,53	562 516,61	584 638,00	605 341,90	618 364,85	655 243,48	654 504,70	706 409,79	725 637,80
Revenues from sales of the passenger carriage services, subsidies from the Public Transport Authority of Warsaw and for the sale of statutory – reduced fare tickets	258 865,46	283 318,79	335 443	371 392,49	395 030,35	412 515,15	362 882,08	378 820,72	383 193,07	405 630,49
Compensation of the provincial government	193 835,19	214 500,00	235 000,00	241 906,31	244 511,57	246 975,46	285 497,46	257 590,10	286 393,50	296 989,26
<b>Other operating revenues</b>	14 480,91	19 661,30	27 317,35	40 299,00	40 130,03	47 131,43	92 866,31	68 626,93	58 677,42	57 123,58
<b>Operating costs, including:</b>	526 093,21	550 151,91	556 322,40	569 763,00	588 945,87	621 990,94	673 408,23	692 330,28	734 742,23	749 950,34
Depreciation	48 787,90	55 520,29	57 246,99	61 008,10	66 376,08	75 623,14	90 011,32	97 609,04	97 595,76	98 774,36
<b>Net financial result</b>	6 780,06	14 540,53	7 327,02	9 510,00	6 189,10	7 998,17	5 846,85	1 342,41	6 687,50	6 897,83

Source: Annual Reports.

**The company PKP SKM Trójmiasto (Urban Railway Gdańsk-Gdynia)**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
<b>Revenues from the sale of products and services, including:</b>	101 508,69	112 666,48	133 614,56	135 807,49	142 790,50	165 852,10	209 319,40	204 734,66	204 812,47	205 948,20
Subsidy for the sale of statutory – reduced fare tickets	13 525,51	14 912,56	18 250,46	18 604,72	19 239,10	22 592,25	20 944,40	23 731,60	22 377,81	22 582,54
Compensation of the provincial government	18 530,39	19 697,29	19 835,98	19 820,32	22 848,41	25 005,55	72 908,00	60 619,20	45 130,82	46 223,12
<b>Other operating revenues</b>	23 967,50	24 428,90	9 075,67	27 471,89	12 040,52	13 701,12	20 501,14	15 441,28	15 977,89	15 071,90
<b>Operating costs, including:</b>	125 637,72	134 549,07	142 258,63	139 631,40	150 888,97	171 240,06	217 688,93	212 219,45	215 860,73	214 288,40
Depreciation	8 482,00	10 207,00	11 427,20	10 740,46	14 304,05	18 601,54	21 177,93	21 111,83	22 162,17	22 357,02
<b>Net financial result</b>	53,70	842,20	722,09	1 008,40	1 737,46	1 495,48	4 253,63	2 632,95	715,18	217,60

Source: Annual Reports.

**The company WKD (Warsaw Commuter Railway)**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
<b>Revenues from the sale of products and services, including:</b>	23 475,52	25 907,60	26 130,70	49 738,78	50 934,08	54 947,91	59 084,43	65 167,27	64 883,73	65 885,20
Subsidy for the sale of statutory – reduced fare tickets	3 028,36	3 215,18	3 114,45	3 245,98	3 484,20	3 358,68	3 104,91	3 423,60	3 747,13	3 751,17
Compensation of the provincial government	6 030,00	6 312,63	15 962,23	20 502,86	18 233,36	24 316,90	30 747,63	30 597,22	27 227,78	27 644,27
<b>Other operating revenues</b>	6 044,29	6 963,25	27 265,98	59 970,61	22 212,36	12 900,41	16 008,52	17 259,02	15 740,07	16 448,92
<b>Operating costs, including:</b>	30 181,61	32 536,18	46 735,36	53 739,23	54 005,19	57 631,65	65 611,51	73 455,03	72 516,40	74 531,77
Depreciation	1 970,00	2 228,00	10 371,00	15 450,05	15 642,92	18 272,75	24 059,56	30 129,40	30 656,92	30 824,53
<b>Net financial result</b>	390,54	731,70	1 022,56	1 220,73	1 358,33	2 119,93	3 462,46	3 466,46	3 460,11	3 463,78

Source: Annual Reports

**The company SKM Warszawa (Warsaw Urban Railway)**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
<b>Revenues from the sale of products and services, including:</b>	51 597,43	81 592,27	123 969,86	127 095,17	120 489,46	102 324,00	123 077,55	123 658,56	135 159,00	147 563,71
<b>Other operating revenues</b>	841,84	10 092,98	12 494,71	30 204,88	32 393,52	31 623,71	30 853,89	27 523,38	23 135,00	20 238,27
<b>Operating costs, including:</b>	47 983,04	73 083,35	116 351,93	124 356,93	127 177,34	136 214,90	145 252,46	141 259,41	149 339,00	160 572,42
Depreciation	6 499,61	12 959,87	32 949,82	41 122,17	41 700,59	41 825,71	41 950,83	27 579,20	28 537,00	28 763,79
<b>Net financial result</b>	1 480,80	3 580,39	4 753,18	1 940,68	3 348,85	2 794,75	2 240,65	3 507,53	264,00	1 960,97

Source: Annual Reports

**The company Arriva**

	2011	2012	2013	2014	2015	2016	2017	2018	2019
<b>Revenues from the sale of products and services, including:</b>	64 133,00	64 042,00	67 513,65	111 850,92	109 446,84	65 497,02	66 675,22	67 459,37	72 528,21
Compensation of the provincial government	51 528,18	54 673,87	46 252,60	58 573,60	74 058,55	49 735,81	50 845,95	50 751,73	52 372,72
<b>Other operating revenues</b>	2 229,04	5 064,96	8 770,30	3 169,428	8 029,25	4 186,75	4 664,64	3 096,04	2 160,85
<b>Operating costs, including:</b>	66 873,00	68 892,00	76 325,17	113 568,76	113 915,75	69 227,74	64 892,18	68 306,45	66 036,70
Depreciation	98,92	237,14	2 877,82	3 955,66	5 680,17	4 234,78	3 699,90	3 935,75	4 654,01
<b>Net financial result</b>	-1 815,46	-555,16	-925,78	-924,382	1 278,42	-1 901,95	4 808,72	1 198,85	8 155,27

Source: Annual Reports

**The company Koleje Dolnośląskie**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
<b>Revenues from the sale of products and services, including:</b>	3 737,39	5 769,34	14 335,80	21 266,44	32 687,85	46 084,80	62 816,37	77 758,92	93 923,72	113 689,46
Revenues from sales of the passenger carriage services	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	56 195,55	70 470,24	84 407
Subsidy for the sale of statutory – reduced fare tickets	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	14 475,66	17 048,09	20 252
<b>Other operating revenues</b>	19 328,88	29 196,25	40 022,91	47 763,96	57 418,28	64 919,49	87 683,61	97 855,74	123 759,57	118 738,19
<b>Compensation of the provincial government</b>	18 211,48	28 243,78	34 098,81	43 223,00	48 472,14	54 152,14	65 639,82	80 821,74	87 516,98	82 621,68
<b>Operating costs, including:</b>	22 572,14	34 723,89	51 531,44	64 740,76	84 086,60	106 002,08	141 714,59	171 953,94	210 252,84	216 914,28
Depreciation	308,10	364,92	391,50	4 300,29	6 942,43	12 380,13	20 256,20	26 318,85	40 813,37	40 866,60
<b>Net financial result</b>	-43,35	1 656,02	2 446,91	1 296,99	3 482,27	1 371,70	2 094,98	1 997,44	- 2 389,43	1 932,30

Source: Annual Reports.

**The company Koleje Śląskie**

	2011	2012	2013	2014	2015	2016	2017	2018	2019
<b>Revenues from the sale of products and services, including:</b>	18 061,50	86 794,64	211 700,86	235 234,26	224 284,92	227 405,90	227 417,37	233 355,14	248 775,53
Revenues from sales of the passenger carriage services	n.d.	n.d.	74 470,49	68 995,20	n.d.	n.d.	66 020,00	69 720,00	78 700,00
Subsidy for the sale of statutory – reduced fare tickets	n.d.	n.d.	15 886,11	16 492,84	n.d.	n.d.	16 620,00	17 450,00	18 900,00
<b>Compensation of the provincial government</b>	7 600,92	42 509,89	123 540,58	148 995,03	139 958,54	142 998,93	139 609,04	139 894,71	145 100,00
<b>Other operating revenues</b>	n.d.	1 679,25	9 012,85	7 428,06	7 220,59	18 981,23	10 556,34	60 847,46	129 500,23
<b>Operating costs, including:</b>	22 544,00	95 837,64	266 317,95	217 270,17	209 536,18	212 316,60	217 272,65	232 090,78	229 421,04
Depreciation	118,31	2 759,00	7 854,06	15 265,30	14 301,42	14 091,52	14 940,41	15 987,57	17 205,87
<b>Net financial result</b>	- 4 482,50	- 11 606,20	- 61 626,82	7 172,67	3 122,51	4 556,95	3 888,72	1 470,35	2 217,56

Source: Annual Reports.

**The company Koleje Wielkopolskie**

	2011	2012	2013	2014	2015	2016	2017	2018	2019
<b>Revenues from the sale of products and services, including:</b>	19 395,79	48 170,00	100 439,00	121 716,00	76 452,00	83 690,00	81 865,00	94 111,80	99 223,46
Compensation of the provincial government	10 775,66	30 803,87	50 408,01	49 679,21	-	-	-	-	-
Other operating revenues	n.d.	n.d.	4 543	4 296	59 447,00	62 978,00	69 971,00	74 967,75	82 977,24
<b>Compensation of the provincial government</b>	-	-	-	-	55 552,61	57 965,25	59 796,18	75 552,92	81 009,55
<b>Operating costs, including:</b>	23 101,60	51 096,00	100 699	122 809	133 539,00	142 775,00	146 243,00	166 552,65	180 374,86
Depreciation	179,26	547,67	1 135,94	1 385,36	1 506,40	2 065,18	1 611,69	1 916,56	1 567,82
<b>Net financial result</b>	-2 176,46	-1 400,00	-851	655	500,00	577,00	764,00	242,10	493,22

Source: Annual Reports.

**The company Łódzka Kolej Aglomeracyjna (Łódź Commuter Railway)**

	2014	2015	2016	2017	2018	2019
<b>Revenues from the sale of products and services, including:</b>	3 055,97	13 027,65	17 981,72	24 596,65	29 908,59	37 759,57
Subsidy for the sale of statutory – reduced fare tickets	371,35	1 583,09	2 185,09	3 180,85	3 672,97	4 357,96
Other operating revenues	7 892,62	49 742,45	53 961,36	52 804,06	57 216,81	68 080,25
<b>Compensation of the provincial government</b>	5 584,68	34 441,74	36 677,53	37 452,44	40 319,47	45 935,05
<b>Operating costs, including:</b>	16 555,68	58 478,09	69 155,73	74 836,57	83 542,88	99 400,00
Depreciation	n.d.	15 000,00	16 836,64	17 054,94	17 017,94	20 305,99
<b>Net financial result</b>	-6 526,81	-1 120,38	325,95	180,38	45,38	4,56

Source: Annual Reports.

**The company Koleje Małopolskie**

	2016	2017	2018	2019
<b>Revenues from the sale of products and services, including:</b>	30 865,11	51 526,24	74 068,44	76 140,53
Revenues from sales of the passenger carriage services	13 643,81	21 218,99	24 734,50	26 216,79
Subsidy for the sale of statutory – reduced fare tickets	2 145,49	3 160,95	3 859,56	4 276,40
<b>Compensation of the provincial government</b>	15 075,80	26 706,58	45 006,93	47 900,61
<b>Other operating revenues</b>	2 145,49	3 178,49	7 867,32	10 549,54
<b>Operating costs, including:</b>	34 121,00	50 292,23	73 699,88	78 243,19
Depreciation	79,38	394,28	485,49	4 013,50
<b>Net financial result</b>	-1 065,79	1 760,36	2 663,62	-143,75

Source: Annual Reports.



## Appendix B

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
<b>Dolnośląskie voivodeship</b>										
Przewozy Regionalne										
Compensation of the provincial government (PLN)	83 650 800	99 613 490	84 124 755	95 768 298	86 360 318	65 972 884	52 921 437	49 457 217	37 798 545	41 525 146
Train-kilometre	6 288 274	6 315 078	5 922 183	5 486 255	5 396 218	4 255 832	3 770 475	3 611 135	2 996 685	3 035 009
Number of passengers	10 800 000	10 500 000	10 500 000	11 200 000	12 198 163	12 200 000	12 600 000	12 834 245	12 416 784	15 172 928
Rail passenger-kilometre (thousands)	19 328,88	29 196,25	40 022,91	47 763,96	57 418,28	64 919,49	87 683,61	97 855,74	123 759,57	118 738,19
Koleje Dolnośląskie										
Compensation of the provincial government (PLN)	18 211 484	28 243 777	34 098 808	43 222 999	48 472 135	54 152 137	65 639 820	80 821 744	87 516 984	82 621 680
Train-kilometre	1 220 929	1 687 334	2 545 480	2 786 072	3 515 742	4 597 843	5 756 616	6 912 305	8 060 890	8 453 928
Number of passengers	675 710	900 558	1 840 100	2 421 200	3 605 520	5 213 744	7 312 884	9 380 451	11 725 670	14 113 636
Rail passenger-kilometre (thousands)	21 933,0	30 129,0	76 770,0	115 160,0	204 107,0	317 462,8	425 079,5	508 047,6	601 188,2	680 852,1
<b>Kujawsko-Pomorskie voivodeship</b>										
Przewozy Regionalne										
Compensation of the provincial government (PLN)	33 132 275	46 688 434	52 796 566	55 238 012	28 489 863	33 694 617	41 811 010	40 699 356	39 905 706	42 565 783
Train-kilometre	3 289 014	3 041 565	2 870 302	2 935 237	1 353 438	1 587 061	3 278 100	3 306 046	3 384 191	3 517 711
Number of passengers	5 400 000	5 000 000	4 600 000	4 400 000	2 215 245	2 300 000	4 100 000	4 216 623	4 452 851	4 936 371
Arriva										
Compensation of the provincial government (PLN)	21 913 733	40 838 079	41 171 365	44 519 529	71 644 222	74 058 546	49 735 814	50 845 948	50 751 726	52 372 722
Train-kilometre	1 725 267	2 074 266	2 055 466	2 103 841	3 850 642	3 919 562	2 232 114	2 278 887	2 286 000	2 366 777
Number of passengers	2 220 647	2 433 599	2 492 527	2 487 662	4 601 074	4 288 725	2 343 169	2 345 661	2 140 894	2 306 799
Rail passenger-kilometre (thousands)	66 247,9	87 211,2	91 087,6	90 705,4	194 464,2	172 685,8	96 354,0	94 802,0	78 642,0	82 720,0
<b>Lubelskie voivodeship – Przewozy Regionalne</b>										
Compensation of the provincial government (PLN)	43 629 974	52 750 000	56 050 020	58 250 000	61 976 742	61 808 980	61 704 524	66 322 336	68 128 313	76 757 952
Train-kilometre	2 514 734	2 786 312	2 960 742	3 000 423	3 122 060	3 057 818	2 949 236	2 821 332	2 848 031	2 757 521
Number of passengers	3 300 000	3 500 000	3 800 000	3 600 000	3 598 249	3 200 000	3 000 000	2 644 788	2 288 616	2 299 838
<b>Lubuskie voivodeship – Przewozy Regionalne</b>										
Compensation of the provincial government (PLN)	31 625 200	37 381 535	38 372 859	36 028 522	36 764 697	38 909 841	40 507 407	42 651 791	45 613 777	50 112 020
Train-kilometre	2 056 163	2 076 932	2 144 334	2 360 407	2 418 598	2 577 427	2 747 025	2 730 812	3 055 064	3 250 710
Number of passengers	3 000 000	2 900 000	2 900 000	2 600 000	2 592 968	2 600 000	2 600 000	2 640 014	2 603 061	2 694 278
<b>Łódzkie voivodeship</b>										
Przewozy Regionalne										
Compensation of the provincial government (PLN)	52 284 750	56 891 590	67 170 883	69 075 192	65 997 936	65 038 808	59 638 245	54 868 760	57 146 054	64 329 909
Train-kilometre	4 348 008	4 176 154	4 322 330	4 554 158	4 107 617	3 779 017	3 485 768	3 324 854	3 349 488	3 305 505
Number of passengers	5 500 000	5 600 000	5 200 000	4 900 000	3 867 333	2 900 000	2 800 000	4 082 033	4 505 765	4 851 985

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Łódzka Kolei Aglomeracyjna										
Compensation of the provincial government (PLN)	-	-	-	-	5 584 677	34 441 744	36 677 528	37 452 440	40 319 469	45 935 048
Train-kilometre	-	-	-	-	293 736	1 713 979	2 040 069	2 379 639	2 708 137	3 107 744
Number of passengers	-	-	-	-	341 717	1 625 791	2 518 053	3 854 074	4 715 367	6 005 086
Rail passenger-kilometre (thousands)	-	-	-	-	15 428,6	73 260,6	122 472,4	141 802,9	158 532,6	182 417,7
<b>Matopolskie voivodeship</b>										
Przewozy Regionalne										
Compensation of the provincial government (PLN)	69 000 000	77 578 456	92 000 000	75 530 000	79 672 124	79 321 827	80 597 726	89 588 196	79 305 094	89 260 989
Train-kilometre	5 554 620	5 235 918	5 524 396	4 474 055	4 197 427	4 105 717	3 712 056	3 939 283	3 495 193	4 015 164
Number of passengers	12 100 000	11 400 000	10 200 000	7 842 500	5 428 482	5 893 765	6 300 860	7 327 900	6 624 397	5 933 728
Koleje Matopolskie										
Compensation of the provincial government (PLN)	-	-	-	-	-	7 592 056	13 671 280	25 859 548	45 719 033	48 369 989
Train-kilometre	-	-	-	-	-	378 052	1 164 756	1 711 145	2 630 879	2 664 965
Number of passengers	-	-	-	-	-	1 793 976	4 788 024	5 730 428	6 438 700	6 478 992
Rail passenger-kilometre (thousands)	-	-	-	-	-	27 908,8	94 625,8	168 350,9	239 121,3	247 199,2
<b>Mazowieckie voivodeship</b>										
Koleje Mazowieckie										
Compensation of the provincial government (PLN)	193 835 191	211 555 722	219 804 663	241 906 309	244 511 571	246 975 458	285 497 464	257 590 103	286 393 497	326 390 160
Train-kilometre	14 248 268	14 945 672	16 046 986	16 147 639	15 429 792	15 433 104	16 608 269	17 724 228	17 374 732	17 682 065
Number of passengers	53 278 822	54 420 839	59 106 665	62 395 021	62 505 527	63 246 500	60 878 591	62 041 365	59 702 687	62 105 138
Rail passenger-kilometre (thousands)	1 817 341,6	1 878 675,6	2 123 590,9	2 223 962,5	2 214 641,7	2 227 472,4	2 163 603,3	2 187 961,2	2 105 568,0	2 140 551,5
Warszawskie Koleje Dojazdowe										
Compensation of the provincial government (PLN)	4 922 130	5 301 279	16 020 949	20 502 863	18 233 365	24 316 905	30 747 631	30 597 222	27 227 779	27 644 273
Train-kilometre	1 132 058	1 157 483	1 146 292	1 214 668	1 300 525	1 187 245	1 201 682	1 541 931	1 607 397	1 652 113
Number of passengers	6 902 956	7 328 792	7 099 197	7 399 021	7 942 015	7 655 899	6 886 835	7 748 508	8 599 772	8 797 129
Rail passenger-kilometre (thousands)	105 638,6	114 464,8	110 733,9	117 581,1	128 571,4	125 589,7	106 861,6	118 488,4	132 132,6	133 230,8
<b>Opolskie voivodeship – Przewozy Regionalne</b>										
Compensation of the provincial government (PLN)	37 146 701	45 637 463	44 600 000	41 200 000	43 634 136	42 850 000	39 428 526	43 708 068	47 708 068	48 260 493
Train-kilometre	3 457 975	3 500 000	3 260 000	2 900 000	3 090 000	3 240 918	2 874 259	3 099 970	3 299 400	3 365 012
Number of passengers	6 600 000	6 500 000	6 400 000	6 000 000	5 094 744	4 800 000	4 300 000	4 443 520	4 652 447	4 463 546
<b>Podkarpackie voivodeship – Przewozy Regionalne</b>										
Compensation of the provincial government (PLN)	37 997 500	39 401 200	40 343 948	42 955 858	51 287 821	51 215 922	40 229 235	48 846 637	55 427 575	65 117 167
Train-kilometre	2 845 686	2 710 177	2 664 023	2 639 722	2 571 265	2 329 065	2 357 178	2 489 980	2 732 956	3 052 248
Number of passengers	4 000 000	3 700 000	3 400 000	3 000 000	2 813 265	2 800 000	2 700 000	2 698 131	2 895 110	3 278 781

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
<b>Podlaskie voivodeship – Przewozy Regionalne</b>										
Compensation of the provincial government (PLN)	21 042 600	15 500 000	23 481 473	15 500 000	15 499 910	18 020 483	15 751 884	23 132 257	24 707 763	27 390 503
Train-kilometre	1 531 902	1 392 638	1 285 808	1 034 007	1 034 017	1 005 607	1 059 068	1 633 670	1 630 892	1 795 031
Number of passengers	1 800 000	1 700 000	1 600 000	1 200 000	1 185 687	1 000 000	835 793	1 032 217	1 142 331	1 340 967
<b>Pomorskie voivodeship</b>										
Przewozy Regionalne										
Compensation of the provincial government (PLN)	43 695 400	46 497 985	52 131 321	52 674 221	59 696 944	64 353 268	66 540 545	79 451 824	75 767 752	92 474 677
Train-kilometre	4 871 351	4 428 501	4 451 901	4 307 887	4 604 330	4 887 871	4 362 287	5 093 397	5 967 205	6 509 018
Number of passengers	9 300 000	9 100 000	9 000 000	8 000 000	7 658 703	8 100 000	8 300 000	9 284 059	11 077 702	13 355 848
PKP SKM Trójmiasto										
Compensation of the provincial government (PLN)	18 530 389	19 697 289	19 835 979	19 820 317	22 848 409	25 005 549	76 125 508	48 718 743	51 250 000	44 655 771
Train-kilometre	3 797 480	3 593 422	3 373 139	3 011 778	3 592 620	3 776 529	5 172 297	3 999 113	4 505 617	4 096 017
Number of passengers	37 300 940	38 370 440	36 812 707	35 205 822	35 732 318	39 327 327	41 855 512	42 302 044	42 218 246	43 094 333
Rail passenger-kilometre (thousands)	872 714,0	902 377,8	838 900,0	801 600,0	916 700,0	979 500,0	1 100 036,3	1 102 115,4	980 618,2	991 118,3
<b>Śląskie voivodeship</b>										
Przewozy Regionalne										
Compensation of the provincial government (PLN)	110 463 285	146 565 165	117 042 466	35 339 502	27 180 894	34 288 285	34 455 190	35 903 179	39 580 748	43 655 170
Train-kilometre	9 098 754	8 174 427	5 505 919	1 460 415	1 224 417	1 701 091	1 687 962	1 775 237	1 897 662	2 060 635
Number of passengers	18 400 000	15 500 000	9 500 000	1 500 000	2 224 171	2 100 000	2 000 000	1 837 043	2 281 175	2 890 070
Koleje Śląskie										
Compensation of the provincial government (PLN)		9 307 661	42 509 902	123 793 341	148 995 026	139 958 539	142 998 925	139 609 040	139 894 709	144 262 138
Train-kilometre		621 893	3 072 691	6 991 296	6 287 566	6 104 680	6 647 911	6 633 513	7 003 735	7 412 127
Number of passengers		1 798 747	9 130 300	16 327 700	16 036 492	15 893 510	15 334 056	15 730 040	16 958 381	20 405 556
Rail passenger-kilometre (thousands)		54 507,0	291 800,0	646 400,0	646 071,1	626 204,1	593 368,6	687 408,4	757 121,8	722 000,0
<b>Świętokrzyskie voivodeship – Przewozy Regionalne</b>										
Compensation of the provincial government (PLN)	23 589 400	19 672 000	23 162 200	22 891 500	23 546 100	24 915 681	25 624 936	31 180 608	33 266 290	35 366 685
Train-kilometre	1 289 147	1 432 386	1 416 676	1 417 204	1 425 848	1 480 762	1 540 420	1 979 862	1 994 400	2 048 700
Number of passengers	1 800 000	2 300 000	2 700 000	2 400 000	1 937 908	1 800 000	1 700 000	2 067 277	2 104 272	2 077 470
<b>Warmińsko-Mazurskie voivodeship – Przewozy Regionalne</b>										
Compensation of the provincial government (PLN)	43 833 249	45 126 046	46 851 051	48 150 000	49 890 000	49 073 000	46 654 954	49 294 501	62 610 000	56 542 000
Train-kilometre	3 380 349	3 487 390	3 615 052	3 008 811	3 000 604	3 105 331	3 000 492	3 000 387	3 000 482	3 000 500
Number of passengers	4 600 000	4 400 000	4 200 000	3 800 000	3 643 053	3 400 000	3 200 000	3 239 978	3 053 942	3 134 410

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
<b>Wielkopolskie voivodeship</b>										
Przewozy Regionalne										
Compensation of the provincial government (PLN)	106 921 800	112 354 900	110 134 225	76 646 961	66 742 961	76 804 792	84 062 728	83 150 776	104 316 783	104 004 010
Train-kilometre	9 249 033	9 588 265	7 848 968	5 789 200	5 464 819	5 896 533	6 600 843	6 548 224	6 294 115	5 885 082
Number of passengers	18 700 000	18 100 000	17 800 000	16 100 000	15 291 784	15 900 000	16 400 000	14 855 190	14 297 388	15 289 975
Koleje Wielkopolskie										
Compensation of the provincial government (PLN)		10 775 662	30 803 867	50 408 011	49 679 211	55 552 613	57 965 249	59 796 176	75 552 920	81 009 547
Train-kilometre		435 409	1 525 165	3 146 717	3 637 921	3 902 150	4 878 171	4 892 767	6 350 185	6 622 226
Number of passengers		566 083	3 347 831	5 397 811	7 240 758	7 372 122	8 257 223	8 096 779	10 961 600	12 166 467
Rail passenger-kilometre (thousands)		16 352,1	105 200,0	244 300,0	348 749,8	350 604,5	390 552,4	357 430,2	406 641,4	439 011,0
<b>Zachodniopomorskie voivodeship – Przewozy Regionalne</b>										
Compensation of the provincial government (PLN)	69 559 300	75 363 790	74 500 000	76 922 956	79 840 509	78 999 989	82 128 462	81 584 678	90 366 685	95 572 194
Train-kilometre	5 947 723	6 037 426	5 475 101	5 467 746	5 410 867	5 505 502	5 417 001	5 422 710	5 644 350	5 836 357
Number of passengers	7 400 000	7 500 000	7 200 000	6 800 000	6 839 923	6 700 000	6 400 000	6 215 195	6 397 337	6 694 700
<b>Przewozy Regionalne (total, with non-PSO trains)</b>										
Compensation of the provincial government (PLN)	809 745 100,0	929 835 500,0	921 372 648,0	780 407 100,0	788 237 800,0	785 268 375,6	773 197 081,3	801 076 310,6	806 040 399,3	948 111 000,0
Train-kilometre	73 170 000,0	70 740 000,0	65 000 000,0	55 977 141,0	48 145 000,0	49 644 751,0	48 842 169,7	50 776 898,0	51 590 113,8	53 434 202,7
Number of passengers	114 320 000,0	109 740 000,0	101 020 000,0	84 877 938,5	79 321 441,0	76 832 647,6	79 459 052,0	79 853 665,0	81 192 364,0	88 872 710,0
Rail passenger-kilometre (thousands)	6 460 350,0	6 637 300,0	6 111 380,0	5 133 254,9	4 823 033,1	4 390 405,6	4 262 498,0	4 214 821,1	4 202 920,8	4 458 843,8

Source: Aggregated reports on the public service obligations (PSO) of provincial governments, <https://dane.utk.gov.pl/sts/przewozy-pasazerskie> (Office of Rail Transport)