C.1. NON-TECHNICAL SUMMARY

One of the feature of many economic phenomena is the possibility to assign them to a specific geographical location. When collecting data on such phenomena, many times one can include in databases information about the place of their occurrence. Not always, however, economic analyses take into account both the fact of linking them to a specific location, as well – even being aware of such connection – the use of geolocation information already held. The results of such models, known as *a-spatial*, describe reality not always in a precise way. A milestone in the economic research was the introduction of the so-called *spatial models*, which allow to consider economic phenomena in the context of their occurrence in predefined regions, what requires the identification of the structure of the neighbourhood, which – in case of a permanent division into regions – remains constant during analysis.

This allows to identify and take into account the possible effects of the influence of neighbouring regions on the phenomenon in the other regions, the spread of economic phenomena between spatial units or the existence of the larger areas with similar level of examined variable (i.e. agglomeration areas), or to identify areas with extremely different values of tested variables (called *hot spots*). Predetermined constant neighbourhood structure works relatively well in case of phenomena of regional character (e.g. macroeconomic ones), but the problem arose in the analysis of phenomena which could be attributed to a precise spot location (usually microeconomic "events"). Examples of such phenomena might be the location of companies or the prices of a given real estate property (and many others).

Previously developed types of spatial models do not fully worked well for such cases. One of the reasons is that the emergence of new data (e.g. a new company, a new real estate transaction) significantly affects the structure of the neighbourhood, i.e. the relationship between (close) observations. Taking into account a new structure is inconvenient, and may cause the worse or even opposite results, mainly because of instable structure and dependence of neighbours in the phenomena examined.

The purpose of the proposed project is to develop the method for the identification of such "space division", which – independently from the occurrence of any new observation – would describe as precisely as possible the structure of the neighbourhood and the links between the location of examined phenomenon. At the same time this structure would be stable, and therefore would allow for including it to the already known spatial models. Due to the fact that for the microeconomic data, we have usually only a small sample of the whole population, the results of the models, and thus conclusions about the spatial effects of examined phenomenon, can be very dependent on the available sample data. Hence, another objective of the project is to develop a method that will allow to get the stable results for population not only for a sample. Obtaining the distribution of many possible results for the analysis, enables selecting those which are most likely (also indicating the possible range of results for a given level of confidence, i.e. with the maximum accepted by a researcher error).

The two indicated above objectives of the project will be implemented using (already known in statistical or econometric research) bootstrapping method, the method of the re-sampling of new subsamples with replacement from the date already possessed. The novelty the project brings, is the use of the proposed method to the design of adequate spatial models. On the basis of a number of randomly selected "new" samples the most probable structure of the neighbourhood for the entire population will be chosen. It will be also possible to identify the most probable, i.e. the most corresponding to the reality, spatial effects, which include the identification and describing characteristics of the area in the context of examined phenomenon and possible impacts of the events in the neighbouring locations. All of this allows for better forecasting of microeconomic point spatial phenomena in the future.

In practice, the above mentioned works will be realized on the basis of already owned database containing the information about the location of companies and real estate transaction price data. These data are geo-located point data. Owned research sample allows to carry out the entire postulated process of finding the best structure of the neighbourhood, that is the links between close or more distant units, whether in relation to the location of companies or real estate transactions, and then to develop a model that would better describe the current state and forecast the future development of the location of companies or transaction prices on the real estate market in specific points in space. This will also allow, compared to the current methods of spatial analysis, for more precise identification of areas that are characterized by a greater flow from new companies or the lack thereof, and the reasons that promote clustering of companies with similar profile. In relation to the real estate market, the project should result in forming the models that will better distinguish the areas with the similar prices, and indication of the reasons responsible for this. Due to the fact that the data used in the research have the typical point nature, the developed methods and solutions can easily be transferred to the other analyses of phenomena with the similar characteristics.