

Spatial Analysis of Unemployment Rates in Germany: Explaining the Gap

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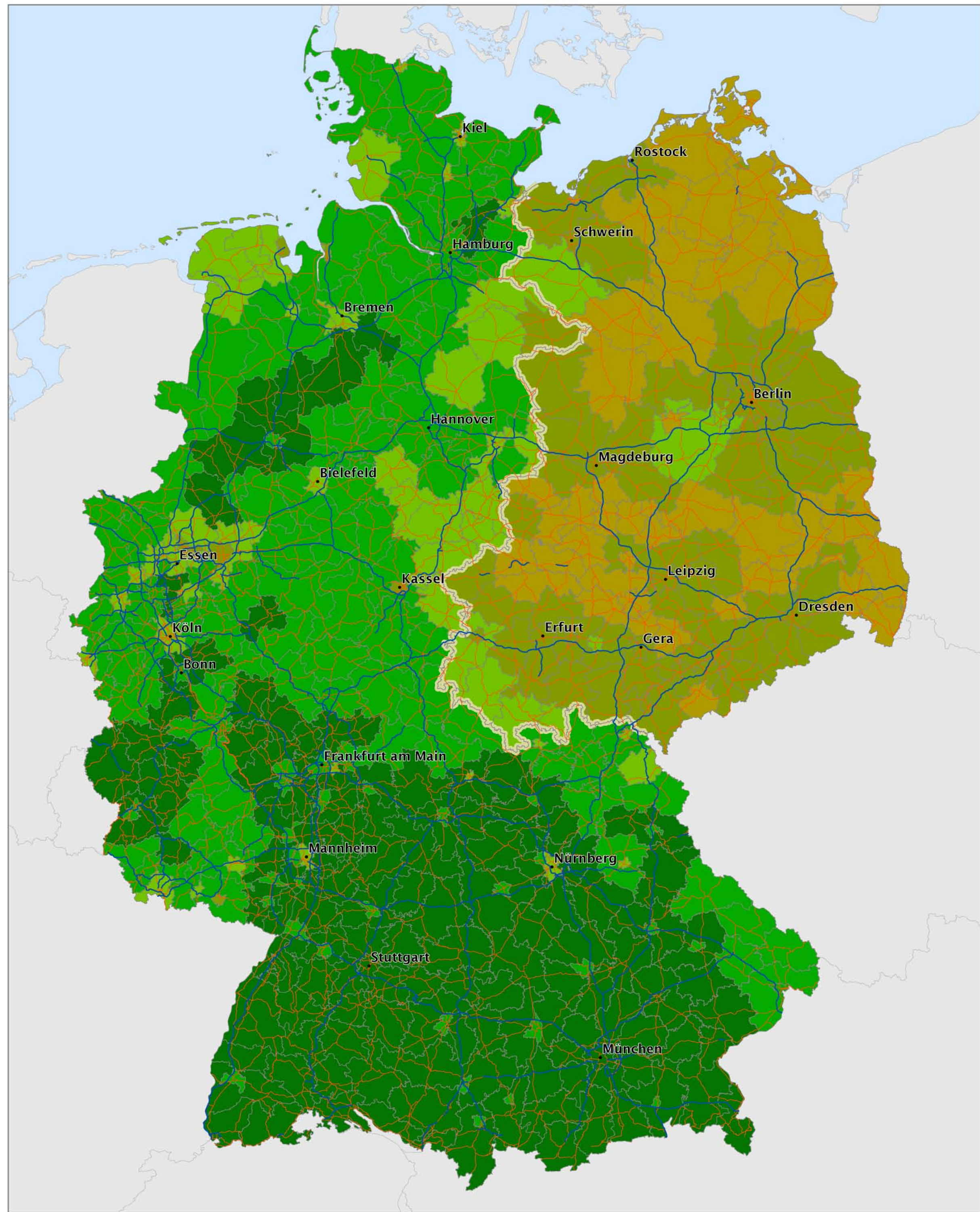
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Summary Spatial analysis of unemployment rates in Germany is presented on this poster. The goal of this analysis is to explain the stubbornly low labor productivity in former East Germany using economically sound models. The case of Germany is particularly interesting because of the sharp break in unemployment rates at the former East-West border. The proposed spatial economic models model the effect of the individual skills, counties infrastructure and individuals commuting behavior on labor. They also allow for correlation, in unemployment rates, between neighboring counties. Preliminary results of these fitted models for Germany are presented below. The process for generating the parameters used in the spatial economic models is also presented.

Actual Mean Unemployment Rate

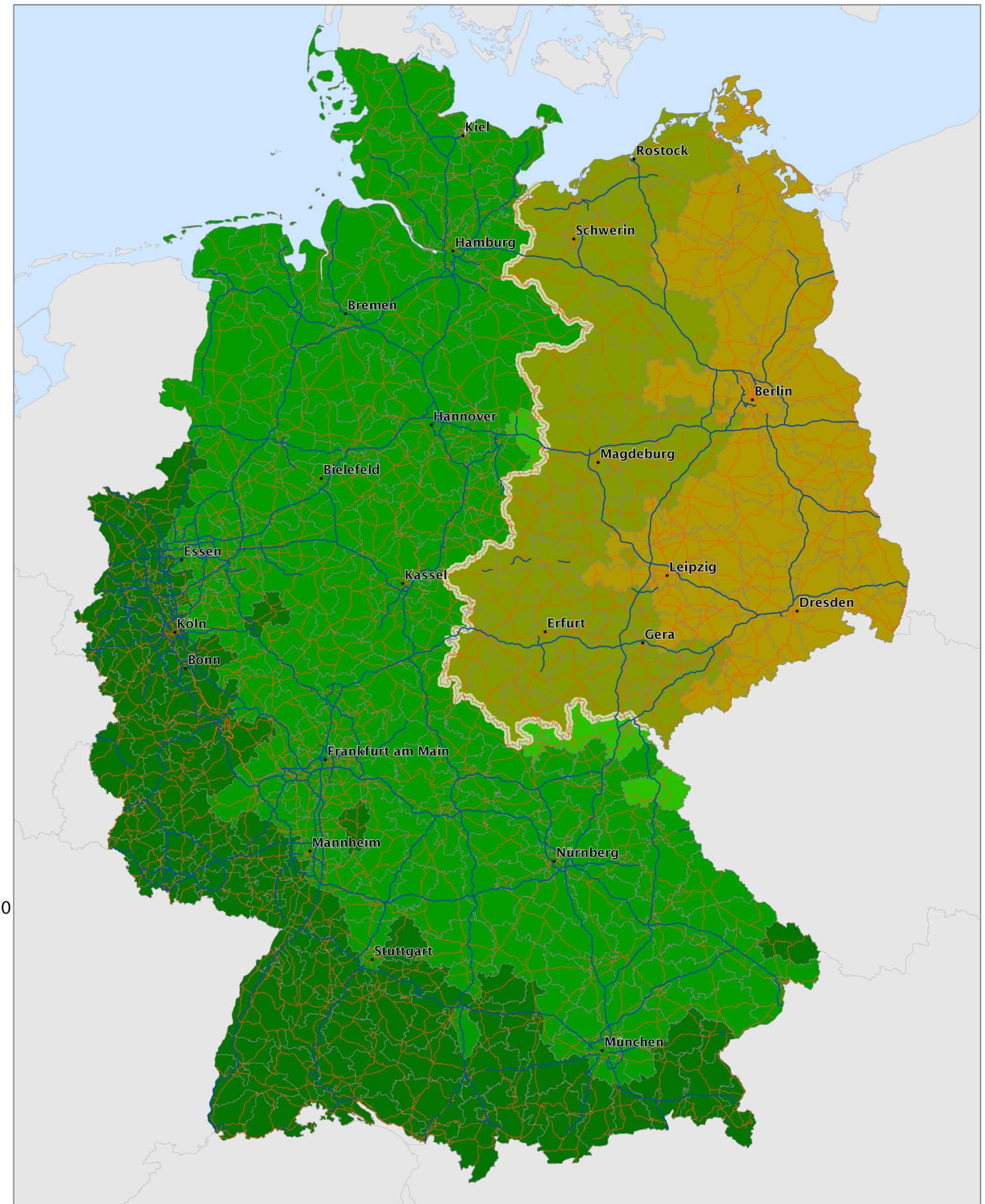
1998 - 2004 Data by Kreis

Source: Institut für Arbeitsmarkt und Berufsforschung (IAB)



Simulated Mean Unemployment Rate

Preliminary Data by Kreis



LEGEND

Map Features

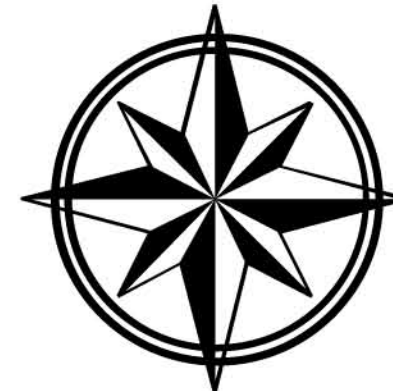
- Major Cities
- Autobahns
- Bundesstrassen
- Former Border
- Kreis Boundaries

Unemployment Rate

- 4.0 to 8.0
- 8.0 to 11.5
- 11.5 to 15.5
- 15.5 to 20.6
- 20.6 to 27.5

0 100 200

Kilometers



Geographic Data Development Service Component

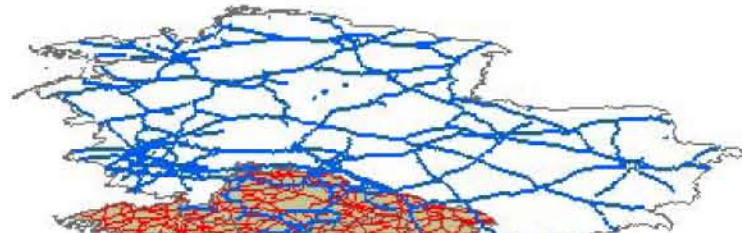
Performed by the Center for Geographic Analysis

Poster Author: Anders N. Hopperstead, GIS Specialist

Step 1 - Develop Network Dataset

A Network Dataset is an ESRI term used to describe a collection of topologically connected network elements (edges, junctions and turns) that are derived from network sources. They are typically used to represent a linear network, such as a road or subway system. In this project, the Network Dataset represents the road network of Germany built from a layer of Autobahns (limited-access highways) and a layer of Bundesstrassen (high capacity national roads).

Autobahns



Bundesstrassen



Data Source: GFK MACON, 2002

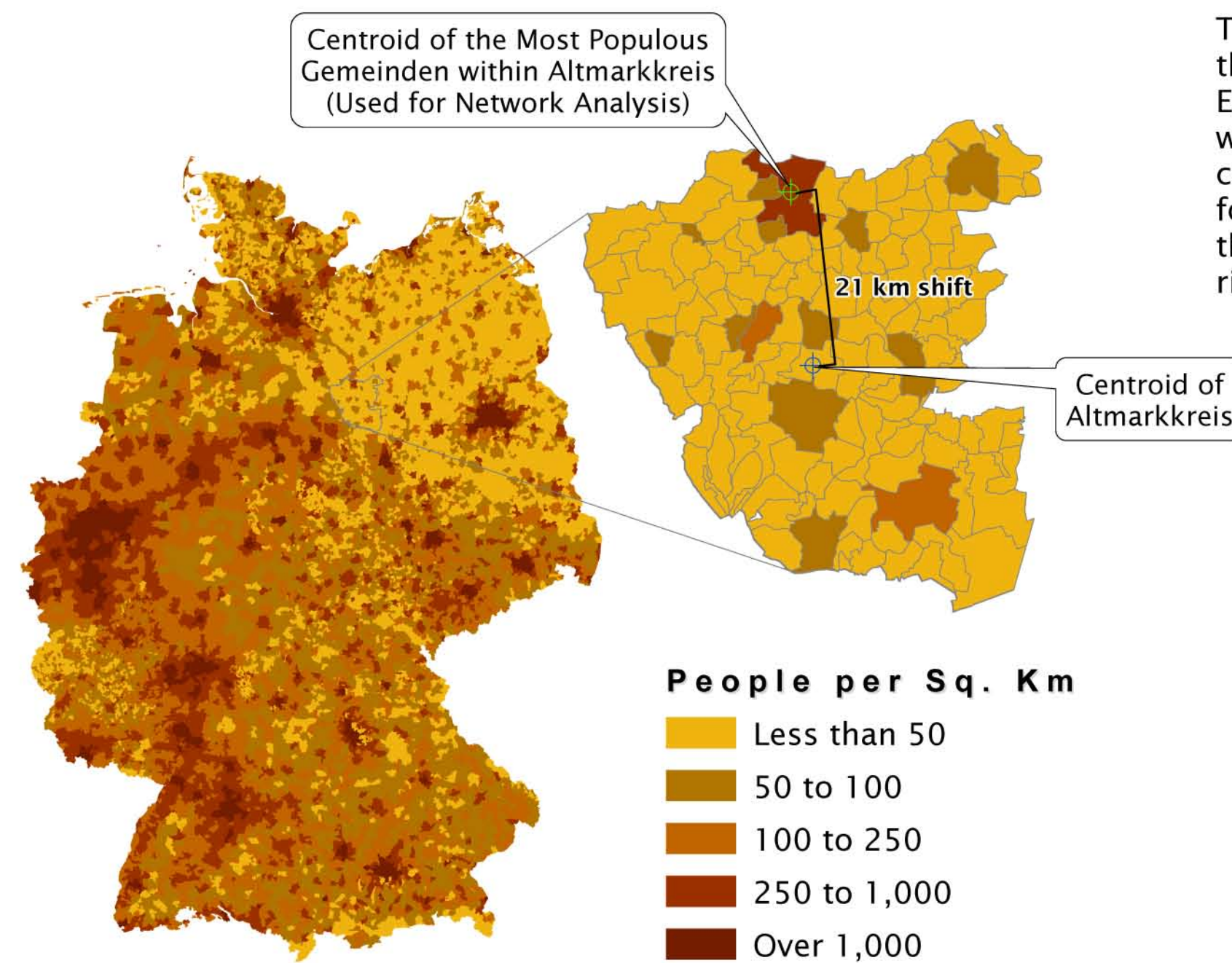
Speed Assumptions: Autobahn 100 km/h
Bundesstrassen 60 km/h

Step 2 - Generate a Kreis Point Layer

Network Analysis requires point features to function as origins and destinations. The simplest approach to developing a point feature layer representing Kreis would be to use the centroid of each Kreis. This option is sub-optimal because the research project is focused on human settlement and employment patterns, and the centroid, or geographic center, of a Kreis has no implicit particular relevance to where people live or work.

A better geographical approximation is the centroid of the most populous Gemeinden, or municipality, within each Kreis. Although the centroid may not correspond precisely to the most concentrated area of settlement, the smaller size of Gemeinden polygons increases the probability that the centroid will correspond to the most dense areas of human settlement, and consequently, the greatest proportion of the Kreis population.

The map to the right illustrates an example of how this process identified more appropriate points for the network analysis.



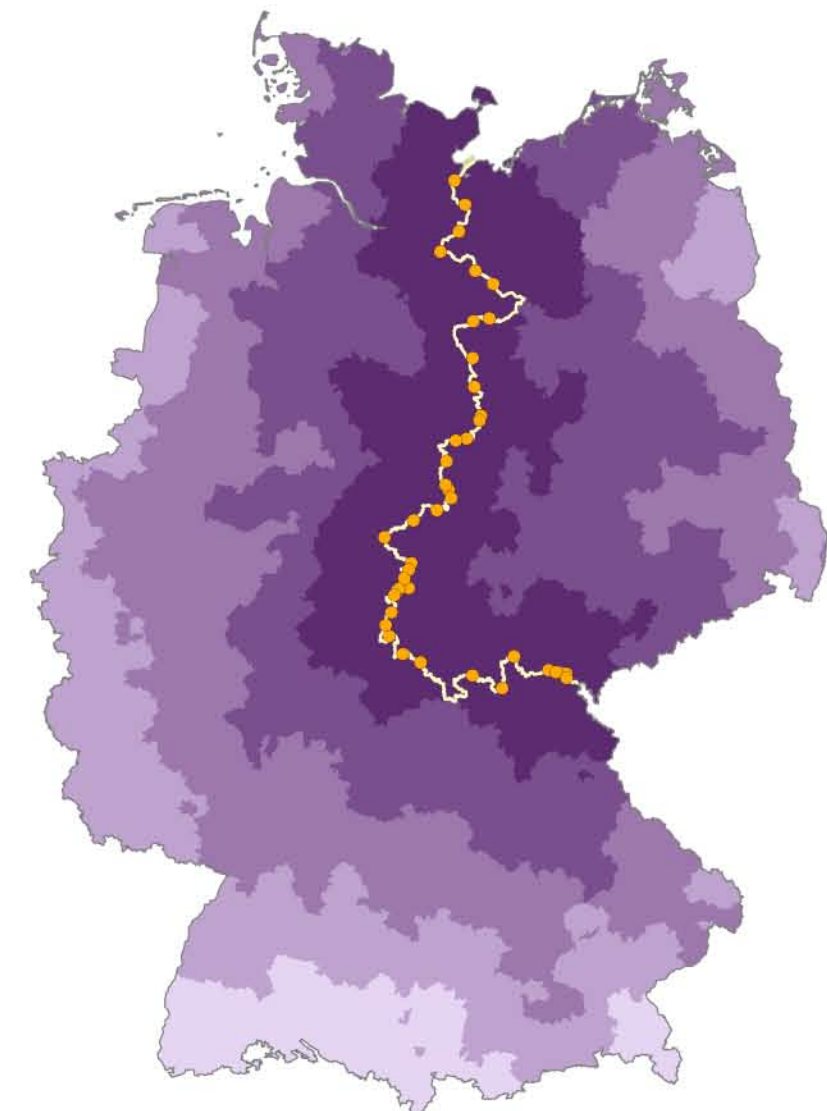
People per Sq. Km

- Less than 50
- 50 to 100
- 100 to 250
- 250 to 1,000
- Over 1,000

Step 3 - Create an Origin-Destination Cost Matrix

The Network Analysis extension contains an OD CostMatrix function that will generate a matrix of minimum cost network paths between multiple origins and destinations. The cost, or impedance, can be distance, time or any other factor of network travel. To permit multiple analysis scenarios, origin-destination cost matrices for both time and distance were generated.

Driving Time to Former Border



Step 4 - Calculate Distance to the Former Border

The OD Cost Matrix function was used again to determine the minimum cost network paths to the former border between East and West Germany. 41 intersections with the former border were identified and loaded as destination points. The minimum cost time and distance path to each of these points was calculated for all 439 Kreis. The resulting matrices were queried to identify the minimum time and distance to the former border. The map at right displays the results of this analysis.

Legend for Drive Time Maps

Estimated Drive Time by Kreis

- Less than 1 hour
- 1 to 2 hours
- 2 to 3 hours
- 3 to 4 hours
- Over 4 hours

Former Border Intersections

Origin Kreis Shaded Using the Same Classification as the Unemployment Rate Maps

0 200 400
Kilometers

Sample Comparison of Drive Time Network Analysis Results

Origin: Haßberge
Actual UR: 7.6%

Origin: Rhön-Grabfeld
Actual UR: 9.5%

Origin: Schmalkalden-Meiningen
Actual UR: 15.2%

Origin: Unstrut-Hainich-Kreis
Actual UR: 17.7%

Origin: Kyffhäuserkreis
Actual UR: 23.8%

