

## **Network Analysis of Commuting Flows in Poland. A Comparative Static Approach**

Commuting patterns have a fundamental role in understanding socio-economic systems. It is a habitual act of leaving one's home and travelling to work. It is an important spatial equilibrating mechanism in the labour market [1]. According to the closed-economy market model, commuting reduces disparities in regional labour market outcomes (e.g. unemployment rate and wage).

Over recent decades an increase in the number of commuters (i.e. people living in one municipality and working in others) has been observed. A moderate increase in the distance covered by these employees can be noticed as well. In recent years, more workers have been travelling from suburbs to city centres and between suburbs [3]. Concentration of economic activity in fewer locations is one of the reasons for commuting [4].

The main goal of this paper is to identify and analyse relations between poviats from the perspective of the labour market, especially commuting over the years. The research includes comparing the following aspects: topology of networks, structures of commuters and intensity of commuting. We compare graphs' topology for several years (using power law degree and basic characteristics of networks). The structure of commuters is described by a weighted directed graph. In consequence, we examine the difference between the structures of these graphs over the years using a permutation test. The intensity of commuting is explained by logistic regression.

Information in the commute matrix format was obtained from the POLTAX database, where data from the tax system is stored. The data came from PIT-11 / 8B and PIT-40 forms submitted by employers to tax offices in Poland (2005, 2010, 2015).

**keywords:** commuters, network analysis, permutation test, power law, logistic regression

### **References**

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