Abstract
The paper deals with analysis of the development of performances in freight rail transport in comparison with the development of gross domestic product as the main indicator measuring the economic performance of the country and on the other hand the performances in passenger rail transport in relation to the development of the average monthly wage as one of the most important indicator characterizing the living standard. The change in demand for transport services is analyzed with respect to the change in the price of the ticket in passenger rail transport and also the change in the price for transport of one tonne of goods in freight rail transport.

Keywords
macro-economic indicators, passenger rail transport, freight rail transport, elasticity

1 Introduction
The development of the economy in the country is influenced by the effective activity and cooperation of households, companies, the state and foreign countries (Poliak et al., 2014). These four sectors are affected by each other. Consumers enter the market for their personal needs as buyers, but also as sellers. Their receipts from ownership of the production factors use for the purchase of goods, services, or savings. The companies produce goods, respectively offer the services, and come to the market for their sale (Gasparik et al., 2015).

The specific role in this cycle has a state, which should guarantee the appropriate conditions for companies but on the other hand also for the households, which are the main customers (Gasparik and Zitricky, 2010).

Transport is one of the most important sectors of the economy (Abramovic, 2017). The share of transport in gross domestic product (GDP) is about 6% in Slovakia. According to the Statistical Office of Slovakia were employed almost 99 thousand people in transport sector in 2014 while 12.5% of this number were employed in railway transport. Therefore, it is relevant to examine the impact of economic indicators on the change of performances in rail passenger and freight transport.

2 Comparison of the transport performances and macroeconomic indicators
Economic situation of the country can be characterized by a number of basic indicators (Kendra, 2014). The development of freight rail transport is compared in relation to the gross domestic product and the development of passenger rail transport depending on the average monthly wage.

2.1 Performances of freight rail transport in comparison with GDP
The most commonly used indicator characterizing the economic situation in the state is gross domestic product (Kampf et al., 2012). It represents the value of final goods and services produced in the time period on the national territory by production factors owned by the citizens of the country or foreigners working in that country. It is that part of gross production which
is intended for final consumption (not to the next production) and satisfies the final consumers.

Fig. 1 shows the development of the GDP (in constant prices) and transport performances of freight rail transport (Annual report of ZSSK CARGO a.s., 2015)

The gross domestic product of Slovakia regularly increased by more than one billion eur in the last period, however the most significant increase was between the years 2013 and 2014 (more than 2.5 billion eur) with the assumption of a continuation of this trend in the future.

The same development was also in the performances of freight rail transport in the analysis period when the increase between the years 2013 and 2015 was 438 million tkm (almost 7%).

2.2 Performances of passenger rail transport in comparison with average monthly wage

Statistics indicate an average monthly level of wages of the employee for the whole economy of Slovakia, therefore include all sectors of economic activities with the exception of management or business receipts and also the receipts of their shareholders, military components, people on maternity and parental leave. The data are classified according to economic activity, geographical area, age groups or education (Lalinska et al., 2015)

Passenger kilometers (pkm) are the most appropriate measure for transport statistics and their comparison in passenger transport because an indicator the number of passengers can bring a high risk of double counting, especially in international transport (Camaj et al., 2015)

Fig. 2 shows the development of average gross monthly wage in the national economy in comparison with the performances of passenger rail transport (Annual report of ZSSK a.s., 2015).

The average monthly wage in Slovakia for the last five years reflects the development of the gross domestic product. An increase of almost 20€ is recorded each year, while the most significant increase was between years 2013 – 2014 (up to 34€). According to different economic situations of regions is the average monthly wage regarded as substandard in certain areas of Slovakia in relation to others where the wage is much lower.

The development of performances in passenger rail transport (expressed in passenger kilometers) showed a similar trend in the years 2011 - 2015, however the last two months of 2014 and year 2015 were significantly affected by the introduction of free transport for certain groups of passengers.

3 Price elasticity of demand for services in passenger and freight rail transport

Price elasticity of demand (PED) shows the relationship between price and quantity demanded and provides a precise calculation of the effect of a change in price on quantity demanded (Mccarthy, 2001). The degree of response of quantity demanded to a change in price can vary considerably. The key benchmark for measuring elasticity is whether the coefficient is greater or less than proportionate (Lizbetin et al, 2015). If quantity demanded changes proportionately, then the value of PED is 1, which is called ‘unit elasticity’.

PED can also be:
- Less than one, which means PED is inelastic.
- Greater than one, which is elastic.
- Zero (0), which is perfectly inelastic.
- Infinite (∞), which is perfectly elastic.

PED on a linear demand curve will fall continuously as the curve slopes downwards, moving from left to right. PED = 1 at the midpoint of a linear demand curve.

3.1 Price elasticity of demand for services in passenger rail transport

Price elasticity of demand for transport is calculated as the ratio of change of quantity to change of price (Button, 2010). We investigated the dependence of the performances of passenger rail transport from the change in the price of the ticket. The price of the ticket is set out for each tariff zone (Table 1).
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</table>

Table 1 Calculation of average price for transport
We calculated the average price as the average of the prices for one passenger kilometer in the individual tariff zones. Prices in passenger rail transport are regulated by the state therefore does not change often. Table 2 shows the price elasticity of demand for passenger rail transport in the years 2012-2015.

The coefficient of price elasticity is less than one in all cases, what means that the demand for services of public passenger rail transport is inelastic - it is not significantly affected by the change of the ticket price.

### Table 2 Effect of change in performances of passenger rail transport to the price for one pkm

<table>
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<tr>
<th>Year</th>
<th>Performances of passenger rail transport in mil. pkm</th>
<th>Average price for 1 pkm in EUR</th>
<th>Price elasticity</th>
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<td>2015</td>
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</table>

3.2 Price elasticity of demand for services in freight rail transport

Price elasticity of freight rail transport is focused on the dependence of the change in the rates for the transport of 1 tonne of goods from the transport performances. The rate for transport of 1 tonne of goods is set out for each tariff zone as well as in passenger transport (Table 3). The conversion is processed for each analyzed year, where the result is the average price for one tonne kilometer. The list of rates is referred in Tariff for freight rail transport – TR1 (TR 1, 2015).

We calculated the average price as the average of the prices for one tonne kilometer in the individual tariff zones. The used list of rates is for railway wagons, which are owned by the carrier. Price elasticity of demand for freight rail transport in the years 2014 and 2015 is shown in Table 4.

The coefficient of price elasticity is more than one in both cases, what means that the demand for services of freight rail transport is elastic. Performances of freight rail transport increased every year, although the rate for transport of one tonne of goods also increased also. This fact could be affected by increased interest in intermodal transport.

4 Conclusion

The good economic situation and living standards is also reflected positively on the increasing demand for services in passenger and freight rail transport. The increase in the number of passengers carried in the period was recorded each year during the period, even between years 2011 and 2015 it was more than 21%. Despite this fact, we are concluded on the basis of price elasticity that the demand remains inelastic to change of price in passenger rail transport. This trend indicates that the price in passenger rail transport is not the most important factor for passengers in deciding on the choice of type of transport. The situation in freight transport was similar when the increase of performances was observed in comparing the years 2013 and 2015, despite the changes in the rates for transport of one tonne of goods. Although a conclusion may review the main points of the paper, do not replicate the abstract as the conclusion. A conclusion might elaborate on the importance of the work or suggest applications and extensions.

Acknowledgement

The paper was supported by the VEGA Agency, Grant No. 1/0019/17 “Evaluation of regional rail transport in the context of regional economic potential with a view to effective use of public resources and social costs of transport”, at Faculty of Operations and Economics of Transport and Communication, University of Zilina, Slovakia.
Table 3 Calculation of average price for transport

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|                | Σ 6.0835         | Aver. 0.1601  | Σ 6.2505      | Aver. 0.1645  | Σ 6.3784      | Aver. 0.1679  |
Table 4 Effect of change in performances of freight rail transport to the price for one tkm

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References


Button, K. (2010), Transport Economics. MPG Books Group, UK.


