CORRELATION BETWEEN TRAFFIC AND ECONOMIC GROWTH IN SLOVENIA

KORELACIJA IZMEĐU PROMETA I GOSPODARSKOG RASTA U SLOVENIJI

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Abstract: *Traffic is of key importance to modern economies, a fact that needs to be taken into account when planning decisions are made. Traffic growth is strongly connected with economic growth. With economic growth, the need for mobility increases. Traffic growth is influenced by two major factors: while the need for private vehicle usage has increased in passenger traffic, traffic growth in freight traffic has been influenced by the changes in the European economy. Economic growth is not only closely connected with traffic development but also with the traffic as such. An efficient economic system is extremely important to the welfare of any country.*

Key words: *economic growth, traffic, traffic growth, correlation, regression*

Sažetak: *Promet je od ključne važnosti u modernim ekonomijama,činjenica koja se mora uzeti u obzir kada se planira donošenje odluka. Porast prometa je usko povezan s gospodarskim rastom. S ekonomskim rastom raste i potreba za pokretljivošću. Porast prometa je pod utjecajem dva faktora: dok je potreba za korištenjem osobnih vozila porasla u putničkom prometu, na povećanje teretnog prometa utjecale su promjene u europskoj ekonomiji. Gospodarski rast nije samo usko povezan s razvojem prometa već i s prometom kao takvim. Djelotvoran ekonomski sustav je izuzetno važan za dobrobit svake zemlje.*

Ključne riječi: *ekonomski rast, promet, porast prometa, korelacija, regresija*

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1. Introduction

Traffic is a key feature of contemporary economies; hence, its large economic importance needs to be taken into account when future activities are being planned. Without an efficient traffic system a full usage of an internal market and globalized business operations are not possible. Through this, numerous traffic problems arise, from traffic congestion to other external effects, caused by traffic.

Traffic growth is strongly connected with economic growth. Therefore, without an efficient traffic system the internal market and global trade cannot be used to their full advantage. Traffic growth is rapidly increasing.

Moreover, passenger traffic has seen a rapid increase of private vehicles. The objective of the paper is to ascertain the correlation between traffic growth and economic growth in Slovenia.

2. Traffic and economic growth

As far as traffic of goods is concerned, growth to a large extent depends on the changes in the European economy and its production system. In the last twenty years, we have moved from a "stock" economy to a "flow" economy. This phenomenon has been emphasized by the relocation of some industries – particularly the manufacturing of goods with a high labour input – which are trying to reduce production costs, even though the production site is hundreds or even thousands of miles away from the final assembly plant or away from its users.

The abolition of frontiers within the Community has resulted in the establishment of the so called "just-in-time" or "revolving stock" production system. Economic growth calls for greater mobility. The demand for freight transport services is expected to increase by 38 % and by 24 % in passenger transport over the next two years. (KES, 2001, 9).

Although, from their planned economy days, the candidate countries have inherited a transport system which encourages rail, the distribution between modes has tipped sharply in favour of road traffic since the 1990s. Between 1990 and 1998, road haulage has increased by 19.4% while during the same period rail haulage decreased by 43.5%. However – and this could benefit the enlarged European Union – it is still, on average, at a much higher level than in the present Community.

If drastic action were to be taken in order to shift the balance between different modes – even if it were possible – it could very well destabilize the entire transport system and have negative effects on the economies of future EU member states. Integrating the transport systems of these countries will be a huge challenge to which the proposed measures have to provide an answer.

National growth approaches model multiplier effects of public investment in which public investment has either positive or negative (crowding-out) influence on private investment, here the effects of transport infrastructure investment on private investment and productivity (EC, 2005).

The correlation between traffic and economy from macroeconomic point of view shows the following facts (EC, 2005):

- transport infrastructure contributes to economic growth and productivity,
- affect of supply elasticity of transport infrastructure to economic growth and country's development.

Road traffic has the biggest market share in the transport sector that also continues to increase. Road traffic contributes a great deal to the state budget. Vehicle related taxes present 10.2% of all EU tax incomes (ERF, 2006, 11). Road traffic plays a significant role in the economic development of undeveloped or under-developed countries. Traffic is a driver of the economy and has an indirect influence on the economic growth in these states (Rosi & Sternad, 2007).

In an indirect way, traffic also influences the welfare of the people, as it facilitates their mobility and at the same time offers employment in the field of road transportation. The demand for freight traffic is a consequence of the delivery service of goods and services of users that need raw materials for their business purposes. Many economic and other sectors depend on road traffic. Investing in the transport sector and hence road traffic system improves social-economic welfare of the state. The impact on the income and the society occurs via macroeconomic (investments, employment, mobility) and microeconomic (costs and prices) factors.

Macroeconomic affects of NPIA on the national economy are in several aspects very favorable, because without this program aggregated investments would be lower at around 7.9 %, growth of GDP would decrease by 1 %, growth of industrial production around 0.48 % per year, inflation 0.1 % per year, final consumption 1.25 % and the employment rate 0.7 % per year. With regards to aggregate investments, the transfer of positive effects on the construction of infrastructure has been most effective in the first few years of the construction, however, until 1999 the effectiveness decreased (Oplotnik & Krizanic, 2007).

Traffic as part of the production of goods and services incurs costs for companies. Improved traffic infrastructure in a country reduces transport costs for companies what further decreases entire production costs, and lowers the prices of products or services.

The major impacts of traffic on economic processes can be categorized as follows (Rodrigue, 2006):
- Geographic specialization. Improvements in transportation and communication favor a process of geographical specialization that increases productivity and spatial interactions. An economic entity tends to produce goods and services with the most appropriate combination of capital, labor, and raw materials. A given area will thus tend to specialize in the production of goods and services for which it has the greatest advantages (or the least disadvantages) compared to other areas as long as appropriate transport is available for trade. Through geographic specialization supported by efficient transportation, the economic productivity is promoted. This process is known in economic theory as comparative advantages.
- Large scale production. An efficient transport system offering cost, time and reliability advantages permits goods to be transported further. This facilitates mass production through economies of scale because more markets can be

accessed. The concept of "just-in-time" has further expanded the productivity of production and distribution. Thus, the more efficient transportation becomes, the larger the markets that can be serviced and the larger the scale of production.

- Increased competition. When transport is efficient, the potential market for a given product (or service) increases, and so does competition. A wider array of goods and services becomes available to consumers through competition which tends to reduce costs and promote quality and innovation.

3. Correlation between traffic and economic growth

Traffic or the level of its development is indirectly connected to the development of the national economy. It is both its facilitator and inhibitor.

With its role in the reproduction process the traffic enables the connection of the production and consumption, a more rational use of production factors or the use of comparable advantages for individual stated. It has a special impact on the social division of labour, what is further reflected in the alteration of the economic structure of the national economy.

At the same time this influence can bee seen in the regional economic development of individual states. The connection of traffic can be determined using correlation and determination coefficient.

Furthermore, a connection of passenger traffic with GDB in Slovenia and gross value added of the transport sector is analyzed, for which the regression curve is used.

	2001	2002	2003	2004	2005	2006
Passenger traffic (1000)	193.388	177.226	168.841	159.222	153.672	149.066
Freight traffic (1000 tons)	76.171	82.497	88.899	96.037	106.642	111.331
GDP (mio EUR)	22.505	24.108	25.344	26.764	28.244	30.453
Gross value added of transport sector (mio EUR)	1.193	1.284	1.493	1.680	1.847	2.087

Table 1: Traffic alterations per year

Correlation of passenger traffic

The determination coefficient between passengers' traffic and GDP is 0.92 and correlation coefficient is 0.96. These values show that we have a strong correlation. Regression line:

$$y = -5,52 \cdot x + 311.832 \tag{1}$$

The determination coefficient between passenger traffic and GDP is 0.91 and correlation coefficient is 0.95. These values show that we have strong correlation. Regression line:

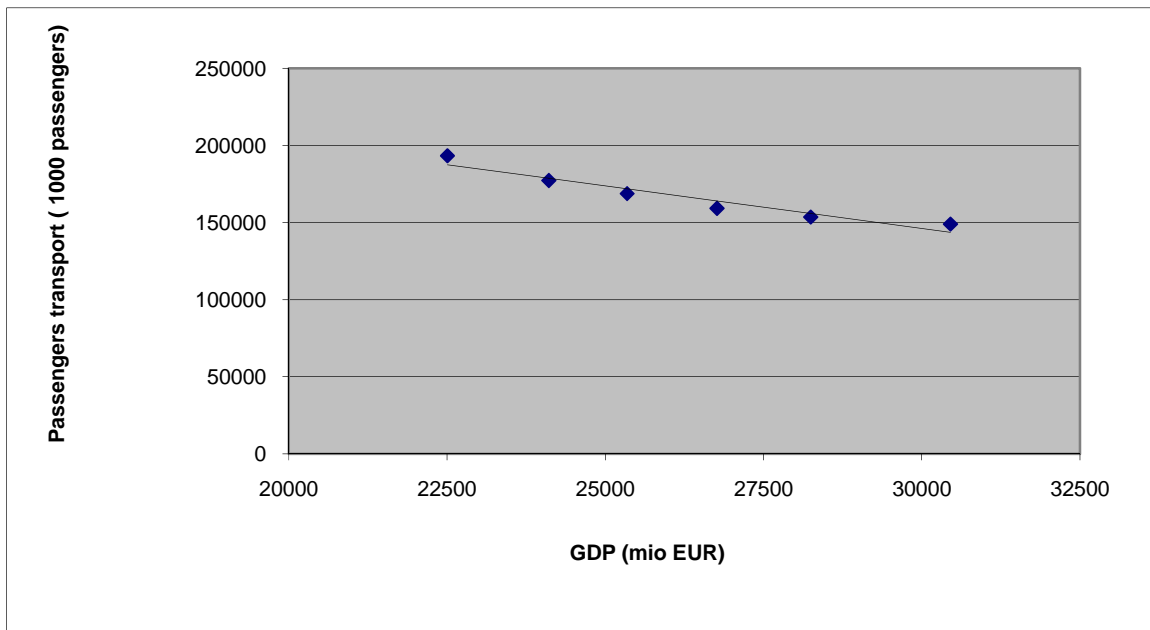$$y = -46,1 \cdot x + 240.571 \tag{2}$$

Figure 1. The correlation between passenger traffic and GDP
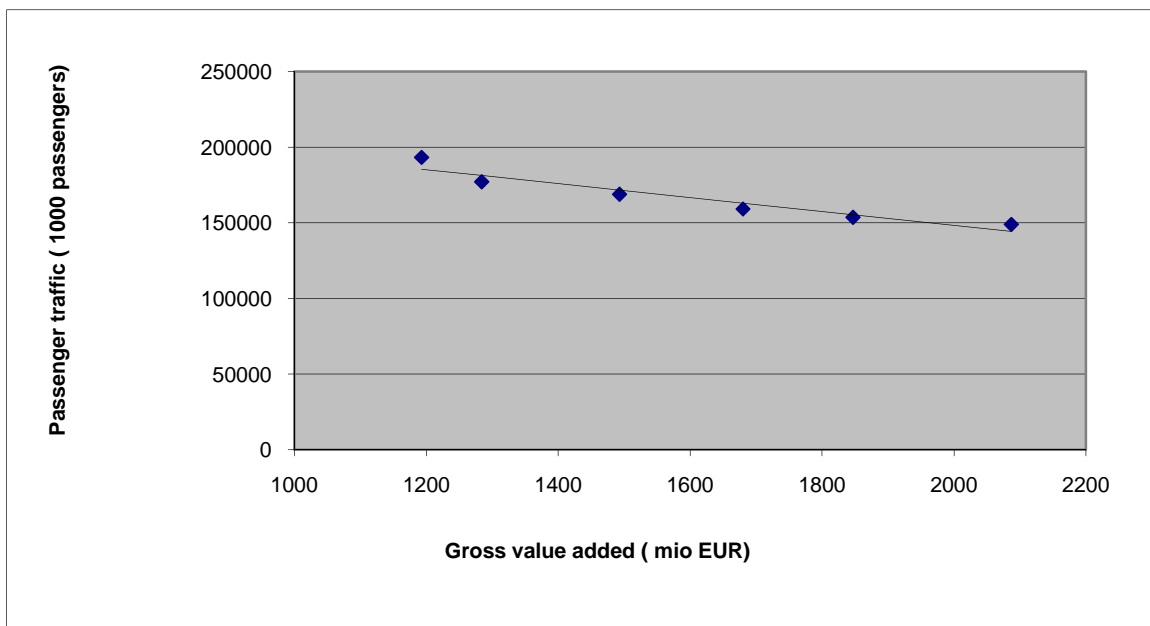

Figure 2. The correlation between passenger traffic and gross value added of transport sector

Correlation of freight traffic

The determination coefficient between freight traffic and gross value added of transport sector is 0.98 and the correlation coefficient is 0.99. These values show that we have a strong correlation. Regression line:

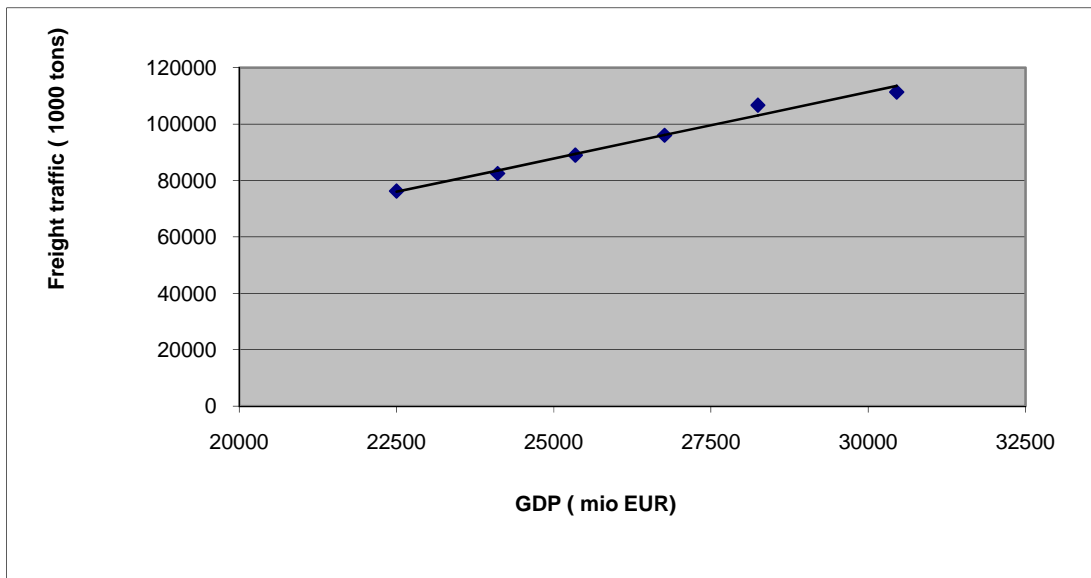$$y = 4,72 \cdot x - 30.225 \tag{3}$$

Figure 3. The correlation between freight traffic and GDP

The determination coefficient between freight traffic and gross value added of transport sector is 0.98 and correlation coefficient is 0.99. These values show that we have strong correlation. Regression line:
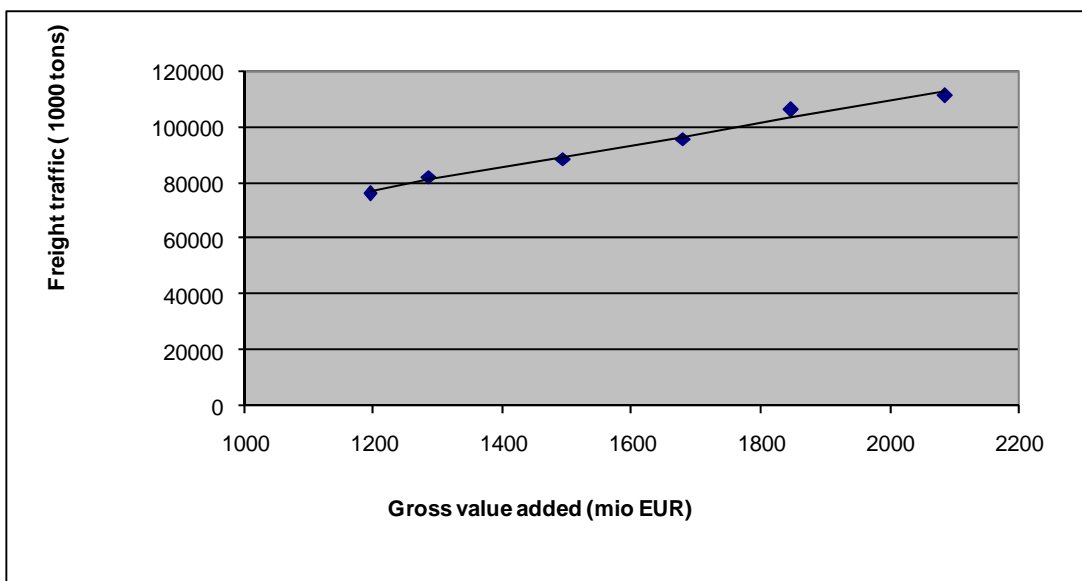
$$y = 39,82 \cdot x + 29.986 \qquad (4)$$

Figure 4. The correlation between freight traffic and gross value added of transport sector

The calculated coefficients indicate a rather strong connection of traffic with economic indicators. GDP has a strong correlation with the transferred passengers and goods. Gross value added indicates a strong correlation with the traffic growth. A chosen regression curve is a straight line that shows a connection of individual indicators with traffic growth. The line also confirms the regularity of the calculated determination and correlation coefficients.

4. Conclusion

Traffic is of key importance to modern economies, a fact that needs to be taken into account when planning decisions are made. Mobility is one of the most fundamental and important characteristics of economic activity as it satisfies the basic need of going from one location to the other, a need shared by passengers, freight and information.

All economies do not share the same level of mobility. Economies that possess greater mobility are often those with better opportunities to develop than those suffering from scarce mobility. Reduced mobility impedes development while greater mobility is a catalyst for development.

Traffic growth is rapidly increasing. Moreover, passenger transport has seen a rapid increase of private vehicles, whereas the use of public transportation is on the decline. With freight traffic being on the increase, the negative traffic situation is further deteriorating.

Traffic growth is strongly connected with economic growth. Taking GDP as a key factor for economic growth into account, the correlation in regards to the calculated coefficients and regression line seems very strong. At the same time, there is a strong link between traffic and BDP of the transport sector.

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