

**ECONOMICS  
WORKING  
PAPERS**

**VOLUME 3**

**NUMBER 1**

**ISSN 1804-9516 (Online)**

**2019**

# ECONOMICS WORKING PAPERS

Volume 3 Number 1 2019

**Publisher:** University of South Bohemia in České Budějovice  
Faculty of Economics

**Reviewers:** prof. Ing. Jiří Strouhal, CSc.  
Škoda Auto Vysoká škola, o.p.s.

prof. Ing. Drahoš Vaněček, CSc.  
University of South Bohemia in České Budějovice  
Faculty of Economics  
Department of Management

**Edition:** 1, 2019

**ISSN:** 1804-9516

# ECONOMICS WORKING PAPERS

## EDITORIAL BOARD:

### CHAIRMAN:

**Ladislav Rolínek**

University of South Bohemia in České Budějovice  
Czech Republic

### EDITORS:

**Eva Cudlínová**, University of South Bohemia  
in České Budějovice, Czechia

**Miloslav Lapka**, University of South Bohemia  
in České Budějovice, Czechia

**Ivana Faltová Leitmanová**, University of  
South Bohemia in České Budějovice, Czechia

**Tomáš Mrkvička**, University of South  
Bohemia in České Budějovice, Czechia

**Darja Holátová**, University of South Bohemia  
in České Budějovice, Czechia

**Ladislav Rolínek**, University of South  
Bohemia in České Budějovice, Czechia

**Milan Jílek**, University of South Bohemia in  
České Budějovice, Czechia

## ASSOCIATE EDITORS:

**Věra Bečvářová**, Mendel University in Brno,  
Czechia

**Věra Majerová**, Czech University of Life  
Sciences Prague, Czechia

**Roberto Bergami**, Victoria University,  
Melbourne, Australia

**Cynthia L. Miglietti**, Bowling Green State  
University, Huron, Ohio, United States

**Ivana Boháčková**, Czech University of Life  
Sciences Prague, Czechia

**Ľudmila Nagyová**, Slovak University  
of Agriculture in Nitra, Slovakia

**Jaroslava Holečková**, University  
of Economics in Prague, Czechia

**James Sanford Rikoon**, University  
of Missouri, United States

**Lubor Lacina**, Mendel University in Brno,  
Czechia

**Labros Sdrolias**, School of Business  
Administration and Economics Larissa, Greece

**Daneil Stavárek**, Silesian University in  
Opava, Czechia

ECONOMICS WORKING PAPERS. Published by Faculty of Economics. University of South Bohemia in České Budějovice • The editor's office: Studentská 13, 370 05 České Budějovice, Czech Republic. Contact: tel: 00420387772486, Technical editor: Tereza Štástková, e-mail: stastkova@ef.jcu.cz • ISSN1804-5618 (Print), 1804-9516 (Online)

## Content

1 Introduction .....	7
2 Current State of the Issue Being Solved.....	10
2.1 Introduction of the Public Transport Issue .....	10
2.2 Basic Aspects of Transport.....	10
2.3 Selected Models for Evaluating Financial Health of Transport Company in the Czech Republic .....	11
2.3.1 Objectives of Financial Management of Transport Company.....	11
Modular Models .....	13
2.3.2 Financial Health and Financial Distress of the Company .....	18
2.4 Bankruptcy and Creditworthy Models for Evaluating Financial Health of Transport Company in the Czech Republic.....	20
2.4.1 Bankruptcy Model Index IN 95.....	21
2.4.2 Creditworthy Model Index IN 99 .....	23
2.4.3 Index IN 01.....	24
2.4.4 Index IN 05.....	24
3 Financing of Public Transport.....	26
3.1 Financial Flows in the Regional Bus Transport .....	29
3.2 Provable Loss in the Public Line Transport - Government Decree No. 493/2004 Sb.....	30
3.2.1 Classification of economically substantiated costs in public line transport .....	34
3.2.2 Classification of revenues from transport activity in public line transport .....	36
3.3. Compensation in Public Line and Track-based Transport Pursuant to Regulation No. 296/2010 Sb.....	37
3.3.1 Classification of economically substantiated costs defined by Regulation No. 296/2010 Sb. ....	39
3.3.2 Classification of revenues defined by Regulation No. 296/2010 Sb. ....	46
3.4 Funding of Public Transport in European and Non-European Countries.....	46
3.5 Discount tariffs in public transport.....	49
4 Goals and Methodology .....	51
4.1 Main Goal of Thesis .....	51
4.2 Partial Goals of Thesis .....	51
4.3 Methodology of Thesis, Research Techniques.....	53
4.4 Determining of Hypotheses.....	53
4.5 Data Sources.....	54
5 Main Results of Research.....	55
6 Conclusion.....	67



# **PROVABLE LOSS ANALYSIS – EVALUATION OF FINANCIAL HEALTH IN PUBLIC TRANSPORTATION FROM ACCOUNTING VIEWPOINT**

**Telecký, M.**

## **Abstract**

The submitted paper analyses the financial health evaluation of the public transport company. The main goal of the paper is to analyse determining of the provable loss amount in the public line transport, track-based transport and municipal public transport pursuant to Government Decree No. 493/2004 Sb., Regulation No. 241/2005 Sb. and Regulation No. 296/2010 Sb. and the methods of payment of subsidies in the regional and long-distance transport. Basic characteristics or the explanatory power of individual legal regulations addressing the issue of economically substantiated costs and revenues and the payment of the relevant amount of compensation (subsidy) arising from the basic transport services prove that Regulation No. 296/2010 Sb. promotes higher financial drawing from public budgets for the needs of ensuring basic transport services and for the renewal of the fleet as compared with Government Decree No. 493/2004 Sb. in case of the public line transport and Regulation No. 241/2005 Sb. in case of the public track-based transport. The partial goal of the thesis is to classify the cost and revenue items affecting the amount of the subsidy and to propose effective classification in individual groups of economically substantiated costs on the basis of their explanatory power.

**Key words:** Public transport, basic transport services, provable loss, economically substantiated costs, financial health of the company, public finance.

**JEL classification:** R40, M41

---

## 1 Introduction

The public line transport, the track-based transport and the municipal public transport are used to ensure basic transport services. These services include the deployment of means of transport in a certain region and satisfy the basic human needs at a given place and time.

The effective division of labour is not possible without the public transport. The public transport represents one of the business areas, which is a part of the country's economy and has a substantial influence on the quality of life of citizens, employees and the whole society. No basic transport services provided by the public transport would result in the partial but significant disintegration of the human society. The overall negative course and a number of other consequences have an adverse influence on the country's economy and the life quality of citizens, business and other entities. The assets and pensions of consumers are so dissimilar that not everyone can afford buying the means of transport which will be used in the passenger transport in future. In this case, basic transport services are very important. (Matoušková, 2000)

The proper function of the transportation requires the high quality transport infrastructure, transport routes, workforce, fuel, energy or other similar operating costs. The mentioned factors which are related with the business activity of the transport company must be directly or indirectly recorded in both the financial and managerial accounting, or in the environmental and suitable accounting. (Stejskal, 2013)

The current economic situation of the Czech Republic offers suitable conditions for future investors in the public transport. New transport companies which provide basic transport services especially in the long-distance transport are being established. It can be stated that the supply exceeds the demand at the transport market and it is necessary to perceive the competitors (external environment) and to maintain the quality of transport services. All of that has an influence on the overall operational nature, risk and financial health of the transport company. (Viturka, 2000)

Especially the financial health evaluation of the transport company represents the basic source of information and provides an indication on how the given company is managed and whether it will have an economic advantage or benefit. In general, the positive results are expected which should result in teasing a potential investor and the future development of the transport company. Owners and managers of the unit being operated decide on the future life stage of the company. Their style of management is affected by even minor decision which will later prove to be negative or positive. It is not advisable to make decisions on the important

---

things, such as the investment of the company, individually. It is necessary to collectively discuss the return on investment well in advance and to efficiently decide on the implementation of investments which will affect the complete process of providing the basic transport services in future. The majority of initial investment plans and other important information in the accounting and financial issue are provided in the accounting reports, notes and annual reports compiled at the end of the accounting period and published by means of the commercial register.

The financial health of the companies carrying out the transport activity in the Czech Republic and other countries of the European Union is mostly represented by the lack of received (earned) money which would sufficiently cover overall costs of the company. The public line, track-based and municipal public transports providing the basic transport services in the defined region fail to generate such profits which would be sufficient for the renewal of the fleet and fixed assets. In this case, we cannot compare the transport companies which provide the long-distance transport and operate at their own risk and the companies which made a contract with a specific client of transport services. The task of the client who orders the transport services is to find a suitable carrier which would provide the basic transport services in the defined location based on the capacity of its means of transport. This relationship between the client and the carrier is defined in the public service contract. This implies that the client ordering the transport is obliged to pay the carrier the relevant loss from the provided transport services, i.e. the "provable loss". The provable loss is generated when the total economically substantiated costs are not fully covered by the revenues coming from the transport services of the transport company. This indicates that the paid losses of carriers are the burden of the public budgets of municipalities, regions and the state.

The contribution is analysed the issue of the financial health evaluation of transport companies within their main and secondary business activities, while applying the suitable bankruptcy and creditworthy models developed by the Neumaier spouses. These models are apt to be applied to the Czech business environment. The partial results of models will make it possible to identify other procedures for the financial health evaluation using the statistical models. Partial results of statistical models show that it is necessary to analyse the specific cost and revenue items as early as within the main business activity of transport companies operating in the public line transport, in particular to analyse determining the amount of a provable loss in the public line transport and the municipal public line transport by applying the different types of methodology determining the amount of compensation from transport services. The



---

thesis also analyses the quality of accounting data, namely the economically substantiated costs, which have a significant influence on the issue of determining the amount of compensation. In relation to the above, the financial health of transport companies in the chosen transport area, i.e. the public line transport and the municipal public transport, is analysed. The results of examination of the accounting data quality should be used as a basis for creating a new financial model for evaluating the financial health of the transport company and should underline the risk areas which become the victim of the creative accounting.

Based on the tender procedure, the transport companies have to meet technical conditions or requirements of the client ordering the transport services as well as adapt themselves to the total financial budget for the period agreed in advance within providing basic transport services. This paper, first and foremost, analyses the issue of the financial health of a transport company from the accounting perspective. The results show that the selected technical requirements do not affect the compensation amount. They are already met in the tender procedure. The preference of the clients ordering the transport services is to deploy appropriate means of transport which comply with the technical standards. The value for a customer is not analysed here, as this is the question of the subsidized lines (transport services). This implies that if a customer is not satisfied with the carrier's services, this will not have any considerable effect on the carrier's financial situation. Only the amount of revenues from transport operation will decrease. This amount will, however, be compensated by means of a subsidy. Transport companies, at the same time, must pay their attention to their strategies and future values. After the public service contract expires, the carrier, however, might not win the next tender procedure as a result of repeated complaints by the passengers. This exemplifies that the value for a customer is perceived as an item of a qualitative character.

---

## **2 Current State of the Issue Being Solved**

To understand the chosen issue in the contribution, it is necessary to define the basic aspects in the transport area which will be included in and linked with the defined goals of the thesis. The goal of the thesis is to analyse the financial health of a company operating in the public line transport and the municipal public transport from the viewpoint of accounting. Many authors addressing the issue of the public transport funding agree on the fact that there is no consistent methodology for allocation of economically substantiated costs to relevant cost items within the financial model. This gives rise to insufficient accounting data reported by individual transport companies within their main business activity. It means that there is no available database which would report the accounting data for the accounting period and there is not an opportunity to find out specific amounts of subsidies provided to individual transport companies from public budgets. The accounting or financial analyses of all transport companies in the Czech Republic is not too positive, as the accounting data in providing basic transport services are often hidden and not public.

### **2.1 Introduction of the Public Transport Issue**

Providing of basic transport services is one of the main services provided by the state, regions and private carriers for citizens and tourists at a certain price set by the carrier. Both the public line transport and the public track-based transport in most cases must be funded from the public budgets of municipalities (towns), regions and the state. Financial injections provided by the client ordering the transport are an integral part of the transport company's life cycle. Without the financial support it is not possible to efficiently renew the fleet in the defined time. Carriers offer their transport services for the far lower price than their real operating costs which are not sufficiently covered by the total revenues. Most transport companies generate a negative economic result, i.e. a loss. Without a cash injection they could no longer exist both in the Czech Republic and other foreign countries.

### **2.2 Basic Aspects of Transport**

Transport is seen differently as to its various functions – economic or technical. The economic function of the transport can be generally characterized as a non-productive branch of the national economy aimed to satisfy the needs of the society and increase its economic

development, including the living standard of the population. The technical function of the transport is situated already in the field of direct satisfying of customers' requirements in the public and non-public transport, or even in the mixed transport. It is a function of provided transport services using the means of transport and transport routes to carry the material assets (material, goods, energy, information, etc.) and to allow the passengers to be transported to a desired destination in time and space.

Transport conditions are determined and adapted by the transport system of the given country. It means that every country has its own transport and pricing policies, the policy of building and modernisation of transport infrastructure, transportation quality, quality of means of transport, speed of transportation and many other factors affecting the customer value.

## **2.3 Selected Models for Evaluating Financial Health of Transport Company in the Czech Republic**

The task is to describe the selected models for evaluating the financial health of a transport company under the real conditions in the Czech Republic, i.e. to analyse those bankruptcy and creditworthy models which are intended for the Czech Republic and to ascertain their explanatory power, credibility and inaccuracy.

### **2.3.1 Objectives of Financial Management of Transport Company**

The aim of the financial management is to obtain a complete overview of the financial situation of the company and the financial aspects. It is necessary to know more information in order to determine the basic objectives of the company in the future. To do so, it is necessary to identify the customers, suppliers, competitors, a quality of provided services, etc. Assessment of the company's financial health is part of effective decision-making. It is necessary to find out the degree of financial doubts and which measures may be applied on them. The efficient management of the company requires the optimum level of the assets, debts, forms of financing the operating activity using the company's equity or external capital, the amounts of costs and revenues and the amounts of income and expenditure. (David, 2003)

If the company is able to earn sufficient money and to comply with its obligations, it will not become insolvent and there will be no risk of its bankruptcy. It means that the financially healthy company can report sufficient profitability and find the optimal sources of financial risk coverage.

---

The potential risks include:

- Entrepreneurial risk,
- Objective risk,
- Subjective risk,
- Financial risk,
- Systematic risk,
- Non-systematic risk,
- Investment project risk,
- And other risks as per the selected model within determining the average costs of capital. (Sedláček, 2009)

**The entrepreneurial risk** is combined in the effectiveness evaluation and the selection of investment projects. Based on the study by Petřík (2009), the entrepreneurial risk is characterized as a risk of deviation of entrepreneurial results from the expected results. If the transport company considers an investment in the fixed assets as well as in the inventory, it can employ a few methods evaluating the efficiency of investments. The most frequently used methods of investment efficiency evaluation include:

- Revenue method
- and the cost method.

**The revenue method** is based on the net present value which consists of the present value and the total capital expenditure. An investment is typically of a long-term character and it is necessary to determine the amount of expected income, the risk of the investment and the sources of coverage. To do so, it is necessary to know the weighted average cost of capital (WACC), which includes the amount of the use of the equity and the debt and the costs thereof, i.e. the cost of equity and the cost of debt.

The present value of the investment is calculated as a sum of discounted income for the duration of the investment project. It is a difficult process when the financial managers attempt to estimate the future income (revenue) from the utilisation of assets. The goal is also to determine the amount of capital expenditure and their reimbursement by the company. If the capital expenditure is paid in the form of instalments, its discounting is needed to reflect the factor of time so that the comparison with other proposed investment projects is available.

Formula for the NPV calculation:

$$\text{NPV} = \sum_{n=1}^N Pn \frac{1}{(1+i)^{n+T}} - \sum_{t=1}^T Kt \frac{1}{(1+i)^t}, \text{ where}$$

$Pn$ ... the value of income in the given year (cash flow),

$i$  ... discounted rate (required return),

$T$  ... time of construction,

$t$  ... individual years of construction,

$Kt$  ... amount of the capital expenditure (investment cost).

**The discounted rate or the required rate of return** is calculated based on the weighted average cost of capital (WACC).

$$\text{WACC (i)} = r_{VK} * \frac{VK}{(VK+CK)} + rd * (1 - t) * \frac{CK}{(VK+CK)}, \text{ where}$$

$r_{VK}$  ... cost of equity,

$VK$  ...equity,

$CK$  ... debt,

$rd$  ...cost of debt,

$t$  ... corporate income tax rate for the purposes of the tax deductible cost.

Another possibility of determining the weighted average cost of capital it to apply the modular models developed by the Neumaiers.

### **Modular Models**

The weighted average cost of capital consists of the cost of equity and the cost of debt, including their weights determined upon the amount of the used equity and debt. The companies should find the optimal ratio between the equity and the debt due to the effective spending of additional costs directly on them. The fact that the company handles the equity created by it does not mean that such equity costs nothing. The cost of equity is, on the contrary, higher than the cost of debt because the risk is associated with the amount of equity. In other words, the shareholders or owners of the company are afraid of not being able to pay the additional cost of capital. The higher risk they take, the larger premium they require. This issue of company owners has been and is investigated in the capital structure theory or, more exactly, in the Miller-Modigliani theorem.

The cost of equity may be expressed in other ways. The most commonly used method is the modular method developed by the Neumaiers (INFA model). As far as its nature is concerned, the method behaves like the majority of the discount rate calculation methods. It takes into account a few partial risk margins which are not derived from the capital market. The effort is to define all risks which may occur in the entrepreneurial practice and to include them in the discount rate.

There are plenty of modular methods. We will deal with the one which includes both the commercial risk and the financial risk. The drawback of the method is that the commercial and financial risks cannot be fully captured. The company strives to be as close to reality as possible and to predetermine what may happen.

The commercial risk includes:

- Risk of the field of business,
- Risk of the market where the company is active,
- Risk of management,
- Risk of competition,
- Risk of production process,
- Other factors of commercial risk. (Mařík, 2011)

The cost of equity may be expressed as follows:

$$r_e = r_f + \mathbf{PR} \text{ or } = r_f * a^x, \text{ where}$$

$r_f$  ..... return of the risk-free asset,

$\mathbf{PR}$  ..... risk premium,

$a^x$  ..... constant for the given situation.

The risk premium is calculated as follows:

$$\mathbf{PR} = r_{LA} + r_p \text{ or } = r_f * a^x = r_f * (a^x - 1), \text{ where}$$

$r_{LA}$  ..... risk margin (for lower liquidity on the market),

$r_p$  ..... risk margin (for the poor outlook of the company's profit),

$(a^x - 1)$  ..... risk margin coefficient.

According to the Neumaiers (2002), it is necessary to quantify the so-called bottom limit that is characterized by the risk-free rate of return  $r_f$  and the top limit representing the maximum

risk margin or probability of the occurrence of maximum cost of equity. The highest possible risk is given by the highest level of risk which is inserted in the relevant formula. As a result, we will obtain the constant "a" for the given situation. The constant "a" is set as follows:

$$a = x \sqrt{\frac{nVK}{rf}}, \text{ where}$$

x ..... represents the risk level (ranges from 0 to 4).

The higher the risk level is, the higher the value is. (Mařík, 2011)

The Neumaier (2002) present the total calculation of  $r_e$  as follows:

$$r_e = r_f + r_{LA} + r_{company} + r_{capital\ structure} + r_{finstab}, \text{ where}$$

$r_{company}$  ..... risk margin (for the amount of the entrepreneurial risk),

$r_{capital\ structure}$  ..... risk margin (arising from the capital structure),

$r_{finstab}$  ..... risk margin (for inability to repay the debt).

For determining the amount of the entrepreneurial risk included in the previous formula, the financial indicators characterizing the creation of the production power are used; the most frequent is EBIT / ASSETS. As the risk margin for the risk of inability to pay the debts, the indicators characterizing the overall liquidity are used. The risk margin for the risk within the capital structure is calculated from the interest coverage level: EBIT / INTEREST PAYABLE. (Neumaier, Neumaierová, 2002)

The modular methods provide only the methodology for determining the financial and commercial risks. Most transport companies use easier methods for determining the discount rate within implementation of the projects. The fact is that it is always subjective opinions and determining of certain risks and providing premiums for them may be exaggerated or underrated. It is important to determine all risks which may occur and, at the same time, the criteria which have a final influence on the final value.

Apart from identifying future income from the project, it is also necessary to identify the investment-related risks. To do so, it is necessary to know the future income (revenue) and probability of its occurrence. This data will be used to calculate the **mean value (EX)**, from which the **variance** and the **standard deviation** which represents the **investment risk** may be calculated. If individual investment projects have the same mean value, the final project can be more easily determined using the standard deviation. The lower the standard deviation is, the

lower risk the investment poses. In case of various EX, the calculation of the so-called variation coefficient is recommended. It is calculated as the standard deviation divided by the mean value (EX). The lower the value of the variation coefficient is, the better the investment in the given project will be. If the variation coefficient value is more than 50 %, it will express fragmentation of the set of statistics (statistical data are heterogeneous). (Lee, 2016, StatSoft)

The evaluation of the cost-efficiency of investments may be determined upon the cost method as well. This method takes into account the company's costs or, more precisely, operating costs. The project is not evaluated from the viewpoint of cash flows, but from the viewpoint of the amount of investment and operating costs.

**The average annual cost method** is deemed to be the most suitable method if all investment options are very similar in terms of the same scope of production and the same price.

The formula for the calculation is as follows:

$$\mathbf{R} = 0 + i * J + V, \text{ where}$$

R ... average annual cost of the option,

O ... annual depreciation,

J ... capital expenditure (purchase price of the assets),

i ... required rate of return,

V ... annual operating costs less annual depreciation.

Based on the comparison of investment options, the company will choose that option which represents the lowest costs. The drawback of this method is that it fails to include the factor of time and risk as in case of the net present value application.

To observe the level of evaluation of the investment cost-efficiency, the following relation is currently used:

$$\mathbf{R} = \frac{J*i*(1+i)^n}{(1+i)^n-1} + V - L * \frac{i}{(1+i)^n-1}, \text{ where}$$

L ... liquidation price (selling price at the end of the project lifetime).

When this more developed method of average annual costs is applied, the so-called interest linkage to the capital occurs. It means that the interest expressing the capital linkage is, in this case, considered from the gradually decreasing net book value of the assets; i.e. also the factor of time which alters and reflects the capital linkage in annual costs is included. The drawback



is that if the company depreciates the assets disproportionately during the service life, it is more difficult to determine the average annual costs. (Lee, 2016, Fabozzi, Peterson, 2003)

Besides financial methods for evaluation of investment cost-efficiency, also other methods for the selection of a suitable investment may be used, using the theory of decision-making (decision-making under uncertainty and risk). This theory considers individual approaches to the selection of suitable investment option as a result of random variables (state of the nature, the number of customers, etc.) When applying the decision-making under uncertainty, individual approaches, such as follows, are available:

- Optimistic approach,
- Pessimistic (Wald) approach,
- Laplace's criterion (same credibility rule),
- Hurwitz criterion,
- Savage's criterion (matrix of losses).

When decision-making under the risk is applied, there are available probabilities which may help us to calculate the expected mean value and the variance. It is almost identical as the evaluation of investment risk in case of the net present value. For determining the probability of individual random events, however, two basic methods for determining the subjective probability are used, namely the relative size method and the method of quantiles. (Sarngadharan, Rajitha, 2011)

On the other hand, also the multi-criteria evaluation of options may, in a way, determine (select) the suitable investment. In practice, the TOPSIS and WSA (Weighted Sum Approach) methods are used. For calculation of TOPSIS and WSA, it is necessary to determine the relevant weights of individual criteria to be determined upon the methods for determining the weights:

- Ranking approach,
- Credit scoring,
- Fuller's method (pairwise comparison method),
- Saaty's method (most frequently used method),
- etc.

The methods of financial analysis, applied mathematics and statistics are very useful for assessment of investment plans. It is necessary to apply every method which will deliver different results and inform the investor, to a sufficient degree, on all consequences which might occur. In other words, there will be no more surprises for the investor. (Director, 2013)

The entrepreneurial risk must be taken as a basis of investment activity, affecting other risks, especially the financial risk. The investment in the fixed capital (fixed assets) and inventory makes up an integral part of the entrepreneurial activity. The fixed assets give rise to the economic benefit and, therefore, must be effectively integrated. The investment in fixed assets must simply make a profit from itself. In such a case, it is a renewal of the fleet and other fixed assets in the transport company.

**The objective risk** is independent of the company's business. It includes:

- Macroeconomic changes (change of interest, duties, exchange rates, currency, etc.),
- Natural disasters,
- Socially pathological events (robberies, terrorist attacks, etc.),
- Political events (change of the government and the parliament).

**The subjective risk** depends on the company's business, specifically the company's management. It may stem from insufficient personnel, technical and economic knowledge, the staff irresponsibility, etc.

**The financial risk** is associated with the use of various forms of capital and the risk of financial insolvency.

**The systematic risk** is closely related to the objective risk which stems from changes on the economic development level and affects all companies in the given country (change of taxes, interest, etc.).

There are many risks which may be identified and allocated to a certain group. It is also up to individual company how it will handle these risks. It will either develop aversion towards such risks and negotiate such measures to prevent occurrence of any deviations or will have a risk-taking mentality or will take a neutral position. The risk-taking companies trading at the stock exchange expect higher revenue than the companies with aversion towards the risk. (Kislingerová, Hnilica, 2005)

### 2.3.2 Financial Health and Financial Distress of the Company

**The financial distress** is the opposite of the financial health of the company. It is a situation when the companies get into financial troubles which are so serious that they cannot be solved without taking necessary measures leading to changes in operational or financial activities. It means, in other words, that the company fails to keep promises made to its creditors or has a hard time keeping them. According to Brealey and Myers (1992), the financial distress is

---

referred to as being costly and is reflected in the market value of securities of the indebted company. The financial credibility leans on the financial health and represents a certain probability that the repayment of receivables may be expected within a short period of time without the company users having to assume an unreasonable risk of a financial loss. The financial health of the company cannot be directly calculated but it can be determined upon the diagnostic methods using the financial analysis which is utilized by the general public and various economic entities with the aim to obtain information on the management and economic situation of the given company. Every economic entity focuses on a different type of information. The company management is interested in the information from all points of view, namely, whether its company

- is liquid,
- is solvent,
- generates a profit,
- is taking on a risk in case of an investment and how big this risk is,
- background and assumptions for further development.

The financial analysis utilizes the diagnostic methods which evaluate the company's management from the viewpoint of the past, the presence and the expected future. The aim is to reveal the weak points which could entail serious problems in the future. And, to start to build-up the financial success and company advantages on the strong points. The internal source of the financial analysis is the calculation and interpretation of financial ratio indicators which may provide information concerning the financial health of the company. The ratio indicators are chosen in such a way they could be economically interpreted regardless of the industry of the given company and the comparability of companies could be ensured.

The basic source of information is the accounting reports used to describe the financial situation and position of the company. (Gibson, 2013, Růčková, 2010)

If the company generates too high costs or low revenues, its financial health becomes weaker and may be transformed into the financial distress resulting in the financial crisis ending up in the bankruptcy. The financial crisis symptoms are as follows:

- Delays in the payment of financial obligations,
- The indebted company does not obtain additional sources of money in the form of credits and loans,

- 
- The sale of products of the manufacturing undertaking decreases, the stock accumulates and tying-up of financial resources becomes more and more complicated,
  - Prices of inputs (labour, land, capital) grow, requirements for wages increase, increase in interest rates,
  - Return on sales and the capital decreases,
  - etc.

The financial crisis may be avoided if the financial plans are regularly checked, any deviations are monitored, their cause is identified and the proper corrective measures are taken. (Lee, 2016)

## 2.4 Bankruptcy and Creditworthy Models for Evaluating Financial Health of Transport Company in the Czech Republic

The systems of indicators are used to evaluate the financial situation of the company. If more indicators are included in the model which evaluates the financial situation of the company, the focus and final evaluation of the company will become more difficult. In creating the systems of indicators, the following is distinguished:

- Systems of hierarchically organised indicators,
- Purposeful selections of indicators.

**In case of systems of hierarchically organised indicators**, individual ratio indicators rating the company's situation or development are specified using a single number. The example is the pyramid-shaped systems of indicators, which analyse the peak indicator by means of the influence of partial indicators using the so-called multiplicative or additive links. The typical example is the return on assets (ROA) or return on equity (ROE) analyses. **Purposeful selections of indicators** are based on the comparative analytical or mathematical and statistical methods. The task is to select those indicators which could manage to efficiently diagnose the financial health of the company and to predict its crisis development.

They are divided into:

- Bankruptcy (prediction) models and
- Creditworthy (diagnostic) models.

Bankruptcy models, also known as prediction models, were compiled and investigated using the detail analysis of individual financial indicators which were applied to various types of samples of examined companies (accounting entities). It means that we selected and analysed

---

such data of the companies which went bankrupt in the past and the companies which were flourishing. Each company was mostly established upon achieving the profit with a different object of business activities. The fact is that bankruptcy models were created for various fields of business (agriculture, industry, etc.) and these cannot be combined. The main goal of bankruptcy models is to warn against a possible bankruptcy of the company "in time". The main factors are such selected indicators which imply a threat to the financial health of the company. Bankruptcy models differ from creditworthy models in that they are and were created upon the real data. Creditworthy models, on the other hand, take into consideration the theoretical knowledge and on some models they answer the question whether the company creates a certain value for the owner and the investors (financial performance of the company). The advantage of creditworthy models is that they keep in mind the details which are available in the accounting reports. The goal is to classify the companies by the degree of their financial health, from the very strong to very weak undertakings. Most creditworthy models are evaluated upon the amount of points allocated to the relevant ratio indicators. The achieved overall score should illustrate a certain degree of financial health. The advantages of creditworthy models include:

- They keep in mind the details which are available in the accounting reports.
- They enable graduation of the financial health of a company based on the financial credibility on the investors' part,
- They consider the economic thoughts (assumptions) of the correctly chosen score, which means that not only the statistical significance is used. (Grünwald, 2002)

In the past, the models evaluating the financial health of the company, basically, consisted of the indicators which characterized the properties and actions of the company in the financial sphere. As the time goes by, the technology develops and the business processes are improved, the new models are updated (innovated) or compiled to better evaluate the financial health of companies. They consider the factors which were not reflected in the past or were not so important to the users to deal with them. They were not substantial, then.

#### **2.4.1 Bankruptcy Model Index IN 95**

The so-called credibility index IN was compiled. The previous Altman's models also include the credibility index IN based on the ratio indicators consisting of the components of activity, indebtedness, profitability and liquidity. Using the set of 100 companies doing business in the Czech Republic territory, Inka and Ivan Neumaier verified the credibility index IN by applying the selected statistical and mathematical methods. The application was carried out on the basis

of the Czech accounting reports under the conditions of the Czech economy. They, thus, considered the Czech accounting reports, relying on the economic situation of the country.

The index IN 95 has the following form:

0.22 * assets / external resources (1)
0.11 * earnings before interest and taxes (EBIT) / interest payable (2)
8.33 * earnings before interest and taxes (EBIT) / assets (3)
0.52 * revenues / assets (4)
0.10 * current assets / (short-term liabilities + short-term bank loans) (5)
-16.8 * overdue liabilities / revenues (6)

**Source:** Taken from Grünwald, Holečková (2009)

- (1) Indebtedness indicator,
- (2) Solvency indicator,
- (3) Profitability indicator,
- (4) Activity indicator,
- (5) Liquidity indicator,
- (6) Liquidity indicator.

The IN 95 index is a specific bankruptcy model designed for the Czech conditions – it means that it does not have the market value of the company determined in any single indicator. The model is designed for those companies which do not trade at the stock exchange. It is generally well known that there is a high level of insolvency in the Czech Republic. Mr and Mrs Neumaier considered this factor in the "overdue liabilities / revenues" indicator. It represents a certain inability of companies to pay off their debts in time (the index value is reduced). (Grünwald and Holečková, 2009; the Neumaier, 2002)

IN 95 > 2

An ability to comply with the financial obligations without problems

1 < IN 95 < 2

Grey area

IN 95 < 1

Insufficient ability to comply with the financial obligations

**Source:** Taken from Grünwald, Holečková (2009)

The advantage is that IN95 takes into account the weights for individual NACEs. The weights V2 and V5 are the same for all industries. Pursuant to NACEs, the transport, storage and communications are marked as I. The indicators have the following coefficients: V(1) - 0.07; V(3) - 14.35; V(4) - 0.75 and V(6) - 60.61. Other indicators are the same.

#### 2.4.2 Creditworthy Model Index IN 99

The IN 99 index ranks among the creditworthy models that are specifically designed from the perspective of an owner. The discrimination analysis was used both on the IN 95 index and the IN 99 index. Weights of individual indicators differ from the IN 95 index. The reason is enforcement of achieving a positive value of the economic profit. (Vochozka, 2011, Neumaier, 2002)

-0.017 \* assets / external capital

4.573 \* earnings before interest and taxes (EBIT) / total assets

0.481 \* sales / total assets

0.015 \* current assets / short-term liabilities

**Source:** Taken from finanalysis

The following information determines the final qualification of the company:

IN 99 >2.07

The company creates a new value for the owner

1.42 <= IN 99 <2.07

It is supposed that the company still creates a value for the owner

1.089 <= IN 99 <1.42

It is not sure whether the value for the owner is created

0.684 <= IN 99 <1.089

The company rather does not create the value for the owner

IN 99 <0.684

The company does not create a value for the owner

**Source:** taken from finanalysis

### 2.4.3 Index IN 01

This model was created upon the discrimination analysis. A total of 1,915 companies were selected and divided into three main groups. The first group contained 583 companies which created a certain value. The second group covered 503 companies being bankrupt or facing bankruptcy. The third group included the remaining 829 companies. The IN 01 index is a specific model which takes into account the previous two models, i.e. IN 95 and IN 99. It is characterized as a bankruptcy and creditworthy model. It consists of five main indicators. This model does not contain the market value of the capital. It means that the model is especially designed for the companies not trading at the stock exchange. (Vochozka, 2011)

0.13 \* assets / external capital

0.04 \* earnings before interest and taxes (EBIT) / interest payable

3.92 \* earnings before interest and taxes (EBIT) / total assets

0.21 \* sales / total assets

0.09 \* current assets / short-term liabilities

**Source:** taken from finanalysis

The following text classifies the value creation on the company's part:

IN 01 >1.77

The company creates a value.

0.75 <= IN 01 <1.77

The company does not create a value, yet it is considered creditworthy.

IN 01 <0.75

The company goes into bankruptcy.

**Source:** taken from finanalysis

### 2.4.4 Index IN 05

The IN 01 index was helpful in creating the recent model IN 05. The Neumaier spouses updated the previous model and applied it on the basis of industrial data from 2004. The goal of this model is not only to determine whether the company is near the bankruptcy, but to determine also a value for the owners. The prerequisite of this model is that it should estimate the bankruptcy of the company with a rate of probability higher than 72 %. After application to the medium-sized companies, the success of the model is 78 %. In case of small companies, it



is 74 %. Both values are deemed to be very a successful result of the created model which can estimate the financial situation of the company. A comparison of a total of 1,526 companies doing business and having registered office in the Czech Republic territory was made. A total of 547 large enterprises, 819 medium-sized enterprises and 160 small companies were chosen. (Vochozka, 2011)

0.13 \* assets / external capital

0.04 \* earnings before interest and taxes (EBIT) / interest payable

3.97 \* earnings before interest and taxes (EBIT) / total assets

0.21 \* sales / total assets

0.09 \* current assets / short-term liabilities

**Source:** taken from finanalysis

IN 05 >1.6

A company creates a value.

0.9 < IN 05 < 1.6

A grey area of neutral results

IN 05 <0.9

A company destroys a value

**Source:** taken from finanalysis

We must not forget the fact that the indicator representing the interest coverage has very distorting effects in this model. These effects can result in the wrong rating of the company's financial health. Based on the authors' recommendation, it is apt to choose the maximum value of 9. The reason is that the interest payable tends to be close to 0 and the interest coverage indicator can achieve extreme values also provided that the weight is only on the level of 0.04.

### 3 Financing of Public Transport

This chapter analyses selected legal regulations which are used to determine and pay the amount of compensation from the transport activity in the public line, track-based and municipal public transport. The goal is to analyse the issue of determining the amount of provable loss in accordance with Government Decree No. 493/2004 Sb. in case of the public line transport, Government Decree No. 241/2005 Sb. in case of the public track-based transport and Regulation No. 296/2010 Sb. which includes the compensation in one methodology for both the public line transport and the track-based and municipal public transports.

Providing of compensation to carriers is used especially to cover the loss from provided transport services that are the subject of business. Carriers are obliged to report all operating costs and revenues which are subsequently separated according to the type of business activity. It is not just about providing of basic transport services, but also the secondary activities which cannot be included in the provable loss calculation. Hence, it is important to separate the bookkeeping for the primary and secondary business activities to increase the explanatory power of individual activities of the transport company.

The evaluation of the financial health of transport company is partly analysed using the methodologies which determine the amount of a provable loss. For better explanatory power, the main activity of the carrier is reported in the required accounting report which considers the economically substantiated costs in total values expressed in monetary units and also expresses the values per one unit of performance, i.e. one kilometre travelled. Total revenues from the passenger transport and other revenues are recalculated in the same way per one kilometre travelled. The carrier and the client ordering the transport gain an overview of individual cost and revenue items expressed per one unit of performance and meet the function of calculation.

The amount of compensation from transport services is seen as the subsidy provided to transport companies from public budgets. The basic income of public budgets is a collection of taxes from tax residents and non-residents. This implies that the amount of the provided subsidy also depends on the tax policy of the state and the method of redistribution of taxes into decentralized budgets. The amount of subsidy determines how and in what amount the annual budget for the public transport is set. (Telecký, 2016)

Table 1 shows the total amount of subsidy (in million CZK) in the regular public passenger transport, i.e. especially the bus line and railway passenger transports between 2010 and 2016. The data for 2017 and 2018 are not available yet.

**Table 1** Total amount of subsidies in the regular passenger public transport in million CZK

For the defined period	2010	2012	2013	2014	2015	2016	2017
Bus line transport (without the municipal public transport)							
<b>Budgets of regional (district) offices</b>	4,823	5,054	5,184	5,275	5,251	5,422	6180
<b>Budgets of municipalities</b>	370	462	470	550	470	658	632
<b>Total</b>	<b>5,193</b>	<b>5,516</b>	<b>5,654</b>	<b>5,825</b>	<b>5,721</b>	<b>6,080</b>	<b>6812</b>
Railway passenger transport							
<b>State budget</b>	4,070	4,009	4,043	4,233	4,414	4,497	4645
<b>Subsidies from regional (district) offices</b>	8,458	8,864	9,245	9,290	9,413	9,584	9794
<b>Total</b>	<b>12,528</b>	<b>12,873</b>	<b>13,288</b>	<b>13,523</b>	<b>13,827</b>	<b>14,081</b>	<b>14439</b>
<b>Total subsidies</b>	<b>17,721</b>	<b>18,389</b>	<b>18,942</b>	<b>19,348</b>	<b>19,548</b>	<b>20,162</b>	<b>21251</b>

Source: *Yearbook of the Ministry of Transport, 2017*

Table 1 shows that the bus line transport is not additionally financed from the state budget. The reason is that the long-distance bus links are carried out at the company's own entrepreneurial risk and, in fact, satisfy a higher demand for the transport of passengers than in case of long-distance railway links. The following rule holds true: "Who satisfies the higher demand for the transport of passengers is not fully entitled to the payment of a provable loss." As an example, we can state the link between České Budějovice and Brno. This railway is served by RegioJet a. s., or other carriers in the bus transport, and by České dráhy, a. s. in the track-based transport. On this route, the demand for transport is satisfied best by the long-distance bus transport. The assumption is that the long-distance railway transport will be financed from the budget of the Ministry of transport. The Table thus shows that the passenger railway transport or, more specifically, the long-distance links are financed from the state budget. It is ensuring of basic transport services by the state (through the Ministry of Transport).

The public line transport depends on the payment of a provable loss from the public regional and municipal budgets. The total amount of the provided subsidy grows in every accounting period. The goal is the renewal and maintenance of the high quality fleet.

---

Also the macroeconomic environment affects the amount of a subsidy:

- Inflation (is set forth in the public service contract),
- Influence of foreign exchange rates (in case of international railway links it affects the price of the fare),
- Government expenditure,
- State taxation policy,
- etc.

Other influences on the amount of the subsidy:

- Change in the number of working days,
- Change in the number of kilometres travelled,
- Strengthening of lines,
- Cancellation of the links with respect to the change in the transport load. (Telecký, 2016)

The following diagrams provide a comprehensive overview of the movement of financial flows in the regional bus transport.

The regional offices or service organizations (transport coordinators) order the basic transport services. The transport coordinators may pay the performances upon the concluded public service contract.

In the regional bus transport, the regional office orders the transport. The bus transport can be further divided into

- national long-distance bus transport,
- international transport.

The above types are operated at the carrier's own business risk.

The municipal public transport is a specific type of transport and it is paid from the budget of its operator. The municipal public transport expects a growing quality of services and growing operating costs due to the improved transport situation – restriction of the motor vehicle transport and total influence on the environment.

The basic income of public budgets is a collection of taxes from tax residents and non-residents. Passengers as end consumers pay the price of fare, including the value added tax. The value added tax is fixed by the first reduced rate of 15 % due to social aspects. The carrier as a

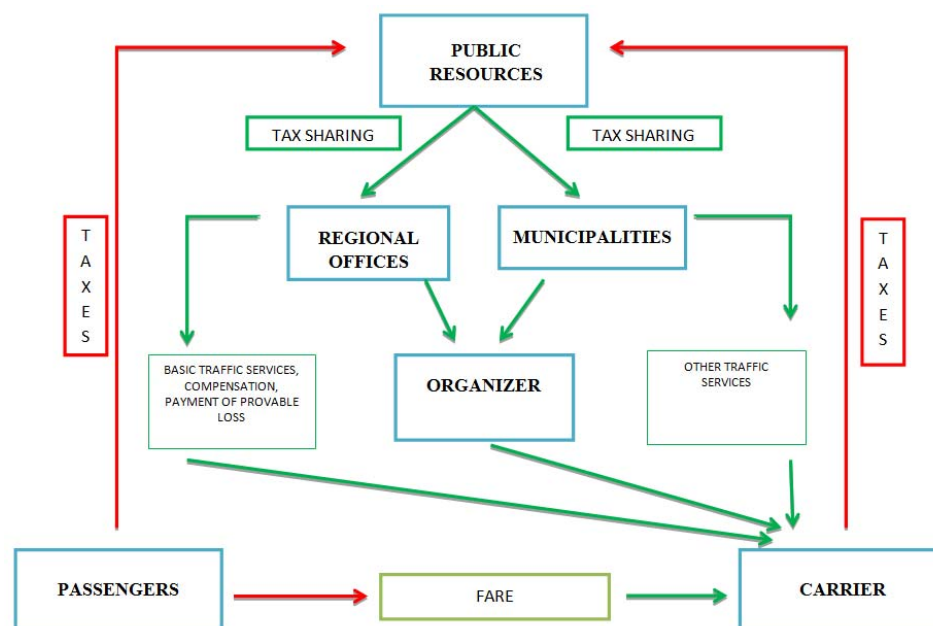
taxpayer is liable for the payment of the value added tax (output VAT from sales) to the public budget of the state. Corporate income tax and consumer taxes are the second integral part of the state budget income.

### 3.1 Financial Flows in the Regional Bus Transport

The regional bus transport is ordered by the regional office and relevant municipalities upon their requirements. Regional offices and municipalities inform the transport coordinator (organizer) on their requirements. The thing is rather difficult due to the railway regional transport. The effective transport system should take account of the interconnection of all modes of transport and not favour one of them.

Financial flows in the regional bus transport can be seen in the following diagram.

**Fig. 1** Financial flows in the regional bus transport



*Source: author's own processing of the source David Sláma (2014)*

The regional bus transport which provides basic transport services is **exempt from the road tax**. On the other hand, long-distance bus links which are operated at the carriers' own business risks are not exempt from the road tax. Regional offices and municipalities provide, by themselves or by means of the transport coordinator, the subsidy to the carrier.

In case of the integrated transport system, the sales from transport services are allocated on the basis of the number of kilometres travelled or the number of passengers transported by a specific carrier. The method depends on the system of passenger handling. Allocation of sales

and other revenues from the transport is done through the so-called clearing centre. The clearing centre in the integrated transport system operates identically as the clearing centre in the banking sector. (Říha, Z., Tichý, J., 2015)

### **3.2 Provable Loss in the Public Line Transport - Government Decree No. 493/2004 Sb.**

Transport companies providing basic transport services in the public line transport, in most cases, do not carry out only one main business activity. The accounting reports which include the results of economic activity of individual carriers during the accounting period show that the carriers mostly perform more than one business activity. Provision of basic transport services is always classified as the main business activity and other services offered by transport companies are understood as the secondary business activities.

The provable loss in the public line transport is detailed in Decree of the Czech Republic Government No. 493/2004 Sb. which regulates the provable loss in the public line transport and establishes the method of exercise of the professional government supervision in the road transport over funding of the basic transport services. Government Decree No. 493/2004 Sb. establishes the method of determining the amount of provable loss. What does the provable loss consist of? What is its explanatory power and the basic methodology of calculating the amount of compensation like?

Pursuant to Government Decree No. 493/2004 Sb., the provable loss in the public line transport is defined as "*the difference between the sum of the economically substantiated costs and the modified adequate profit and the earned receipts and revenues*". In other words, transport companies fail to cover their total operating costs or, more precisely, total economically substantiated costs by their earned revenues. This implies that carriers depend on subsidies provided by the client of transport services and are, thus, a burden of public budgets (see subchapter 2.4 Funding of Public Transport).

Government Decree No. 493/2004 Sb. generally defines the method of determining the amount of provable loss calculated by the transport company itself on the basis of accounting data. The client ordering the transport is not obliged to determine the amount of compensation for the carrier but it is authorized to oversee all activities of the transport company. The basic document on providing basic transport services and determining the amount of provable loss, including an adequate profit, between the client ordering the transport and the carrier is the

public service contract which details the terms and conditions of the transport activity and refers to the relevant legislation which regulates the provision of the subsidy.

The provable loss also includes a so-called adequate profit which is used especially to renew the fleet in the eight-year cycle. The provable loss is calculated as follows:

$$\begin{aligned}
 \textit{Provable loss} &= \textit{total economically substantiated costs} + \textit{adequate profit} - \textit{total revenues from} \\
 &\textit{the transport and other revenues from the operation}
 \end{aligned}
 \tag{1}$$

The adequate profit in the public line transport is set as follows:

$$\begin{aligned}
 \textit{Adequate profit} &= \left[ \left( \frac{\textit{Number of buses} * \textit{average price of the bus}}{8} - \textit{accounting depreciation} \right) / \right. \\
 &\left. \textit{coefficient} \right] - \textit{earmarked subsidy from the state budget and the client's budget for the} \\
 &\textit{purchase of buses}
 \end{aligned}
 \tag{2}$$

The coefficient for determining the adequate profit is set as follows:

$$\frac{100 - \% \textit{ rate of corporate income tax}}{100}
 \tag{3}$$

Due to its explanatory power it is seen as a tax coefficient. It is used for the needs of including the corporate income tax.

The adequate profit is used for the renewal of the fleet in the eight-year cycle only. It must not be used for other purposes of the transport company. It is understood as a tool enabling obtaining the financial resources for the fleet renewal in the public line transport and the municipal bus transport. All terms and conditions are set forth in the public service contract.

Another part of the provable loss calculation is the economically substantiated costs which are the most discussed cost items and characterize the total operating requirements for the main business activity of the transport company. Economically substantiated costs must be negotiated and recognized by the client of the transport services in advance in the public service contract. Other cost items not defined in the contract, which would affect the amount of provable loss, cannot be included.

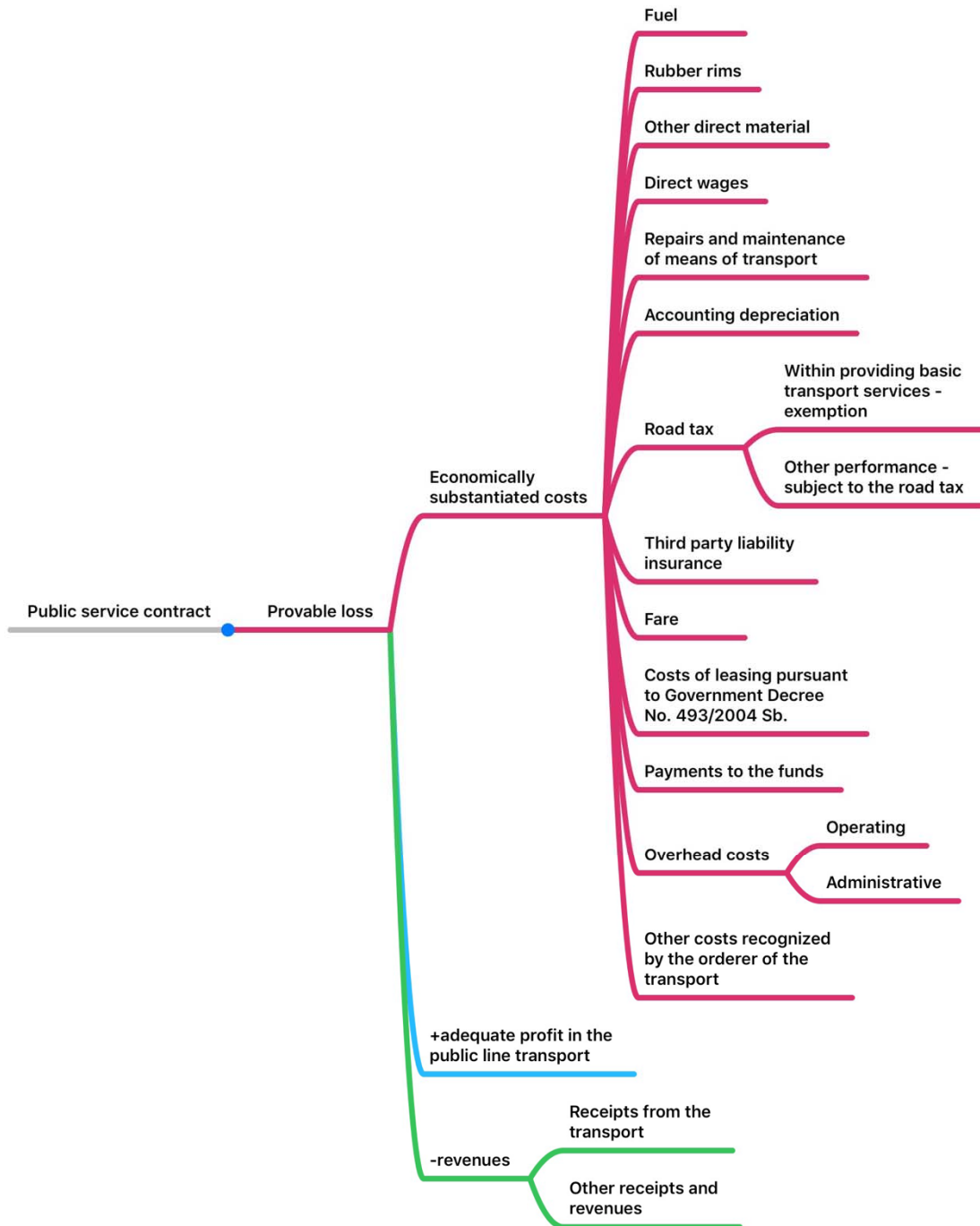
---

As already mentioned, transport companies must separate cost and revenue items generated from the main business activity and the secondary business activity in calculating the provable loss. Accounting data must not be distorted and handled in such a way which would consciously or unconsciously determine the amount of provided subsidy in a wrong way. In this case, it is necessary to separate the main business activity (providing of basic transport services) and other secondary services provided by the transport company (e.g. tourist buses) **in the accounting system**. The transport company is obliged to compile a preliminary (planned) structure of economically substantiated costs and to set their preliminary amount, i.e. the amounts of individual cost items. The value of individual items of economically substantiated costs should not deviate too much from the actual costs. This implies that the transport company is obliged to structure and evaluate the total costs coming from transport services and to inform the client ordering the transport on the actual accounting data which should be verified by an independent auditor.

The diagram No. 2 shows the calculation of the provable loss pursuant to Government Decree No. 493/2004 Sb.



**Fig. 2** Calculation of provable loss pursuant to Government Decree No. 493/2004 Sb.



Source: author

---

### 3.2.1 Classification of economically substantiated costs in public line transport

The diagram No. 2 divides economically substantiated costs into 13 main groups. It is based on the main accounting report created for the transport activity in the public line transport pursuant to Government Decree No. 493/2004 Sb.

Economically substantiated costs are divided into the following groups:

1. **Fuel** – consumption of diesel, oil, gasoline, lubricants for the mileage for the whole accounting entity
2. **Rubber rims** – new tyres, inner tubes, valves.
3. **Other direct material** – spare parts, electric parts, cleaning and washing detergents, anti-freezing mixtures, uniforms, protective aids, common repairs (material directly consumed on the means of transport)
4. **Direct wages** – wages of drivers, inspectors, guards/conductors, cleaning staff, cash desk personnel, technical and economic staff.
5. **Depreciation** – accounting depreciation of the means of transport, tangible fixed assets which are directly associated with the public line transport, depreciation of the capital goods related to the information system of the pre-sale of tickets. The accounting entity will determine the methods of depreciation of the fixed assets and the rates of accounting depreciation. Tax depreciation is not recognized as the economically substantiated costs due to its insufficient explanatory power. Within the transportation of passengers and other things it is important to maintain the records of the total performance of all means of transport deployed for the needs of determining the price per one unit of performance, i.e. one kilometre travelled.
6. **Means of transport leasing** – lease instalments for the means of transport, equipment related to the operation of the public line transportation, cost of down payment.
7. **Repairs and maintenance of means of transport**– external repairs quantified upon individual invoices, their own repairs.

- 
8. **Road tax** – means of transport (buses) deployed to ensure the internal line transport are exempt from the road tax under Income Tax Act and Road Tax Act.
  9. **Third party liability insurance** – concluded contract for the statutory and collision insurance.
  10. **Fare** – travel costs pursuant to the transport cost act.
  11. **Payments to the funds** – premium paid for the social security insurance, contribution to the State employment policy and the premium paid for the general health insurance
  12. **Overhead costs** – costs directly related to the bus transport operation and the regular line transport operation. In the public service contract, the accounting entity must determine the method of the overhead cost division as to the main and secondary business activities. Total overhead costs for the whole accounting entity cannot be included in the main business activity as the amount of the provable loss would be intentionally increased. The method of division of overhead costs must be approved by the client ordering the transport. The carrier is able to divide overhead costs as per the mileage, number of drivers or vehicles or on the basis of operating costs.

Overhead costs are divided into:

- Operating overhead costs,
- Administrative overhead costs.

**Administrative overhead costs** consider such costs which are related to the management of the company. These costs include depreciation of administrative buildings, costs of the staff education, costs of the informatics, salaries of managers, etc.

13. **Other costs recognized by the client ordering the transport** – costs arising from the car accident. The orderer of the transport may partially share the payment of the damages. Costs of accidental events.

### 3.2.2 Classification of revenues from transport activity in public line transport

Government Decree No. 493/2004 Sb. regulates the issue of structuring the sales and other revenues from the transport activity in the public line transport.

1. **Sales from transportation** – sales from the transportation of passengers (fare), fare from the transportation of excess luggage.
2. **Other sales** – revenue from the sale of timetables, revenue from the sale of not used means of transport, contractual and other fines and penalties, revenue from the sale of fuel, revenue from the sale of goods, revenue from the sale of services, revenue from the sale of materials, etc.
3. **Loss paid from the pupils' fare** – a type of the revenue which is seen as a provided subsidy for the provable loss calculation.

The carrier is obliged to submit to the orderer of the transport any information on the operation of the transport company in providing basic transport services, including the economic and technical data. The public service contract considers at least 80% of performance of the deployed means of transport. Whether the carrier is an owner of means of transport or not is not a condition. If the condition of 80% of performance of the vehicle was not met, the subsidy would be reduced. For the calculation of an adequate profit, it is important to correctly determine the average price of the buses deployed; the average price is determined as per the net book value of the immediately preceding accounting period.

The information on individual cost and revenue items from the transport operation can be found in the Report on the costs and revenue from the transport operation which is used as a basis for payment of the subsidy (provable loss + adequate profit). The basic structure of this report is included in the Annex of the doctoral thesis.

The orderer of the transport is not obliged to establish the amount of the provable loss to the carrier. The transport company is obliged to do this and is responsible for it. The orderer of the transport only checks the data obtained from the carrier and pays out the subsidy.

The subsidy is paid out under the public service contract by means of the advance payment:

- quarterly,
- half-yearly
- or annually.

The carrier is obliged to preliminarily discuss all cost and revenue items which will be then approved by the orderer of the transport. Reports on the costs and revenue from the transport operation, which include the planned cost and revenue items, are submitted. The preliminary subsidy which is then checked for a certain period is paid out on the basis of the report. Two situations may happen:

1. Based on the initial report on the costs and revenue from the transport operation in the public line transport, a **higher** amount of subsidy which was set as per the planned cost and revenue items in comparison with the actual report on the costs and revenue from the transport operation for a certain period was paid out.

In this situation, a part of the subsidy will be returned to the public budget or the carrier's subsidy will be reduced by a difference in the next period. It means that the next advance payment for the subsidy will be paid out in a reduced value.

2. Based on the initial report on the costs and revenue from the transport operation in the public line transport, a **lower** amount of subsidy which was set as per the planned cost and revenue items in comparison with the actual report on the costs and revenue from the transport operation for a certain period was paid out.

In this case, the process is opposite – the carrier will be paid a higher subsidy in the next period. In this situation, in most cases, the orderer of the transport does the in-depth check of all cost and revenue items and asks the transport company to explain the deviations. (Telecký, 2016)

### **3.3. Compensation in Public Line and Track-based Transport Pursuant to Regulation No. 296/2010 Sb.**

If the orderer of the transport wants to issue a call for tender for providing basic transport services in the defined region, the prerequisite is the registration of potential carriers. It means that the successful candidate of the tender for providing basic transport services will make the public service contract in the future, which will newly refer to Regulation No. 296/2010 Sb. on the procedures for establishing the financial model and setting the maximum amount of the compensation.

Regulation No. 296/2010 Sb. supersedes the previous legal regulations on the method of establishing the provable loss in the public line and track-based transport and requires more details on the transport company. Prior to making the contract, the entire performance of the carrier is examined, including the fleet which would be sufficient for the ordered public service.

In other words, the future number and quality of the means of transport deployed, sufficient transport capacity and all financial and accounting matters which affect individual rules and methodology of Regulation No. 296/2010 Sb. are discussed. All cost and revenue items which concern the main business activity only, i.e. providing of basic transport services, must be discussed in advance and submitted for approval. Following the due examination of individual items, the orderer of the transport will inform the carrier on the required adjustments or will approve the initial proposal of the carrier.

The procedure of compensation establishing is based on the same principle as in Government Decree No. 493/2004 Sb. and Regulation No. 241/2005 Sb. Regulation No. 296/2010 Sb, however, establishes the compensation in both the public line transport and the track-based transport, including the municipal public transport. It is, therefore, not necessary to refer to any other regulations analysing the amount of a provable loss. This Regulation is different in that it replaces the term "provable loss" with "**compensation**" and "adequate profit" with "**net income**".

At present, most transport companies have the valid public service contract which still refers to Government Decree No. 493/2004 Sb. and Regulation No. 241/2005 Sb. These days, these regulations are no longer valid, but they are still effective until these contracts expire. Then, the new contract or addendum to the contract which will be governed by current Regulation No. 296/2010 Sb. will be made.

The transport company informs the orderer of the transport on its operational activity by means of initial and actual financial models in the public line and track-based transport and submits the initial and actual report on operating assets. Upon the submitted details, the transport company is paid the ascertained amount of compensation. The report on operating assets is to serve as an overview of the means of transport deployed and their age, and the use of other fixed tangible and intangible assets. The value of means of transport and other fixed assets in providing basic transport services is ascertained according to the net book value in the immediately preceding accounting period. The most important condition of Regulation No. 296/2010 Sb. is the condition of **property ownership or a future promise of property ownership**. It means that the transport company only uses for offering transport services such property which is exclusively owned by it and can be included in the balance sheet of the transport company or such property which the transport company will own in the future. In case of financial leasing (promise of future ownership), the carrier will include the first extraordinary instalment in operating assets and this instalment will be reduced for the duration of leasing.

The reason is that the transport company is not an owner of the property (recorded in the off-balance sheet) and cannot include the total value of the input price in operating assets. Within financial leasing, the input price of the fixed assets would intervene in the calculation of the net income and distort the accounting data. If the means of transport are hired, it is necessary to state the net book value of the assets. Then, the transport company may apply the accounting depreciation and include the amount of the rent in operating assets. The lease of the property and its use are conditioned upon the public service contract which can slightly deviate from the conditions of Regulation No. 296/2010 Sb.

The transport company must not include the following in operating assets: tangible and intangible fixed assets in progress, advances paid for tangible and intangible fixed assets, the assets or its part procured using the subsidy and the valuable rights and goodwill pursuant to another legal regulation.

As stated above, Regulation No. 241/2005 Sb. deals with the maximum of 5 % of the amount of adequate profit from the economically substantiated costs in the public track-based transport. Regulation No. 296/2010 Sb. requires a new condition which relates to reporting of operating assets and determining the maximum amount of the net income. The condition of the Regulation is that the carrier must not **exceed the maximum permissible rate of return per the capital, being 7.5 % annually from the operating assets**. A percentage amount and the method of payment of the net income are defined in the public service contract. Government Decree No. 493/2004 Sb. does not consider the restricting conditions for applying the maximum amount of an adequate profit.

### **3.3.1 Classification of economically substantiated costs defined by Regulation No. 296/2010 Sb.**

In providing basic transport services, the transport companies submit a proposal of the structure of economically substantiated costs to the orderer of the transport. Regulation No. 296/2010 Sb. defines the general procedure for including the costs arising from the operating activity of the transport company. However, the public service contract is a basic and decisive document. On the basis of the requirements of the transport company and the orderer of the transport, the public service contract, at the final stage, specifies a direct division of operating costs into the selected cost items upon their explanatory power. The classification of economically substantiated costs is specified as per the initial financial model for the public

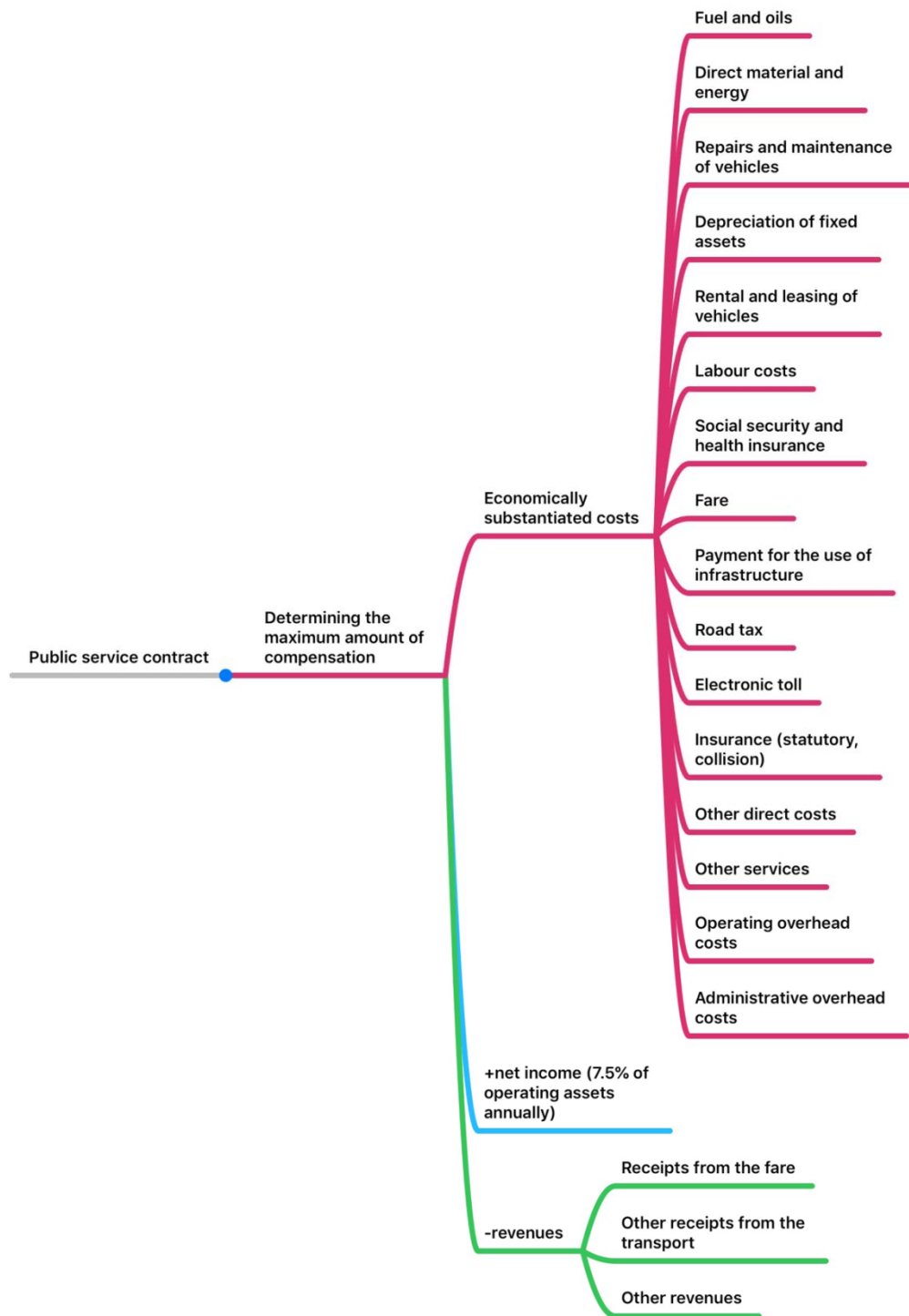
---

line and track-based transport. Any report other than that stipulated by Regulation No. 296/2010 Sb. cannot be used.

The following part analyses economically substantiated costs in the public line, track-based and municipal public transports as per the financial model set by Regulation No. 296/2010 Sb.

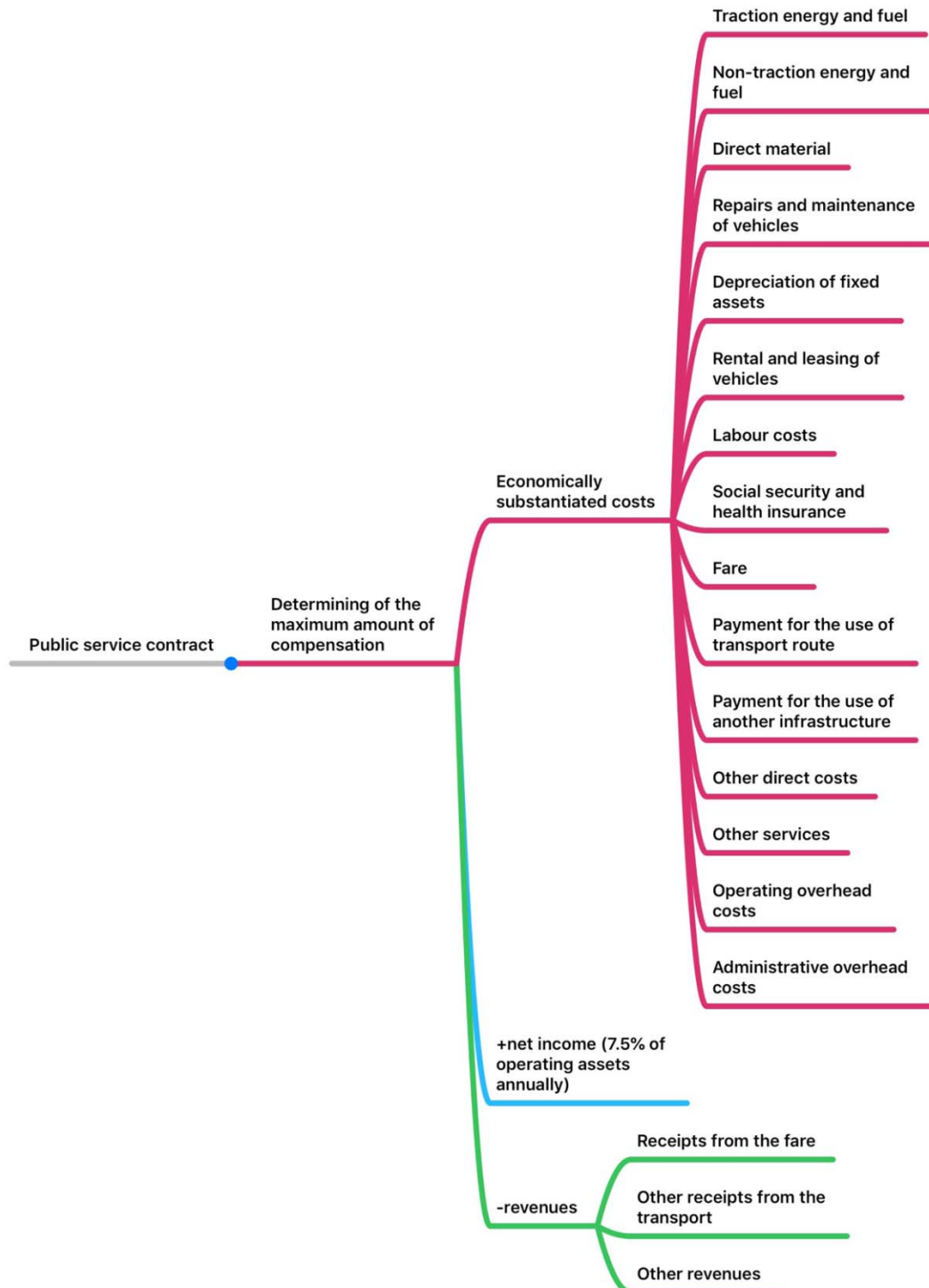


**Fig. 3** Determining the compensation amount for the public line transport pursuant to Regulation No. 296/2010 Sb.



Source: author

**Fig. 4** Determining the compensation amount for the public track-based transport pursuant to Regulation No. 296/2010 Sb.



*Source: author*

Regulation No. 296/2010 Sb. divides economically substantiated costs into 16 basic groups in the public line transport and 15 groups in case of the public track-based transport. The trolleybus and tram transport (municipal public transport) is classified as the track-based transport. As a result, economically substantiated costs for the public line transport cannot be classified for it. The bus transport (municipal public transport), on the other hand, classifies economically substantiated costs as per the financial model for the public line transport.

In practice, it is difficult to effectively include operating costs in the following cost groups:

- Other direct costs,
- Other services,
- Operating overhead costs,
- Administrative overhead costs.

In practice, there is no methodology yet which would effectively rank operating costs into relevant operating groups. It means that every transport company ranks "the same operating costs on the basis of their explanatory power" differently into relevant cost groups. Nowadays, there are transport companies which carry out the main and secondary business activities and do not report on the operating and administrative overhead costs. From the viewpoint of defining the provable loss or compensation, the whole process of the operating cost breakdown is very ineffective. Accounting data are impaired and the amount of compensation from transport services is ineffectively determined which results in higher spending of public budgets.

The following section suggests including of operating costs in individual groups of costs by the transport company before making the public service contract in the public track-based transport. Similar classification of costs is also applied in the public line transport.

1. **Traction energy and fuel** – diesel purchased using the CCS card, traction diesel on the rolling stock, traction energy on trolleybuses, traction energy on locomotives.
2. **Non-traction energy and fuel** – consumption of fuel (diesel, gasoline, natural gas, energy, water).
3. **Direct material** – consumption of spare parts (machines, cars), office supplies, personal protective equipment, consumption of the long-term minor assets, consumption of other material, consumption of water (water rate).

- 
4. **Repairs and maintenance of vehicles** – consumption of spare parts (locomotives, rail motor cars, wagons).
  5. **Depreciation of fixed assets** – accounting depreciation of the tangible and intangible fixed assets and the fixed minor assets.
  6. **Lease of vehicles** – rent (locomotives, rail motor cars, wagons).
  7. **Labour costs** - salaries of drivers, inspectors, guards/conductors, cleaning staff, cash desk personnel, technical and economic staff, remuneration for the board members.
  8. **Social security and health insurance** – payments of health insurance and social security for the employees, the employer's obligation to pay the health insurance and social security.
  9. **Fare** – travel and subsistence expenditure, use of a private car for business purposes, non-tax travel allowances, travel allowances acknowledged by the accounting documents.
  10. **Payment for the use of transport route** – fees for the use of the SZDC's transport route.
  11. **Payment for the use of another infrastructure** – transport route including the traction system.  
The traction system or the electronized transport route is seen as another infrastructure here.
  12. **Other direct costs** – consumption of goods, creation of legal and other reserves, creation of statutory provisions, credit interest, loan interest, shareholder loan interest, exchange differences (various currencies), fees paid to the banks, other insurance premium, other financial expenditure, quantitative losses or deterioration, other extraordinary costs, income tax on ordinary activities (due and deferred), additional chargeable taxes, pension and life insurance, reparation money including compensations in case of accidents at work, road tax, property tax, other taxes and fees, material sold, gifts, contractual fines and penalties, depreciation of bad debt, heller (halfpenny) compensation, other operating costs.
  13. **Other services** – repairs and maintenance (real property, cars, machines, others), entertainment costs, cost of transportation – railway, road, alternative bus transport, postal expenditure, fees

---

for telephone services (fax), rent (cars, properties, machines, financial leasing and leaseback, complaints).

14. **Operating overhead costs** – consumption of protective equipment, consumption of electricity, water, material, phone charges, tear and wear of cars and machines.
15. **Administrative overhead costs** – depreciation of administrative buildings, labour costs of administrative staff, remuneration for the board members.

Based on the obtained data, transport companies allocate the costs associated with providing of basic transport services differently into individual cost groups. The question is whether the process of cost allocation is effective. Transport companies offering transport services within their main and secondary business activity should automatically report the operating and administrative overheads and find a way of dividing these costs between the main business activity and the secondary business activity. If the carrier does not report the operating and administrative overhead costs and has a few business activities, it knowingly draws more funds from the public budgets than it is supposed to. In such a case, determining of the amount of a provable loss or compensation is affected also by an activity of the transport company other than providing basic traffic services. The task of the transport company is to separate the main business activity and the secondary business activity in its accounts and to clearly state which costs are common for both activities of the carrier. Regulation No. 296/2010 Sb. fails to report any information or the methodology on the method of ranking cost items in individual cost groups. In such a case it is appropriate to obtain the instructions directly from the orderer of the transport.

The following section analyses individual cost items and its ranking in cost groups. If the carrier operates only the trolleybus, tram, bus or railway transport within one business activity, then the identification of costs and their allocation to groups are not demanding. There must be a direct link to the specific type of the transport.

### 3.3.2 Classification of revenues defined by Regulation No. 296/2010 Sb.

Regulation No. 296/2010 Sb. divides revenues into three groups which are identical for the public line transport and the track-based transport:

1. Receipts from the fare,
2. Other sales from the transport,
3. Other revenues.

**Receipts from the fare** include receipts from the sale of domestic and foreign tickets, receipts from the luggage transportation, receipts from the sale of tickets within an integrated transport system.

**Other sales from the transport** represent specific revenues coming from random events. Revenues generated by the alternative bus transport, receipts from transport services within the "on-call buses", receipts from extraordinary links organized within the anniversary of the transport company or a town (operation of steam locomotives, historical buses), other receipts from the transport within the integrated transport system.

**Other revenues** represent revenues generated by the sale of timetables, discount applications, revenues generated due to the exchange difference in the sale of foreign tickets converted as per the current exchange rate, receipts from the sale of goods, receipts from the sale of the material, contractual fines and penalties obtained from passengers (stowaways), revenues from the written-off claims, other fines and penalties, lease of the means of transport.

Total revenues must not include the receipts from the sale of fixed assets unless such assets are sold and acquired again within the leaseback. Revenues from the sale of the assets in case of the leaseback accrue throughout the leasing period. The total amount of receipts from the sale of assets cannot be included in the current accounting period.

Under the public service contract, the risk of sales is borne by the carrier.

### 3.4 Funding of Public Transport in European and Non-European Countries

As compared to the conditions in the Czech Republic, financing of the provable loss in the public transport in some EU countries is done in a very chaotic way. Providing of subsidies depends on not only the operating activity of the transport company but especially on the population density in the given region and the political and economic factors. Each country set the methodology for determining the amount of compensation and the method of reimbursement of this amount differently. The question is where the funding of the public

transport will come from. If we consider, for instance, the transport system in the Federal Republic of Germany and in the Czech Republic, the subsidy policy in Germany is stricter within providing basic transport services and observing the transport performance on the carrier's part. If the carrier makes a slight mistake in its operating activity (i.e. the required quality of the transport will be reduced), the carrier's loss in providing basic transport services will not be fully financed. (Deloitte, 2008)

The issue of determining the amount of compensation for carriers active in Germany and the Czech Republic is currently a relevant topic. There is no consistent methodology for allocation of economically substantiated costs. This methodology is required by the Ministry of Transport of the Czech Republic. Transport companies overestimate their costs, which represents a higher burden for public budgets. The public service contract refers to the relevant legislation which, however, fails to provide the methodology for allocation of economically substantiated costs to individual cost groups of the financial model (reports). The purchasers of transport services in various regions are, hence, forced to set their own methodology which is very different from the methodologies of other entities ordering transport services. This results in ineffective funding of basic transport services from public budgets. The Ministry of Transport of the Czech Republic, therefore, requires a consistent methodology which will be included in the doctoral thesis.

The aim of the Federal Republic of Germany and other EU countries is to reform determining the financial basis for the local public transport. The Federal Republic of Germany is divided into 16 federal states, each of them having its own Minister of Transport. Requirements of individual ministers vary. In Germany and other countries, there is no uniform methodology for determining the financial basis for the public budget and it is clear that an inconsistent quality is provided in ensuring basic transport services, in particular with respect to economic disparities between the old and new federal states of the Federal Republic of Germany, which results in different financing of the amount of compensation. The existing funding structures are not transparent and fail to provide incentives for improving the quality and profitability. A major weakness lies in the impossibility of checking the financial models. Unless the consistent methodology is available, an effective check will not be possible. (Kirchhoff, 2002, Kraft, Marx, 2005)

The public transport is financed from the fare and the advertisement revenues. The fare, advertisements and the leases form the internal income of transport companies. The external income is created by the structure of taxes. In the Czech Republic, it is the value added tax that

---

is imposed on the sale of the fare. This tax consequently serves as a source of financing the public transport from public budgets. The current VAT rate on the sale of fare amounts to 15 % (reduced tax rate).

The federal government of Germany has recently transferred the responsibility for the public transport to federal states and municipalities. The future of the properly managed allocation of financial means to the public transport is still unclear. At present, the transport companies are forced to increase the price of the tariff for reimbursement of operating costs and not to directly depend on unclear subsidies. The amount of subsidies depends on the size and the population density of the served area while maintaining the high quality of transport services. The following rule applies: the smaller area is served by the carrier, the lower is the share of the provable loss reimbursement. This condition is not applicable to the transport companies providing basic transport services in the specific region of the Czech Republic. (Grischkatt, 2009)

Ticket prices of carriers in the German federal states are set in line with the level of allocation of money from public budgets. The ticket prices are determined by the carrier. In the Czech Republic, the ticket prices are determined under the public service contract in which the client and the carrier agree about the specific amount of fare provided that the loss from the fare sold will be fully compensated to the carrier so that the latter will not suffer any financial harm. This process is not introduced in the German Länder. The German carrier may suffer the financial harm, which results in continuous increase in its ticket price. This problem is yet to be solved. Another issue in providing basic transport services is funding of the public line and track-based transport services in the German locations. The low-demand transport links are being cancelled. This does not hold true for the Czech carriers – here, on the contrary, a not fully occupied transport link is subsidised. (Peinstrup, 20005)

In France, providing of basic transport services is funded from other sources than in the Czech Republic. The public passenger transport in France is subsidized from the transport charges as per the size of the relevant town/city. Towns or villages with a population of 2,000 inhabitants establish the so-called transport charge amounting to 0.55 to 1.75 % of the total wages of all companies acting in that area and having more than 10 employees. The transport charge is then used to support the local public transport. In metropolitan areas with more than 100,000 inhabitants, the transport charge amounts to up to 1 %. In the areas with 50,000 inhabitants, the transport charge is up to 0.55 %. Transport charges serve as the main financial



tool of the local public transport. The similar system of the public transport support works also in London and Stockholm. (Zembri-Mary, 2017, Quinet, 2011)

Transport companies characterize themselves as a tool of the tax policy. They improve the public transport level by way of the renewal of their fleet and providing basic transport services of a sufficient quality. The advantages are also transferred to the passengers as the public transport is more easily accessible than the private passenger transport and, as a result, preferred. In the United States, Japan and Spain, the public transport brings advantages in the form of increasing a value of real property. Thanks to the better accessibility, prices of real property increase. (Baldassare, Ryan, Katz, 1998, Börjesson, Kristoffersson, 2018)

### **3.5 Discount tariffs in public transport**

The government and the Ministry of Transport of the Czech Republic have decided on the grant of discounts for students and the persons above 65 years of age. The above groups of passengers will pay 25 % of the fare only. The remaining 75 % will be compensated to the carriers from public budgets (of the state, municipalities or towns/cities). The prerequisite for the grant of discounts for students is that the students must hold a valid ISIC card (full-time study) and the passengers below 15 must be holders of the pupil's ID card. The decision on the grant of discounts became effective in September 2018.

Previously, the passengers under the age of six did not have to pay the fare when using the public line transport (especially the services of bus carriers). The passengers below 15 used to be granted a 50 % discount on their fare and those passengers who proved their identity upon submitting their pupil's ID cards were provided a discount amounting to 62.5 % of the fare on a predetermined route from the place of their permanent residence to their relevant school (institution) for a duration of the school year, i.e. 10 months. The principle of application of discounts for pupils and students changed in September 2018. A holder of the valid ISIC card, aged between 15 and 26, was entitled to be granted a discount of 25 % on the fare. At present, the discount of 75 % applies to all passengers who hold the ISIC card and have commenced their full-time study. The defined route is no longer applied as a prerequisite and the discount applies without limitation as to the time and territory. Passengers above 65 must prove their identity by submitting their ID card or another identification card directly provided by the carrier and the discount of 75 % will apply to them without limitations, too. The goal is to

achieve more effective availability of the public transport for the low-income groups of the population.

The introduction of newly applicable discounts has an effect on the public budgets of states, regions, towns and villages. The carriers are entitled to be compensated for the difference between the full amount of fare and the grant of discount. Hence, the higher financial demands on public budgets are expected. Since 2019, the state budget expenditures are estimated to increase to CZK 5.83 billion a year as a result of the amount of compensation to be paid out to all carriers which provide basic transport services. (<https://www.mdcz.cz/Media/Media-atiskove-zpravy/Od-soboty-1-zari-zacnou-platit-slevy-jizdneho-pro>)

It depends on the transport company owner whether it will provide the discount within the municipal public transport system. The discount, however, has to be applied in suburban and interurban areas. (<https://www.finance.cz/513762-sleva-na-dopravu-od-zari/>)

Another problematic area is the reduction of the value added tax rate (VAT) on fares, effective since February 2019. VAT is the main source of income for funding the public transport. In last months, the passengers were still paying the first reduced rate of VAT, i.e. 15 %. The Senate of the Czech Republic strives for the VAT rate reduction to 10 % of the fare within the amendment of the VAT Act. This will result in the further monetary outflow, i.e. the lack of income going into public budgets. (<https://zdopravy.cz/senat-schvalil-snizeni-dph-na-jizdenky-melo-by-pomoci-objednatelum-21187/>)

At present, the company CENDIS, s. p. (the Centre of Transport Information Systems of the Ministry of Transport of the Czech Republic) cooperates with the Ministry of Transport of the CR, railway companies and transport systems in conceiving the so-called tariff integration. The idea is that a passenger will be handled (transported) from the place A to the place B upon a single ticket upon his/her request, regardless of a contractual carrier used. The tariff integration would be established for the railway transport, in particular. The goal is to transport a passenger in a simple, clear and effective way. (<https://www.cendis.cz/projekty/tarifni-integrace/>)

The basic kilometric rate with a coefficient of CZK 1.3554 per kilometre travelled was determined. The final price, however, will include also the so-called boarding rate and will reflect the future inflation. (<https://zdopravy.cz/ministerstvo-zvazuje-ze-jednotny-tarif-dovlaku-zavede-uz-letos-25303/>)

The above issue of transport funding makes it clear that it is necessary to find other appropriate measures which would account for the positive development for all stakeholders.

---

## **4 Goals and Methodology**

### **4.1 Main Goal of Thesis**

The main goal of the contribution is to evaluate the financial health of a transport company providing public transport services in the public line transport, track-based transport and the municipal public transport. The issue of the provable loss as the cash injection which supports the level and quality of the public transport (from the finance (subsidy) viewpoint) is analysed in more details. The secondary (additional) business activity of transport companies will be analysed at the beginning. The partial goal of the thesis will be to evaluate the financial health of transport companies while applying the bankruptcy and creditworthy models developed by the Neumaiers. Upon the partial results after applying these models, the statistical methods will be used to determine the dependence of selected partial financial indicators which appear most often in the models evaluating the financial health on the results of the selected bankruptcy or creditworthy model which seems to be the most successful one in practical terms. Results of the partial research, however, will transfer the main idea of the research into another form of the goal of the thesis. The goal of the thesis is to design a model which would point to economic, accounting and technical factors having an influence on determining the amount of a provable loss in the public transport. Transport companies in most cases do not report a profit for an accounting period in providing basic transport services. The first theoretical part of the thesis, processed during the study, analyses the selected transport legislative regulations and their explanatory power in terms of the division of operating costs and sales and determining the amount of a provable loss. It was ascertained that the explanatory power of Government Decree No. 493/2004 Sb. and Regulation No. 296/2010 Sb. is insufficient from the viewpoint of the breakdown of costs and appropriate ranking of costs into relevant groups of economically substantiated costs. A major problem is the absence of a single methodology for a breakdown of operating costs in providing basic transport services in the public line, track-based and municipal public transports. Based on the above issue, the main goal of the thesis is divided into a few partial goals.

### **4.2 Partial Goals of Thesis**

The thesis has the following partial goals:

1. The analysis of the main and secondary business activity of transport companies using the application of bankruptcy and creditworthy models developed by the Neumaiers,

---

who focus on individual areas of entrepreneurial activities in the Czech Republic. The partial result will be the evaluation of success of individual bankruptcy and creditworthy models (IN95, IN99, IN01, IN05) applied to the transport conditions in the Czech Republic. The most successful model will be further statistically analysed. Another partial goal of the thesis is to point out selected financial indicators which will appear as dependent on the transferred results of the most successful model. Selected financial indicators will also include a possibility of replacing EBIT with cash flow (indirect method) within the explanatory power.

2. The analysis of Government Decree No. 493/2004 Sb., which regulates the provable loss in the public line transport and establishes the method of exercise of the professional government supervision in the road transport over funding of the transport services; Regulation No. 241/2005 Sb. on the provable loss in the public track-based passenger transport and on the definition of the parallel public passenger transport; Regulation No. 296/2010 Sb. on the procedures for establishing the financial model and setting the maximum amount of the compensation.
3. Upon the second partial goal, the explanatory power of selected legislative regulations is identified. Then, it will be confirmed whether Regulation No. 296/2010 Sb. promotes higher drawing on public budgets for improving the quality level of the public transport.
4. Based on the data collected during the study from the clients of transport servicers, the dependence of factors which are used in the calculation and affect the amount of a provable loss or compensation amount in the public line transport and the municipal public transport will be statistically analysed. The railway transport will not be further analysed due to insufficient input data affecting the financial health evaluation.
5. The conclusion of the thesis lies in designing a model evaluating a financial health of the transport company from the viewpoint of accounting as to granting of the compensation (subsidy) from public budgets within providing basic transport services and stating important factors affecting the amount of compensation for the carriers.

---

### 4.3 Methodology of Thesis, Research Techniques

The results of the above mentioned partial goals of the thesis will be achieved upon the methodical procedure applied on the theoretical level and then combined with the business practice. **The theoretical level includes:**

- Current state of the issue of financing the public transport based on the study of literature,
- Obtaining of the overview of selected cost items which should not be classified as economically substantiated costs or the costs which are inefficiently identified and ranked into groups of economically substantiated costs; in such a case the results are misinterpreted and are of an insufficient explanatory power which may affect the future decision making on the operation of the transport company (saving from the operation of means of transport, investment in the fixed assets, methods of investment funding, etc.),
- Brief summary of cost and revenue items entering the issue of a provable loss as a result of creative accounting.

**Practical level:**

- Data collection,
- Personal interviews with the clients of transport services,
- Data analysis,
- Application of other mathematical and statistical tools (correlation analysis, multiple regression, general linear model, generalized linear mode),
- Design based on the findings in accordance with future law (de lege ferenda).

### 4.4 Determining of Hypotheses

1. Does Regulation No. 296/2010 Sb. support higher drawing on public budgets without the restriction of the public service contract between the carrier and the client as compared with Government Decree No. 493/2004 Sb.?
2. Do the selected methods of allocation of overhead costs to individual activities or departments support an increase in the total value of economically substantiated costs and the total amount of compensated amount?

- 
3. It is permissible that the non-financial (technical) indicators expressed in natural units have an influence on the compensated amount and the entire financial health of the transport company or a municipal transport company?

#### **4.5 Data Sources**

For the application of selected mathematical and statistical models and determining the prognosis of a financial health of a transport company in the field of provable loss or compensation amount, the data from various sources are used. The data sources are structured as follows:

- Data obtained from the database: Albertina CZ Gold Edition,
- Data obtained on the basis of interviews with the clients of transport services,
- Data obtained upon the author's own calculations.

The financial health analysis will be made for 13 transport companies providing the mixed transport services, i.e. the bus, trolleybus and tram transport; 8 transport companies provide the bus transport only.

---

## 5 Main Results of Research

Upon the identification of the first partial goal, the analysis of the main and secondary business activity of transport companies will be made using the application of bankruptcy and creditworthy models developed by the Neumaiers who focus on individual areas of entrepreneurial activities in the Czech Republic. The partial result will be the evaluation of success of individual bankruptcy and creditworthy models (IN95, IN99, IN01, IN05) applied to the transport conditions in the Czech Republic.

The financial health analysis will be made for 13 transport companies providing the mixed transport services, i.e. the bus, trolleybus and tram transport; 8 transport companies provide the bus transport only. Based on the annual report for 2017, no information on "overdue obligation" was ascertained.

Credibility of classification models will also be verified using the return on equity and the return on assets on the basis of their recommended values. The return on equity gives utmost priority to the financial health evaluation of the transport company. The prerequisite for ROE is achieving of at least the minimum recommended values of around 10 %. Higher ROE values basically indicate a healthy company. The content of individual indices IN xx is the return on total capital (i.e. return on assets) which has very similar considerations as the return on equity and the highest weights allocated to it.

Table 2 lists the transport companies in an alphabetical order. The financial health evaluation of transport companies is divided into two parts:

The first part represents the municipal transport companies providing basic transport services (municipal public transport) – see the blue colour;

The second part represents the municipal transport companies providing basic transport services (public line transport) – see the orange colour;

Due to the confidentiality of provided data, the list of carriers will not be included in the Annex.

**Table 2** Overall success of individual indices developed by the Neumaiera

ROE (%)	CARRIER		Final value of IN 95	SUCCESS OF THE MODEL		Final value of IN 99	SUCCESS OF THE MODEL		Final value of IN 01	SUCCESS OF THE MODEL		Final value of IN 05	SUCCESS OF THE MODEL						
3.32	A	INDEX IN 95	49.55	UNSUCCESSFUL	INDEX IN 99	0.59	SUCCESSFUL	INDEX IN 01	18.46	UNSUCCESSFUL	INDEX IN 05	1.37	SUCCESSFUL						
0.1	B		508.00	UNSUCCESSFUL		0.21	SUCCESSFUL		185.68	UNSUCCESSFUL		1.72	UNSUCCESSFUL						
2.39	C		3.62	UNSUCCESSFUL		0.50	SUCCESSFUL		1.76	SUCCESSFUL		1.30	SUCCESSFUL						
0.06	D		0.84	SUCCESSFUL		0.22	SUCCESSFUL		0.77	SUCCESSFUL		0.79	SUCCESSFUL						
0.09	E		0.44	SUCCESSFUL		0.07	SUCCESSFUL		0.57	SUCCESSFUL		0.57	SUCCESSFUL						
1.84	F		1.10	SUCCESSFUL		0.27	SUCCESSFUL		1.12	SUCCESSFUL		1.16	SUCCESSFUL						
-3.68	G		-19.93	SUCCESSFUL		0.22	SUCCESSFUL		-6.09	SUCCESSFUL		-6.08	SUCCESSFUL						
-0.08	H		1.38	SUCCESSFUL		0.20	SUCCESSFUL		1.90	UNSUCCESSFUL		1.90	UNSUCCESSFUL						
1.2	I		0.93	SUCCESSFUL		0.30	SUCCESSFUL		0.74	SUCCESSFUL		0.74	SUCCESSFUL						
-2.36	J		0.79	SUCCESSFUL		0.24	SUCCESSFUL		0.97	SUCCESSFUL		0.97	SUCCESSFUL						
0.86	K		2.04	UNSUCCESSFUL		0.44	SUCCESSFUL		2.34	UNSUCCESSFUL		2.34	UNSUCCESSFUL						
-5.36	L		-1.34	SUCCESSFUL		0.09	SUCCESSFUL		-0.13	SUCCESSFUL		-0.11	SUCCESSFUL						
0.76	M		1.96	UNSUCCESSFUL		0.34	SUCCESSFUL		2.53	UNSUCCESSFUL		2.53	UNSUCCESSFUL						
4.07	N		2.58	UNSUCCESSFUL		0.69	SUCCESSFUL		1.10	SUCCESSFUL		1.09	SUCCESSFUL						
4.84	O		5.28	UNSUCCESSFUL		0.50	SUCCESSFUL		2.23	UNSUCCESSFUL		1.20	SUCCESSFUL						
15.13	P		0.31	UNSUCCESSFUL		0.04	UNSUCCESSFUL		0.27	UNSUCCESSFUL		0.27	UNSUCCESSFUL						
15.17	Q	1.44	UNSUCCESSFUL	0.51	UNSUCCESSFUL	0.57	UNSUCCESSFUL	0.57	UNSUCCESSFUL										
10.33	R	4.54	SUCCESSFUL	1.26	UNSUCCESSFUL	1.76	SUCCESSFUL	1.51	UNSUCCESSFUL										
12.95	S	3.71	SUCCESSFUL	0.89	UNSUCCESSFUL	1.41	UNSUCCESSFUL	1.20	UNSUCCESSFUL										
8.32	T	1.88	SUCCESSFUL	0.90	SUCCESSFUL	0.67	UNSUCCESSFUL	0.67	SUCCESSFUL										
18.97	U	35.49	SUCCESSFUL	1.67	SUCCESSFUL	13.35	SUCCESSFUL	2.50	SUCCESSFUL										
				<b>SUCCESS OF THE MODEL IS APPROXIMATELY 57 %.</b>					<b>SUCCESS OF THE MODEL IS APPROXIMATELY 81 %.</b>					<b>SUCCESS OF THE MODEL IS APPROXIMATELY 52 %.</b>					<b>SUCCESS OF THE MODEL IS APPROXIMATELY 62 %.</b>

Source: author



Table 2 makes it clear that the highest success rate of the financial health evaluation is provided by the index IN 99 (81%). IN 95, IN 01 and IN 05 contain almost the same financial (ratio) indicators. Based on the recommendation of the authors of the IN 05 index, the maximum value of interest coverage of up to 9 was considered. In this case, the success rate of the IN 05 index increased up to 62 %. The success rates of the index IN 95 and IN 01 in revealing the financial health of the company are 57 % and 52 %, respectively. It can be concluded that the overall success rates of indices is satisfactory.

The IN 99 index is closest to the reality. The reason is the provided subsidies in the form of the compensation amount. In providing basic transport services, we can hardly find a carrier which would cover its total costs with the total revenue and generate the accounting profit. The IN 99 index reports all carriers as the companies which do not generate a new value for the owner. When the index level is at least 1.42, we cannot directly determine whether any value for the company owners is generated. The index values less than 1.42 represent the situation when the companies do not generate the value for the owner.

The structure of the index IN 99 describes the business of a transport company best and appears to be the most successful model. Within this result, the model success rate will be further analysed. It means that the financial indicators that are most frequently applied in the models evaluating the financial health of the company will be chosen. Using the correlation analysis, we will find the dependence among individual variables and the dependence of individual variables on the final value of IN 99. It is interesting to note that in some financial indicators the numerator EBIT is replaced with CASH FLOW calculated using an indirect method. CASH FLOW cannot be calculated using a direct method due to a demanding clerical work of transport companies.

The following financial indicators were chosen:

- Return on equity (profit/loss before taxation and interest/equity),
- Return on assets (profit/loss before taxation and interest/fixed assets),
- Activity indicator (revenues/fixed assets),
- Indebtedness indicator (fixed assets/external resources),
- Interest coverage (profit/loss before taxation and interest/interest payable),
- Interest coverage on condition of the cash flow (cash flow/interest payable),
- Return on revenues (profit/loss before taxation and interest/(revenues from the sale of own products and services + revenues from the sale of the goods),

- Monetary liquidity (short-term financial assets/(short-term liabilities + short-term bank loans),
- Fixed assets turnover (revenues/fixed assets),
- Indebtedness indicator (external resources/equity).

**Table 3** Results of the correlation analysis application

	IN 99 (Y)	ROE	ROA	REVENUES / ASSETS	ASSETS / ER	EBIT/IP	CFLOW/IP	EBIT/REVENUES	MONETARY LIQUIDITY	REVENUES / FA	ER/EQ
IN 99 (Y)	1.000000	0.683195	0.914214	0.912854	-0.206501	-0.097140	-0.151007	0.734301	-0.210716	0.822744	-0.056353
ROE	0.683195	1.000000	0.620458	0.665021	-0.475838	-0.109309	-0.138809	0.574267	-0.418788	0.489359	0.616556
ROA	0.914214	0.620458	1.000000	0.673671	-0.215258	-0.035120	-0.101592	0.850803	-0.198437	0.630300	-0.034216
REVENUES / ASSETS	0.912854	0.665021	0.673671	1.000000	-0.240479	-0.156453	-0.188905	0.496440	-0.267750	0.863556	-0.022067
ASSETS / ER	-0.206501	-0.475838	-0.215258	-0.240479	1.000000	0.116677	0.132135	-0.206322	0.880109	-0.205204	-0.412878
EBIT/IP	-0.097140	-0.109309	-0.035120	-0.156453	0.116677	1.000000	0.993460	-0.003305	0.231161	-0.147136	-0.101749
CFLOW/IP	-0.151007	-0.138809	-0.101592	-0.188905	0.132135	0.993460	1.000000	-0.063074	0.234682	-0.173461	-0.092195
EBIT/REVENUES	0.734301	0.574267	0.850803	0.496440	-0.206322	-0.003305	-0.063074	1.000000	-0.140520	0.382755	-0.019270
MONETARY LIQUIDITY	-0.210716	-0.418788	-0.198437	-0.267750	0.880109	0.231161	0.234682	-0.140520	1.000000	-0.192970	-0.354821
REVENUES / FA	0.822744	0.489359	0.630300	0.863556	-0.205204	-0.147136	-0.173461	0.382755	-0.192970	1.000000	-0.076992
ER/EQ	-0.056353	0.616556	-0.034216	-0.022067	-0.412878	-0.101749	-0.092195	-0.019270	-0.354821	-0.076992	1.000000

Source: author

Table 3 shows that the variables ROE; ROA; REVENUES / ASSETS; EBIT / REVENUES; REVENUES / FA have a significant effect on the observed variable of IN 99. Cash flow appears to be independent (irrelevant) for the final value of IN 99. The variables dependent on IN 99 express the proportional correlation. It means that if the dependent variables are increased by a unit, the index IN 99 will show higher values (creation for the owner).

The partial result of the thesis is to point out other financial indicators which may theoretically affect the results of the financial health evaluation of transport companies when

the IN 99 index is applied. The current results were presented on condition that the main and secondary business activities of transport companies were included. Transport companies, however, basically mostly fail to achieve the positive economic result and they, therefore, depend on the subsidy policy allowing them to cover at least their operating costs.

1. This leads to the idea of analysing the economic result only within the main business activity of transport companies, i.e. providing basic transport services. The question is: "Why do the transport companies fail to achieve the positive economic result?" The main reason is that, within providing basic transport services, the terms and conditions are agreed between the carrier and the client ordering transport services in the public service contract. The contract stipulates the carrier's price tariffs which are mostly underestimated and are far from covering the economically substantiated costs. This is why the majority of transport companies fail to achieve the positive economic result. The clients ordering the transport services undertake to pay to the carrier the compensation amount aimed to compensate the level of revenues and costs to the same financial value. This leads to the balanced (zero) economic result. What is more, the transport company will obtain the adequate profit which will serve for the renewal of its fleet. The new question is: "Does Regulation No. 296/2010 Sb. support higher drawing on public budgets without the restriction of the public service contract between the carrier and the client as compared to Government Decree No. 493/2004 Sb.?"

The outcome can be assessed using the example of the selected transport company which determines the provable loss pursuant to Government Decree No. 493/2004 Sb. Following that, the compensation amount pursuant to Regulation No. 296/2010 Sb. will be calculated. Table 4 includes the basic classification of economically substantiated costs, receipts or revenues and the number of kilometres travelled by all means of transport according to the timetable. The owner of the transport company (or, more precisely, a municipal office) is supposed to pay 80 % of the provable loss or compensation and the region or other municipalities will pay 20 % of the payment. Table 4 also shows the report on the costs and revenues from the bus transport operation in 2017. The selected transport company owns 56 buses of an average price set for the immediately preceding accounting period on the basis of the net book value of CZK 5,020,000. Based on the report on operating assets, the operating costs amount to CZK 470,490,000.

The figures are in thousands of units.

**Table 4** Report on the costs and revenues from the bus transport operation of the selected transport company in 2017

Item	Line	Bus transport of the selected carrier in 2017						
		Town		Outside the town		Total		
		thousand CZK	CZK/km	thousand CZK	CZK/km	thousand CZK	CZK/km	
Fuel	1	24,000	10	5,700	9.83	29,700	9.97	
Tyres	2	1,350	0.56	250	0.43	1,600	0.54	
Other direct material, energy	3	8,300	3.46	2,100	3.62	10,400	3.49	
Direct wages	4	37,000	15.42	9,100	15.69	46,100	15.47	
Buses	Depreciation of vehicles	5	18,500	7.71	4,700	8.1	23,200	7.79
	Lease of means of transport	6	0	0	0	0	0	0
	Repairs and maintenance of buses	7	23,500	9.79	5,700	9.83	29,200	9.8
	Road tax	8	0	0	0	0	0	0
	Insurance (accident, statutory, collision)	9	1,400	0.58	350	0.6	1,750	0.59
Other direct costs	Fare	10	0	0	0	0	0	0
	Payments to the funds	11	12,600	5.25	3,100	5.34	15,700	5.27
	Any other direct costs	12	250	0.1	100	0.17	350	0.12
Overhead costs	13	19,600	8.17	4,800	8.28	24,400	8.19	
<b>Total operating costs</b>	<b>14</b>	<b>146,500</b>	<b>61.04</b>	<b>35,900</b>	<b>61.9</b>	<b>182,400</b>	<b>61.21</b>	
Sales	<b>Total</b>	<b>15</b>	<b>53,650</b>	<b>22.36</b>	<b>13,120</b>	<b>22.62</b>	<b>66,770</b>	<b>22.41</b>
	Sales from transportation	16	53,200	22.17	13,000	22.41	66,200	22.21
	Other receipts and revenue	17	450	0.19	120	0.21	570	0.19
Reimbursement of provable loss	<b>into total receipts and revenue</b>	<b>18</b>					<b>136,173</b>	<b>45.7</b>
	From the municipal office	19					108,938	36.55
	From the regional office and municipalities	20					27,235	9.14
Loss paid from the pupils' fare	20a							
<b>Adequate profit for bus renewal</b>	<b>21</b>						<b>20,543</b>	<b>6.89</b>
Subsidies into the receipts for renewal of buses by way of leasing	21a							
Mileage (thousand km) (according to the timetable + technology)	22		2,400		580		2,980	

Source: author

**Determining of provable loss pursuant to Government Decree No. 493/2004 Sb.**

The adequate profit calculation is governed by the valid data contained in Table 4. Namely,

$$\left[ \frac{56 \text{ buses} * 5.020}{8} - 18.500 \right] / 0.81 = \text{CZK } 20,543,000$$

The adequate profit amounts to CZK 20,543,000. The total provable loss is calculated on the basis of the following formula:

<b>Provable loss</b> = total costs – receipts (revenue) + adequate profit = 182,400 – 66,770 + 20,543 <b>= CZK 136,173 thousand</b>
--

As a result, the municipal office and the region or other municipalities participate in the disbursement of CZK 136,173,000, i.e. CZK 45.7/kilometre travelled. Lines 19, 20 and 21 in Table 4 show the disbursement of a provable loss and adequate profit by the municipal office (80 %) and the region (20 %) in a total amount and in the value as per one kilometre travelled due to a better explanatory power of the report.

**Determining of the amount of compensation pursuant to Regulation No. 296/2010 Sb.**

The figures from the report are the same, however, the Regulation does not reckon with the calculation of an adequate profit. Regulation No. 296/2010 Sb. takes account of the term "net income" which amounts to 7.5 % of operating assets at most. The following definition applies: "*rate of return per the capital: 7.5 % of operating assets*".

The compensation will be calculated as follows:

<b>Compensation</b> = total costs – total receipts (revenue) + net income = 182,400 – 66,770 + 35,287 = <b>CZK 150,917 thousand</b>
---

The **net income** is determined upon the data included in the report of operating assets. The calculation was set as 7.5 % of 470,490 thousand CZK. The net income amounts to 35,287 thousand CZK. The requirement of the rate of **return per the capital** of 7.5 % of operating assets is met.

The result is that Regulation No. 296/2010 Sb. promotes higher financial drawing from public budgets by the specific transport company by CZK 14,744,000, while the organizational structure and operating values (of costs and revenues) within providing basic transport services are the same. The same would apply for other transport companies. Increasing demands for funding the public transport from public budgets may be reflected in the final model of the compensation amount (subsidy) disbursement.

Funding of public transport from public budgets is currently a frequently addressed issue. The Ministry of Transport requires the uniform methodology for allocation of economically

---

substantiated costs and revenues from the transport operation within providing basic transport services. Such a methodology does not exist. Regions, towns and municipalities let the transport companies have free reign in creating their own methodology for allocating costs and revenues to individual groups or the regions create their own methodology. This, however, results in an ineffective process of creating a number of methodologies.

As the quality of transport increases, the transport companies require higher financial compensation. The final goal of the thesis will be to propose a model the content of which will examine and analyse which explanatory (economic, technical) variables will affect the explained (dependent) variable, i.e. the provable loss (compensation loss). This process may estimate (predict) quantitative changes of explanatory variables in the overall change of the explained variable.

As the explanatory variables, the following variables were chosen:

1. Economically substantiated costs,
2. Income (revenues),
3. Number of vehicles,
4. Total mileage as per the timetable, including the arrivals at and departures from the depot,
5. Average age of vehicles.

The goal of the thesis is to establish which explanatory variables will be statistically significant in relation to the explained (dependent) variable, i.e. the compensation amount (subsidy). As a sample of a statistical analysis, a total of 20 transport companies providing basic transport services in the Czech Republic have been chosen. The data are acquired directly from the clients ordering transport services upon the confidentiality agreement. The data are of a very good quality. As the sample under review does not contain a qualitative type of data, the multiple regression may be applied.

**Fig. 4** Application of regression model – first step

```

Coefficients:
                Estimate Std. Error t value Pr(>|t|)
(Intercept)      2.320e+06  1.308e+07   0.177  0.86175
average.age.of.buses  4.769e+05  1.622e+06   0.294  0.77307
economically.substantiated.costs  8.807e-01  1.093e-01   8.060  1.26e-06 ***
mileage          4.444e-01  1.337e+00   0.332  0.74454
number.of.buses -2.153e+04  4.661e+04  -0.462  0.65116
sales           -8.383e-01  2.052e-01  -4.086  0.00111 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 7796000 on 14 degrees of freedom
Multiple R-squared:  0.9515, Adjusted R-squared:  0.9342
F-statistic: 54.93 on 5 and 14 DF,  p-value: 1.053e-08

```

Source: author

The results of the regression model in the first step show that the variables "economically substantiated costs" and "sales" are substantially dependent on the explained variable "provable loss". The reason is that the p-value is lower than 0.05. Other variables appear to be statistically insignificant. The variable "number of buses" achieves the lowest value – 0.65116 and, therefore, it will be excluded from the model in the next step. The correlation coefficient (coefficient of determination) determines the accuracy of the chosen regression model using the method of the least squares. It says how many per cent of the dispersion of the dependent variable is explained by the model and how many per cent remains unexplained. Generally, the higher the value of R–square is, the higher the dependence between the explained variable and the explanatory variable is. Values close to 1 imply a positive quality of the regression model.

**The coefficient of determination** determines the accuracy of the chosen regression model – its value is 94.12%, which is positive.

#### Values of parameters in the first step:

**Provable loss** = 2320000 + 476900\*average age of buses + 0.8807\*economically substantiated costs + 0.4444\*mileage – 21530\*number of buses – 0.8383\*sales

**Fig. 5** Application of regression model (elimination of the "number of buses" variable) – second step

```

Coefficients:
                Estimate Std. Error t value Pr(>|t|)
(Intercept)      1.828e+06  1.269e+07   0.144 0.887350
average.age.of.buses  4.452e+05  1.578e+06   0.282 0.781655
economically.substantiated.costs  8.745e-01  1.056e-01   8.285 5.58e-07 ***
mileage          3.172e-01  1.274e+00   0.249 0.806730
sales           -8.325e-01  1.993e-01  -4.176 0.000811 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 7589000 on 15 degrees of freedom
Multiple R-squared: 0.9508, Adjusted R-squared: 0.9376
F-statistic: 72.41 on 4 and 15 DF, p-value: 1.266e-09

```

Source: author

After eliminating the "number of buses" variable, the same situation as in the first step happened.

The coefficient of determination amounts to 93.76 %. Unlike the previous model, it decreases slightly.

#### Values of parameters in the second step:

**Provable loss** = 1828000 + 445200\*average age of buses + 0.8745\*economically substantiated costs + 0.3172\*mileage– 0.8325\*sales

In the next step, the variable "average age of buses" with a value of 0.781655 will be eliminated.

**Fig. 6** Application of regression model (elimination of the "average.age.of.buses" variable) – third step

```

Coefficients:
                Estimate Std. Error t value Pr(>|t|)
(Intercept)      5.190e+06  4.243e+06   1.223 0.238890
economically.substantiated.costs  8.865e-01  9.375e-02   9.456 5.95e-08 ***
mileage          2.701e-01  1.226e+00   0.220 0.828411
sales           -8.549e-01  1.774e-01  -4.819 0.000189 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 7367000 on 16 degrees of freedom
Multiple R-squared: 0.9505, Adjusted R-squared: 0.9412
F-statistic: 102.4 on 3 and 16 DF, p-value: 1.177e-10

```

Source: author

The coefficient of determination increased to 94.12%.



**Values of parameters in the third step:**

$$\text{Provable loss} = 5190000 + 0.8865 * \text{economically substantiated costs} + 0.2701 * \text{mileage} - 0.8549 * \text{sales}$$

The "mileage" variable with the value of 0.828411 appears as the last insignificant variable.

**Fig. 7** Application of regression model (elimination of the "mileage" variable) – fourth step

```

Coefficients:
                Estimate Std. Error t value Pr(>|t|)
(Intercept)      5.401e+06  4.016e+06   1.345    0.196
economically.substantiated.costs  8.943e-01  8.430e-02  10.609  6.46e-09 ***
sales            -8.639e-01  1.678e-01  -5.147  8.07e-05 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 7158000 on 17 degrees of freedom
Multiple R-squared:  0.9503, Adjusted R-squared:  0.9445
F-statistic: 162.7 on 2 and 17 DF,  p-value: 8.232e-12
    
```

Source: author

**Values of parameters in the fourth step:**

$$\text{Provable loss} = 5401000 + 0.8943 * \text{economically substantiated costs} - 0.8639 * \text{sales}$$

The regression model or, more precisely, the multiple regression at the final stage results in the fact that the dependent variable "provable loss" is statistically affected by the explanatory variables "economically substantiated costs" and "revenues".

The coefficient of determination increased to 94.45 %. After elimination of independent variables, the accuracy of choosing the regression model increased by 0.33 % as compared to the regression model in the first step.

The rest up to 100 % is not explained by the regression model and creates the so-called statistical noise or a random error. For testing the normality of data, the Shapiro-Wilk normality test is applied. For testing the homogeneity of variances, the Breusch – Pagan test is applied. At the last stage, the serial independence is tested using the Durbin-Watson test. Results are provided in Table No. 5.

**Table 5** Assumptions for data normality, homoscedasticity and independence (residuals2) – second step

	p - value
Shapiro-Wilk normality test	0.02841
Breusch-Pagan test	0.4694
Durbin-Watson test	0.1919

Source: author

---

All assumptions of residuals were met. The normality test is observed at least on 1% level of significance.

---

## 6 Conclusion

In the contribution was analysed to evaluate the financial health of a transport company in terms of accounting using the suitable bankruptcy and creditworthy models and the statistical models as well as to analyse the primary legislation laying down the methods for determining the amount of subsidy in the public line, track-based and municipal public transport to obtain the results within investigating of the given issue. The goal of the thesis was to evaluate basic legislative regulations providing the methods for establishing the amount of subsidy in the public line transport, track-based transport and municipal public transport. The author chose such a text structure which should be understandable for a common reader as well. The thesis was processed from the basic terms and from the general level to the more detailed analyses of the examined legislation. The partial goal of the thesis was to evaluate whether the currently effective Regulation No. 296/2010 Sb. promotes higher drawing on public budgets (budgets of the regions, towns and the state budget) within providing transport services on the regional and nationwide level and the possibilities of the fleet renewal. At present, the majority of public service contracts made (agreed) between the orderer of the transport and the carrier in previous years still refer to Government Decree No. 493/2004 Sb in the public line transport and Regulation No. 241/2005 Sb. in the public track-based transport. Their wording is, however, insufficient. The newly made contracts refer to Regulation No. 296/2010 Sb. which is applicable to both the public line transport and the track-based transport. Municipal transport companies operating the bus, tram and trolleybus transports use the same legislation. The calculation of the compensated (paid) amount is, however, separated for the municipal bus transport and the track-based (trolleybus and tram) transport. The classification of cost and revenue items in providing basic transport services plays a crucial role in the managerial and financial accounting. Proper separation of these items in the accounting provides the transport companies and the clients of transport services with an overview of information on individual activities carried out by the transport company. The carrier has to separate the cost and revenue items in its accounting system separately for the main business activity (providing basic transport services) and the secondary business activity. The same applies also within one business activity only when the carrier transports the passengers by means of the municipal bus, trolleybus and tram transport as well as the special transport (metro, cableways). Hence, the author strived to suggest the methodology which would identify the cost items more effectively and classify them in relevant groups of economically substantiated costs for the public and track-based transport. Nowadays, there is no single methodology for cost breakdown and the

---

summary of operating costs arising from transport companies is not determined (restricted). This results in the situations where the cost items are overestimated and distort the amount of the subsidy. The compensation amount is overestimated and more money is drawn on public budgets. The regression analysis results show that the dependent (significant) variables are the economically substantiated costs and the revenues generated within providing basic transport services. These explanatory variables have a direct effect on the dependent variable, i.e. the compensation amount (subsidy). An absolute change in economically substantiated costs and revenues will give rise to a change in the overall subsidies provided from public budgets. The number of vehicles, the mileage and the average age of vehicles are not statistically significant and do not have a direct influence on the amount of compensation. They are likely to be a part of the economically substantiated costs.

The public transport in the Czech Republic is subsidised from public budgets and the income of public budgets designed for the transport is formed by especially the value added tax imposed on the sale of the fare within the passenger transport. There are some proposals available which imply how the public transport could be funded and the transport quality could be efficiently improved.

At present, the sources which serve as a basis for supporting the public transport in the Czech Republic are insufficient. The mineral oil tax represents a small percentage in funding the public transport. Only the value added tax or, more precisely, 15 % of the tax rate is deemed to be a main tool for supporting the public transport. The government seeks to apply another reduced tax rate, i.e. 10 %, on the price of the fare. This would, however, end up in leaning of public budgets and the lack of money for providing subsidies and the compensation of provable losses from transport activities. One of the solutions is to introduce the local transport taxes which already function in France, London and Stockholm. There is also a possibility of introducing the so-called employer charges as implemented in Vienna, Austria. They work on the tax principle when the companies take part in co-financing of the public transport in their area. The companies pay the fixed amount of EUR 2 per each employee a week, only for the employees who perform their work in Vienna. Additional costs of the company spent on the employer charges will become the tax deductible cost. Another option of the public transport promotion is the fees for entrance into a certain urban area. These fees serve as a secondary source of funding the public transport in London and Stockholm. The fees for parking the cars in towns/cities at the parking lots, except for the parking places near the flats, would foster the public transport development and improve the transport infrastructure. Another possibility is

the excise duty regulation or, more precisely, an increase in the mineral oil tax. The amount of administrative costs of the tax collection would be the lowest; however, any tax increase is politically unpopular.

## 7 Resources

- [1] BALDASSARE, M., RYAN, S., KATZ, C. *Suburban attitudes toward policies aimed at reducing solo driving* (1998) *Transportation*, 25 (1), pp. 99-117.. ISSN 00494488. DOI: 10.1023/A:1004982709482.
- [2] BÖRJESSON, M., KRISTOFFERSSON, I. *The Swedish congestion charges: Ten years on* (2018) *Transportation Research Part A: Policy and Practice*, 107, pp. 35-51. ISSN 09658564. DOI: 10.1016/j.tra.2017.11.001.
- [3] BREALEY, R. A. a MYERS, S. C. *Theory and Practice of Company's Finance* (translation) Prague, Victoria Publishing, 1992, EAST Publishing 1999. ISBN 80-85605-24-4.
- [4] CENDIS. *Tarifní integrace (Tariff Integration)* [online]. Available from <https://www.cendis.cz/projekty/tarifni-integrace/>.
- [5] DAVID, E., VANCE. *Financial Analysis and Decision Making: tools and techniques to solve financial problems and make effective business decisions*, 2003, pag. 410. USA: McGraw-Hill Vomapnies, Inc. ISBN 978-0-07-141559-0.
- [6] DELOITTE (ed.) *Role of Local Public Transport Policy in the Federal Republic of Germany, survey taken in cooperation with the Federal Association of Local Transport Policy, Association of Municipalities in Germany*, BAG public transport, Düsseldorf.
- [7] DIRECTOR, S. *Financial Analysis for HR Managers: tools for linking HR strategy to business strategy*, 2013. New Jersey: Pearson Education, Inc. ISBN 978-0-13-299674-7. FABOZZI, F., J., PETERSON, P., P. *Financial Management and Analysis*, second edition, 2003, pag. 983. USA: Wiley, John Wiley and Sons, Inc. ISBN 0-471-23484-2.
- [8] Editorial office, Finance.cz. *Sleva na dopravě 75% už od září (75 % Discount Fare Already Since September)* [online].[Retrieved on 25/08/2018]. Available from <https://www.finance.cz/513762-sleva-na-dopravu-od-zari/>.
- [9] FINANALYSIS. *Used Bankruptcy and Creditworthy Models (Použité bankrotní a bonitní modely)*. [online], 2014. Available from: <<http://www.finanalysis.cz/pouzite-bankrotni-modely.html>>.
- [10] GRISCHKATT, S., 2009. *Municipalization of public transport funding – experience, opportunities and risks*. Express service, a monthly of the Association of the North Rhine-Westphalia, No. 11, November 2009, pp. 468-471. Düsseldorf.

- [11] GRÜNWARD, R. and HOLEČKOVÁ, J. (2009). *Financial Analysis and Planning of the Company (Finanční analýza a plánování podniku)* Prague: Ekopress, 318 pp. ISBN 978-80-86929-26-2.
- [12] GRÜNWARD, R., HOLEČKOVÁ, J. *Financial Analysis and Planning of the Company (Finanční analýza a plánování podniku)*, 1st issue in 2002. ISBN: 80-245-0422-7.
- [13] CHARLES, H., GIBSON. *Financial Reporting and Analysis: Using Financial Accounting Information*, 2013, pag. 688. Cengage Learning; 13th ed. Edition. ISBN 978-1133188797.
- [14] KIRCHHOFF, P., 2002. *Regulation of Tasks and Competition, Prerequisites for Successful Development of Public Transport*. The Transport, 5/2002, Association of German Transport Companies (VDV), pp. 8-11. Munich, Düsseldorf.
- [15] KISLINGEROVÁ, E.; HNILICA, J. *Financial Analysis: Step by Step (Finanční analýza: Krok za krokem)*. 1st issue Prague: C. H. Beck, 2005. 137 pp.. ISBN 80-7179-321-3.
- [16] KOVALČÍKOVÁ, D. and ŠTANDERA, J. *Act on Public Services in Passenger Transport with the Comments (Zákon o veřejných službách v přepravě cestujících s komentářem)*. 236 pp. Wolters Kluwer, a. s. 2011. Comments on page 72. ISBN 978-80-7357-662-2.
- [17] KRAFT, G., MARX J., 2005. *Funding of Existing Network of German Railways, Approaches to Service Providing and Funding of the Agreement by the Federal Government*. The Transport, 3/2005, Association of German Transport Companies (VDV), pp. 7-10. Frankfurt am Main.
- [18] LEE, A., C., LEE, J., C., LEE, CH., F. *Financial Analysis, Planning and Forecasting: Theory and Application*, third edition, 2016, pag. 1358. World Scientific Publishing Co, Pte. Ltd. ISBN 9789814723848.
- [19] MAŘÍK, M. et al. *Methods of Appraisal of the Undertaking. Appraisal Process – Basic Methods and Procedures (Metody oceňování podniku, Proces ocenění – základní metody a postupy)*. 3rd issue Prague: Ekopress, s.r.o., 2011. 494 pp. ISBN 978-80-86929-67-5.
- [20] MAŘÍK, M., MAŘÍKOVÁ, P. *Modern Methods of Performance Evaluation and Company Appraisal: Economic Value Added, Market Value Added, CF ROI (Moderní metody hodnocení výkonnosti a oceňování podniku: ekonomická přidaná hodnota, tržní přidaná hodnota, CF ROI)*. 2nd issue Prague: Ekopress, 2005. 164 pp.. ISBN 80-86119-61-0.
- [21] MATOUŠKOVÁ, Z. *Regional and Municipal Economy (Regionální a municipální ekonomika)*. Prague: University of Economics, Prague, 2000. ISBN 80-245-0052-3.
- [22] Ministry of Transport. *Transport Yearbook of the Czech Republic. Total amount of subsidies in the regular passenger public transport, 2017*. [online]. Available from <www.sydos.cz>.
- [23] Ministry of Transport of the Czech Republic. *Od soboty 1. září začnou platit slevy jízdného pro studenty a seniory (Discount Fares for Students and Senior Citizens To Be*

*Effective from Saturday, 1 September*) [online]. Media and press releases, 2018 [Retrieved on 29/08/2018]. Available from <https://www.mdcz.cz/Media/Media-a-tiskove-zpravy/Od-soboty-1-zari-zacnou-platit-slevy-jizdneho-pro>.

[24] Government Decree No. 493/2004 Sb. *regulating the provable loss in the public line transport and establishing the method of exercise of the professional government supervision in the road transport over funding of the basic transport services.*

[25] NEUMAIEROVÁ, I., NEUMAIER, I. *Performance and Market Value of the Company (Výkonnost a tržní hodnota firmy)*. 1st issue Prague: GradaPublishing, 2002. 216 pp. ISBN 80-247-0125-1.

[26] PEINSTRUP, M., 2005. *Funding of Public Transport, Structures, Legitimacy and Incentives*. Solved problems from the lecture from the Institute of Transport Studies at the Münster University, Karl-Hans Hartwig: subsidiarity, competitions and subsidies in transport, Article 42. Münster.

[27] PETŘÍK, T. *Economic and Financial Management of the Company. Managerial Accounting in Practice (Ekonomické a finanční řízení firmy. Manažerské účetnictví v praxi)* – 2nd extensively extended and updated issue. Prague: GradaPublishing, 2009. 736 pp. ISBN 978-80-247-3024-0.

[28] QUINET, É. *Transport taxation in France: From the development of supply to the management of demand* [Article@La fiscalité des transports en France: Du développement de l'offre à la gestion de la demande] (2011) *Futuribles: Analyse et Prospective*, (370), pp. 5-29. ISSN 0337307X.

[29] RŮČKOVÁ, P. *Financial Analysis: Methods, Indicators, Utilisation in Practice (Finanční analýza: metody, ukazatele, využití v praxi)*. 3rd issue Prague: Grada, 2010. 144 pp. ISBN 978-80-247-3308-1.

[30] ŘÍHA, Z., TICHÝ, J. *The costs calculation and modelling in transport. (2015) Transport Means – Proceedings of the International Conference, 2015 – January*, pp. 388-391.

[31] SARNGADHARAN, M., RAJITHA KUMAR, S. *Financial Analysis for Management Decisions*, 2011, pag. 364. PHI Learning. ISBN 978-8120342477.

[32] SEDLÁČEK, J. *Financial Analysis of the Undertaking (Finanční analýza podniku)*. 1st issue Brno: ComputerPress, 2009. 154 pp. ISBN 978-80-251-1830-6.

[33] SLÁMA, D. *Financing of Public Transport from the State Budget and Regional and Municipal Budgets (Financování veřejné dopravy ze státního rozpočtu, krajských a obecních rozpočtů)*. Public Administration Daily, Aug 01, 2014, OF 4/2014, section: Transportation.

[34] SLÁMA, D. *Financing of Public Transport (Financování veřejné dopravy)*. Public Administration Daily, Aug 25, 2014, OF 3/2014, section: Economics.

[35] STEJSKAL, P. *Tariffs, Prices, Taxes and Fees in Transport (Tarify, ceny, daně a poplatky v dopravě)*. Prague: Czech Technical University in Prague, 2013. ISBN 978-80-01-05362-1.

[36] StatSoft, Inc. *ElectronicStatisticTextbook*. Tulsa, OK: StatSoft. WEB: <http://statsoft.com/textbook/>.

[37] ŠŮRA JAN. *Ministerstvo zvažuje, že jednotný tarif do vlaků zavede už letos (Ministry Considers Introducing of Single Tariff for Trains Already This Year)* [online]. [zdopravy.cz](https://zdopravy.cz), 2019 [Retrieved on 15/03/2019]. Available from <https://zdopravy.cz/ministerstvo-zvazuje-ze-jednotny-tarif-do-vlaku-zavede-uz-letos-25303/>.

[38] ŠINDELÁŘ JAN. *Senát schválil snížení DPH na jízdenky, mělo by pomoci objednatelům (The Senate Approved Reduction of VAT on Tickets to Help Customers)* [online]. [zdopravy.cz](https://zdopravy.cz), 2018 [Retrieved on 20/12/2018]. Available from <https://zdopravy.cz/senat-schvalil-snizeni-dph-na-jizdenky-melo-by-pomoci-objednatelum-21187/>.

[39] TELECKÝ, M. *Factors Affecting Financial Health of Public Transport Companies from the Viewpoint of Accounting, Financing and Other Disciplines (Faktory ovlivňující finanční zdraví podniků veřejné dopravy z pohledu účetnictví, financování a dalších disciplín)* České Budějovice: University of South Bohemia in České Budějovice, Faculty of Economics, Department of Accounting and Finances, 2016. ISBN 978-80-7394-630-2.

[40] VITURKA, M. *Regional Economy (Regionální ekonomie II)*. Brno: Masaryk University, 2000. ISBN 80-210-2257-4.

[41] VOCHOZKA, M. *Methods of Comprehensive Evaluation of the Undertaking (Metody komplexního hodnocení podniku)*. Prague: GradaPublishing, 2011. 248 pp. ISBN 978-80-247-3647-1.

[42] Regulation No. 241/2005 Sb., *on the provable loss in the public passenger track-based transport and on the definition of the parallel public passenger transport*.

[43] Regulation No. 296/2010 Sb. *on the procedures for establishing the financial model and determining the maximum amount of compensation*.

[44] Act No. 16/1993 Sb., *on the road tax*.

[45] Act No. 235/2004 Sb., *on the value added tax*.

[46] ZEMBRI-MARY, G. *Planning transport infrastructures in an uncertain context. Analysis and limits to contemporary planning in France* (2017) *European Transport Research Review*, 9 (4), art. no. 51, ISSN 18670717. DOI 10.1007/s12544-017-0266-4.