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Measuring economic diversity in rural areas

Knowledge Transfer Accelerator | 5th activity

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Part 1: What is economic resilience? Insights from the literature

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ECONOMIC RESILIENCE

A regional and evolutionary perspective

General definition

a region's capacity to withstand and recover from economic shocks, such as natural disasters, market fluctuations, demographic decline or policy changes

Key aspects

- Conceptual fuzziness
- Dynamic nature
- Contextualised idea

ECONOMIC RESILIENCE

Contested assumptions

- Type of stressors
- Nature of stressors
- Exposed systems
- Responses

ECONOMIC RESILIENCE IN RURAL AREAS

Unique challenges in rural areas…

- Outmigration of young people
- Declining agricultural markets
- Climate Change
- Deficient infrastructures

… call for adaptive policy responses:

- Innovation systems
- Inclusivity
- Local communities are key

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Part 2: Rural Business Resilience: measuring economic diversity in rural areas

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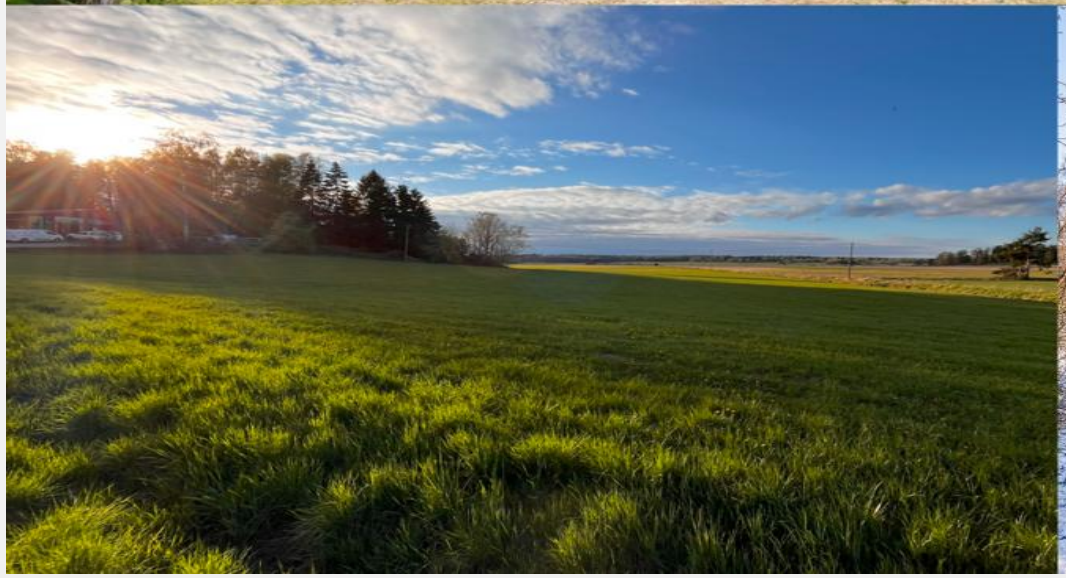
ECONOMIC DIVERSIFICATION IS KEY

Why diversification matters for economic resilience?

- Risk reduction
- Employment stability
- Access to markets
- Local innovation
- Community development
- Social equity

WELCOME TO VALLENTUNA MUNICIPALITY, SWEDEN

Pop 34 119 (10.44 hab/km2)



ICA
KVANTUM

SLUSH
ГОВАК

DIVERSITY VS REDUNDANCY

A functional perspective on economic resilience

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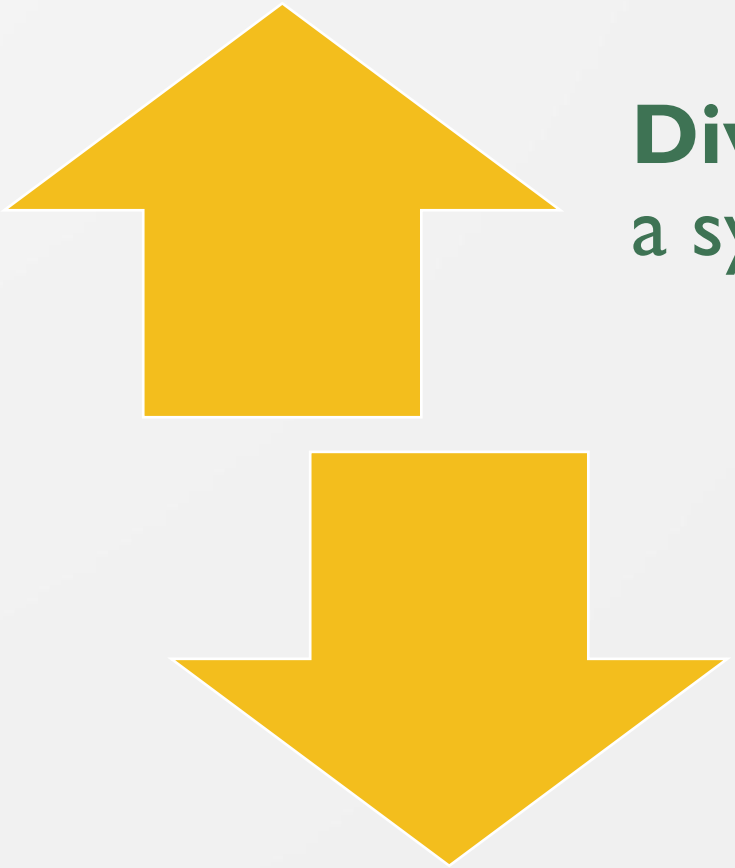

Diversity – boosts general resilience at a system level (e.g. an economy)

VS

Redundancy – boosts resilience of specific system components (e.g. particular services)

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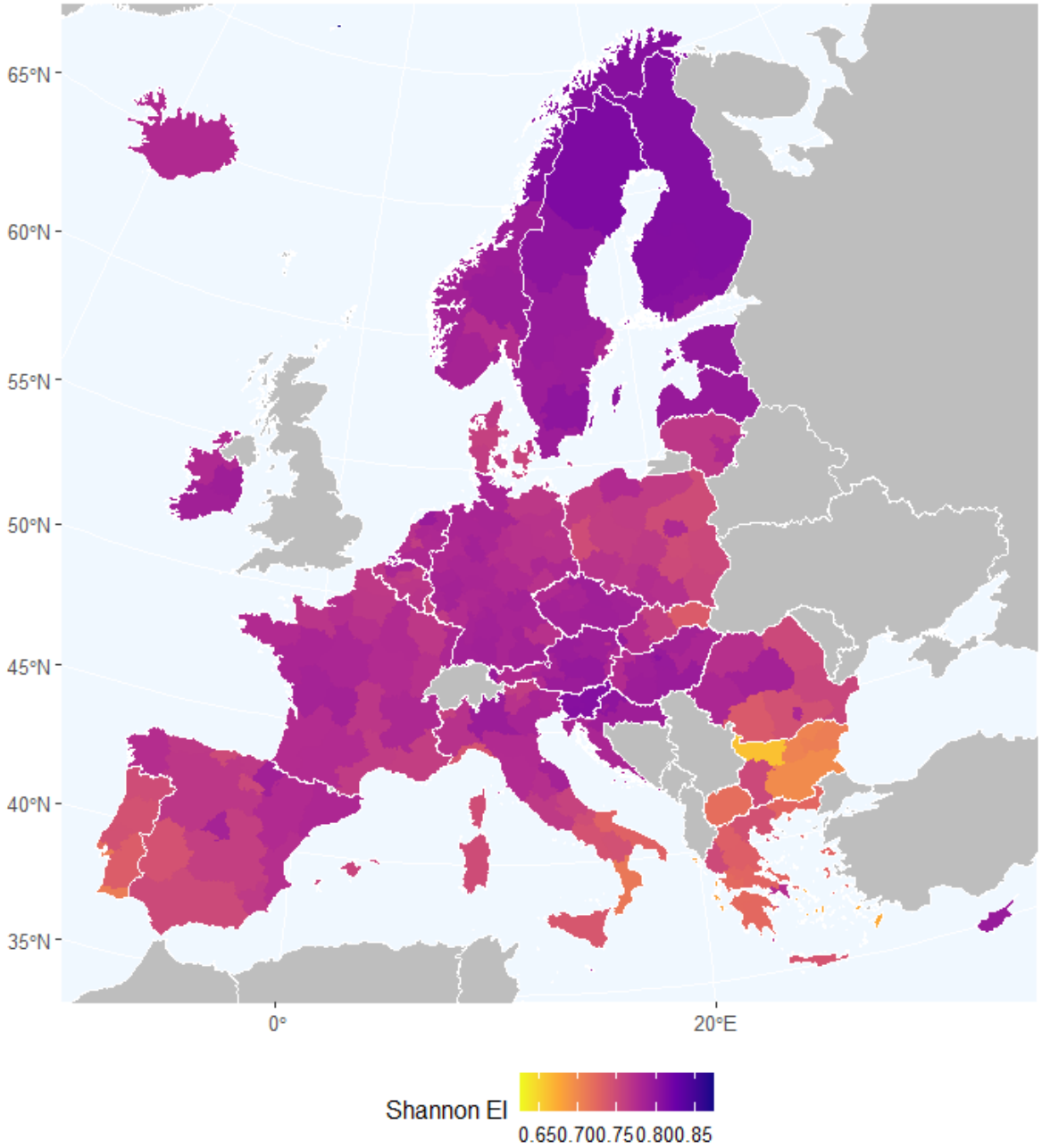
Shannon Equitability Index (NACE Rev. 2 Lev. 2, 2022)

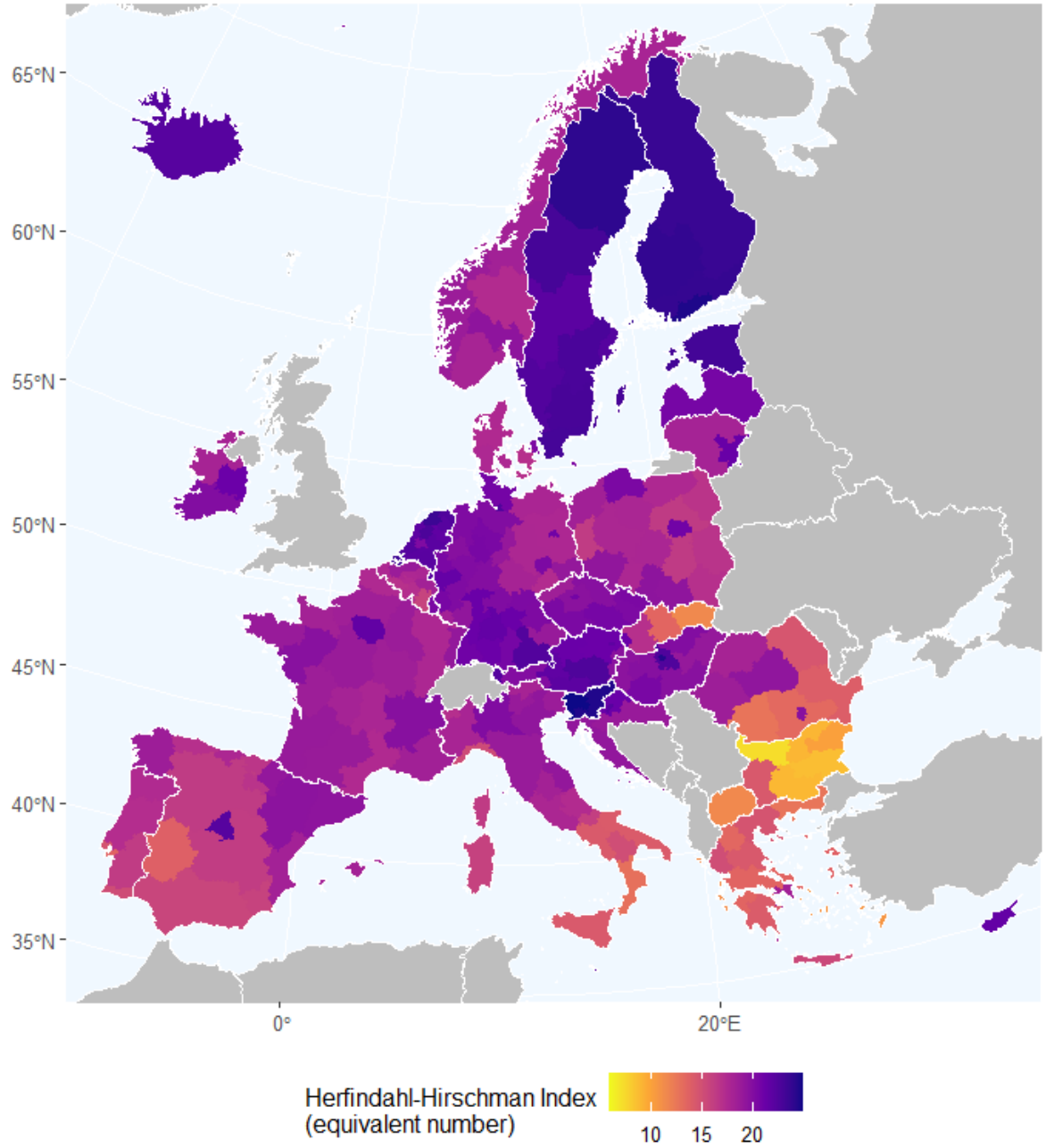
Structural Business Statistics (Local units - number)



Source: Own based on Eurostat data (sbs_r_nuts2021)

Herfindahl-Hirschman Index (NACE NACE Rev. 2 Lev. 2, 2022)

Structural Business Statistics (Local units - number)



Source: Own based on Eurostat data (sbs_r_nuts2021)

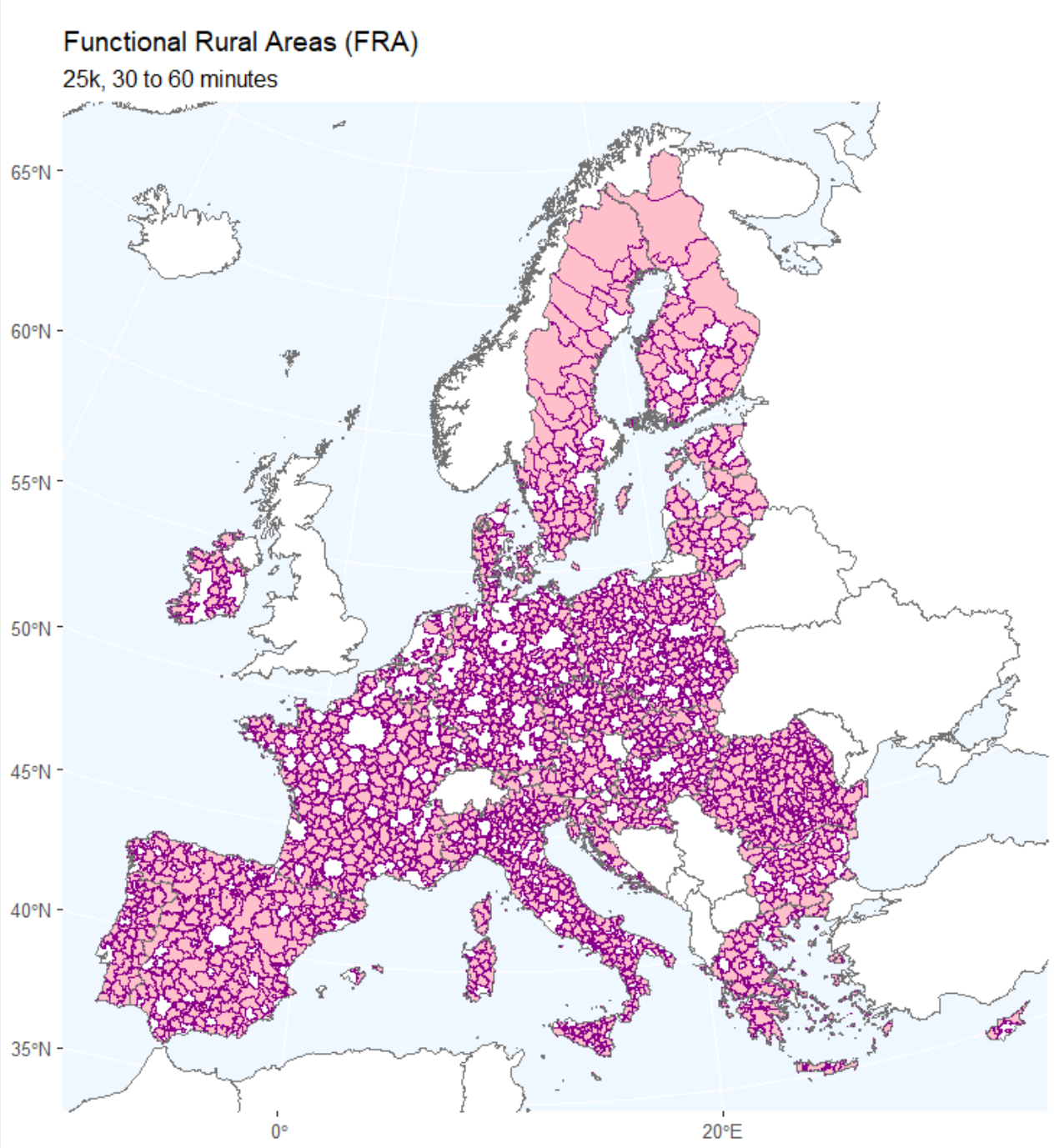
MEASURING ECONOMIC DIVERSIFICATION

Functional Rural Areas (FRA)

- Reflect functional rural systems
- Cover all territory **outside functional urban areas**

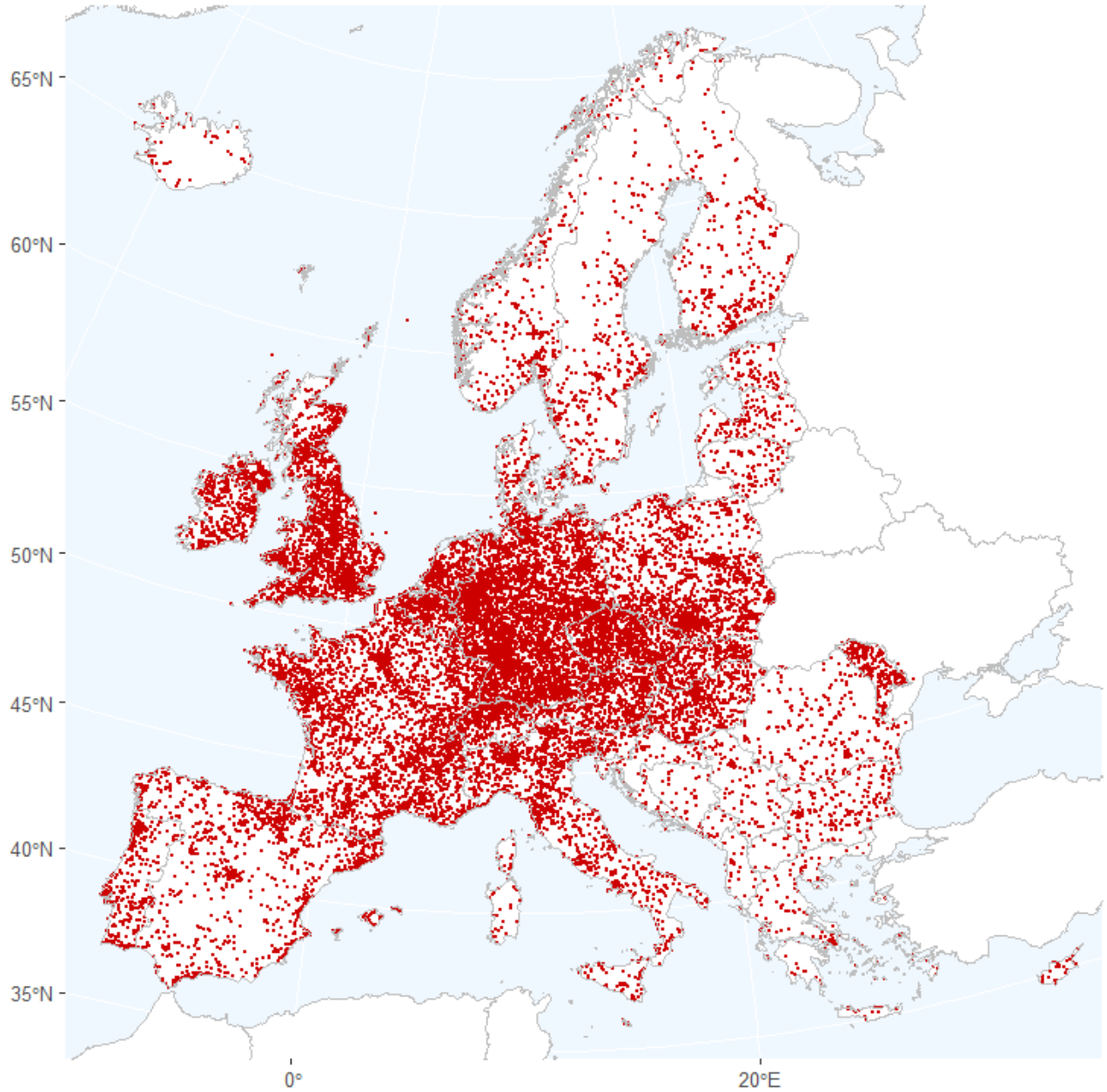
Each FRA:

- Contains at least one village or town
- Has at least 25,000 inhabitants
- FRAs less than 30 min. apart are combined



OSM POIs with potential economic relevance (2025)

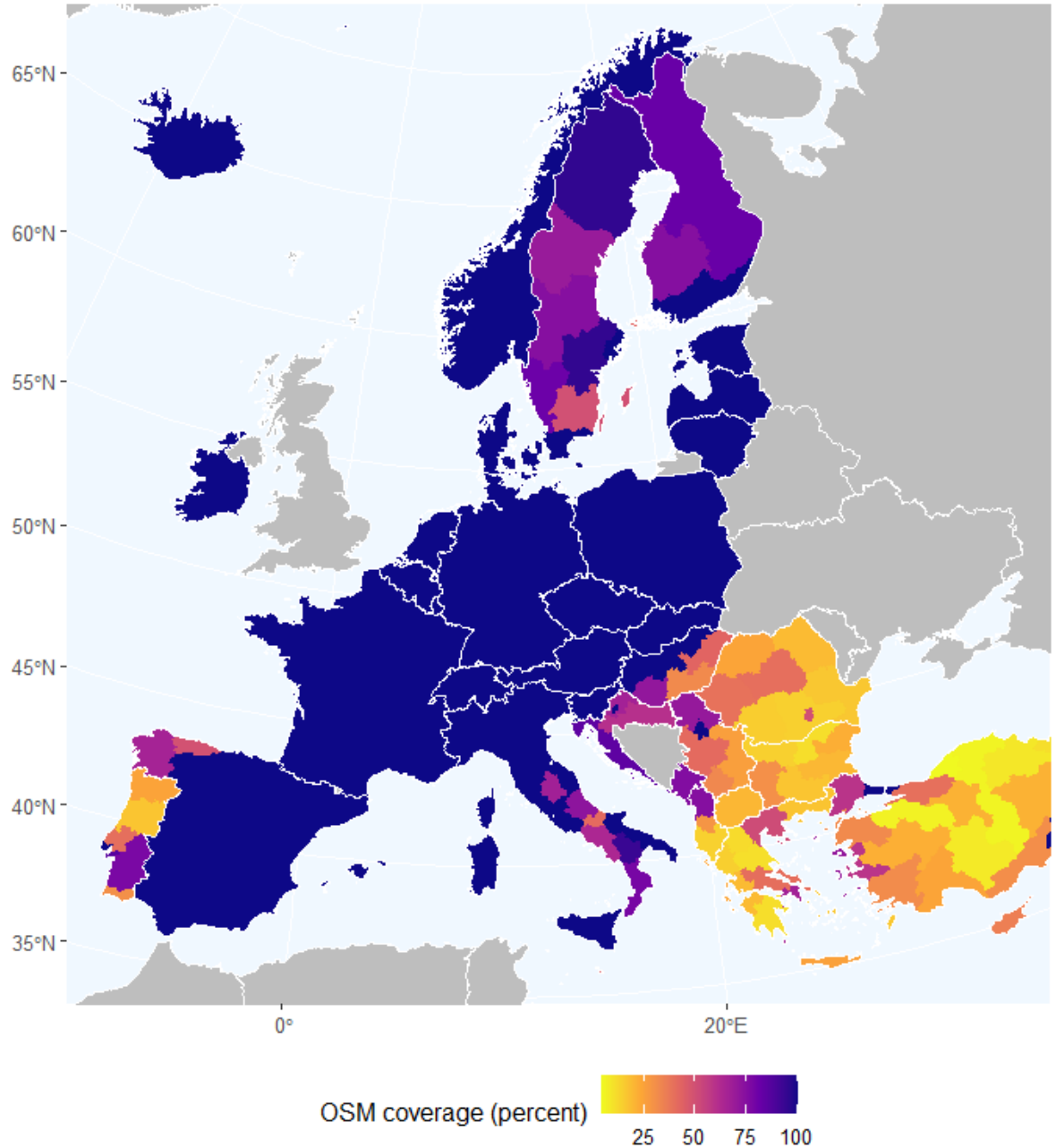
33 072 546 points (30 000 shown on map); 17 unique OSM keys; 12 411 unique OSM values



Source: OpenStreetMap

OSM coverage at NUTS-2 level relative to alternative services

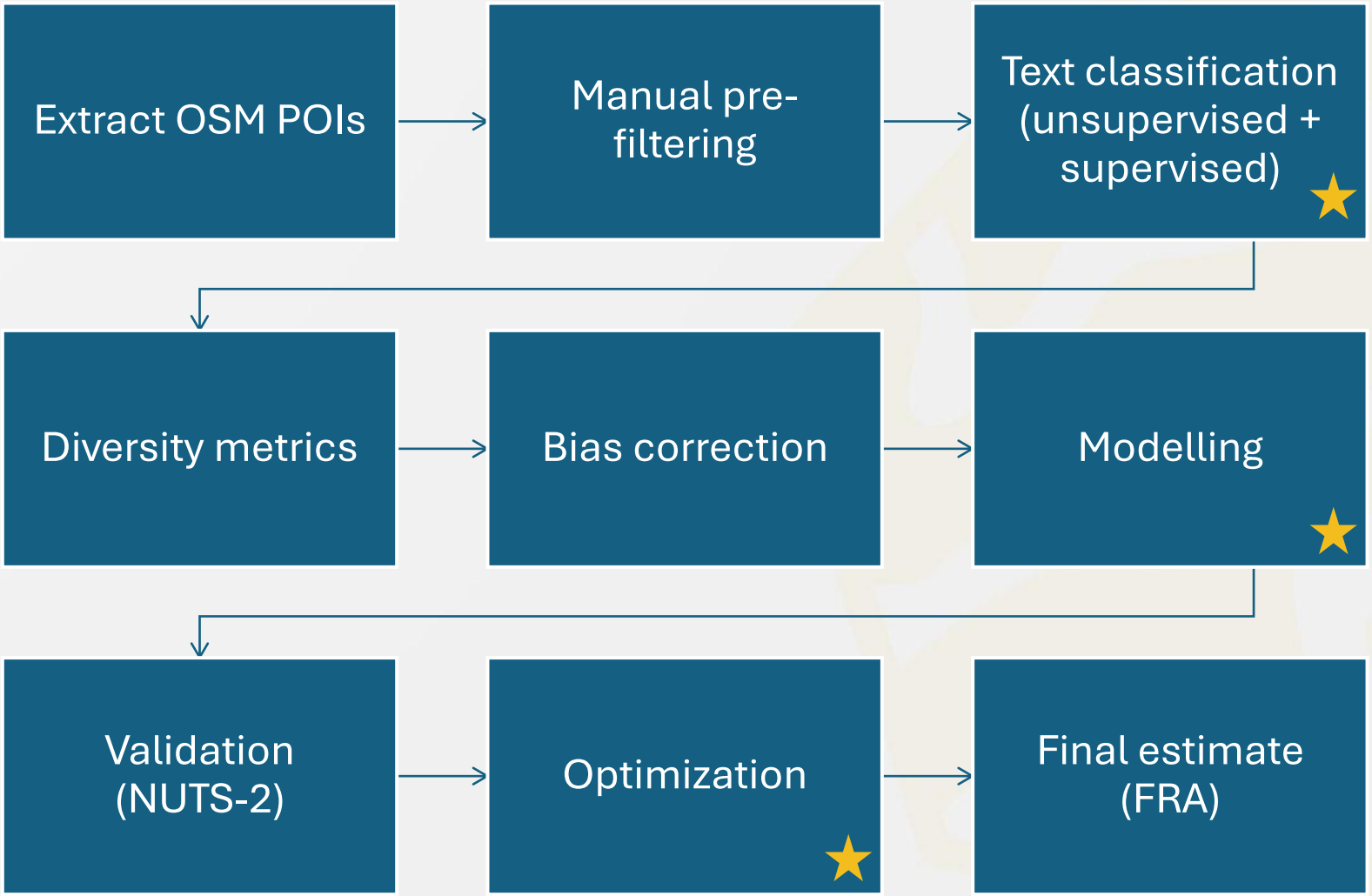
Alternative sources include Microsoft, Esri and Google mapping platforms



Source: Own based on Overture Maps data

MEASURING ECONOMIC DIVERSIFICATION

Methodology



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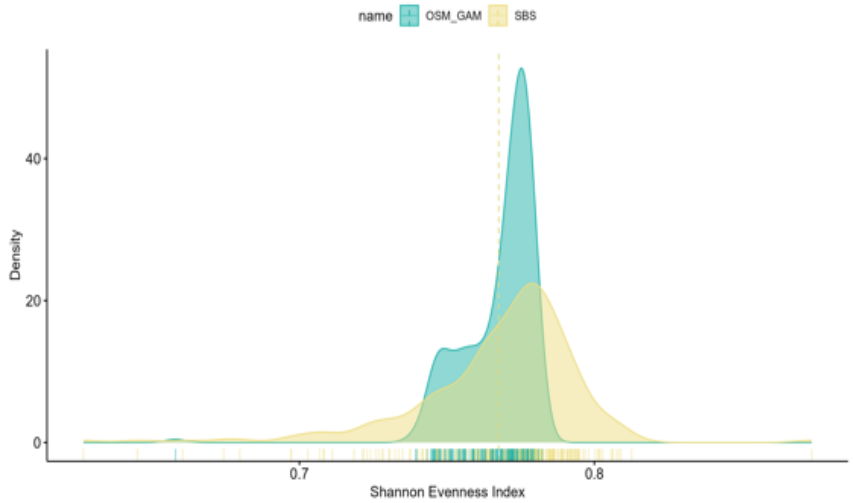
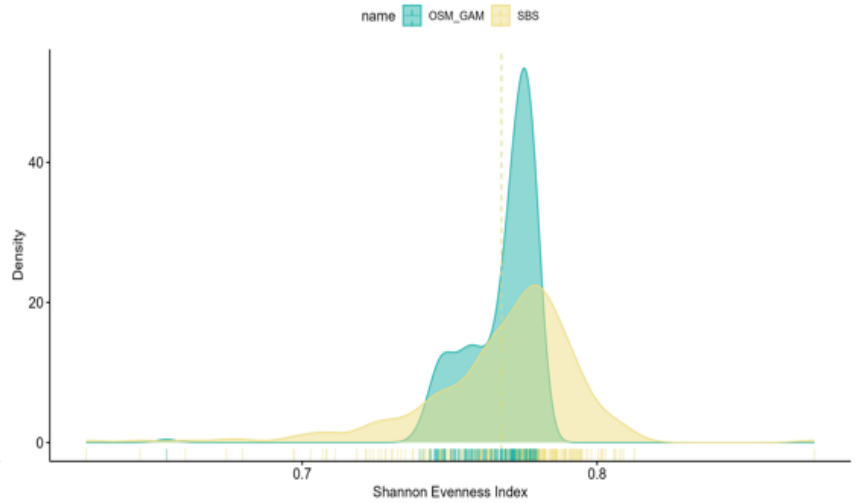
Observed vs GSM predicted: NLP model: gemma2. OSM keys: shop, craft

K-S test: D=0.344, p-value=0e+00. Error Var: 0.001, SD: 0.033



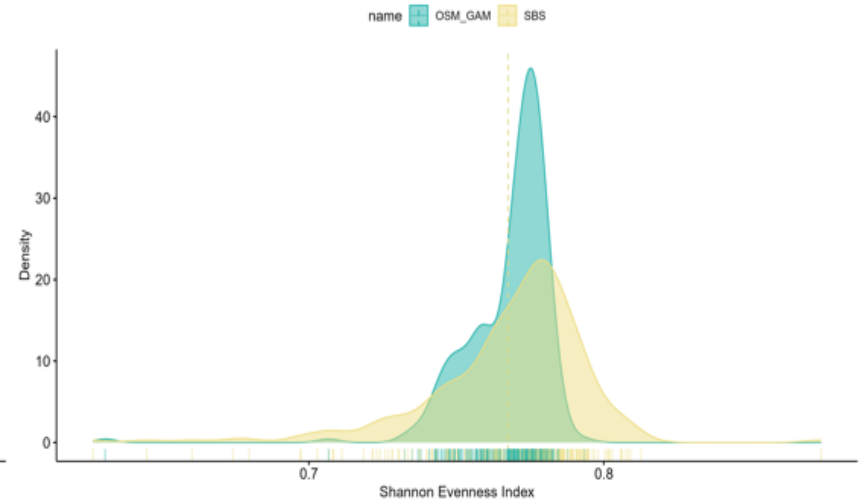
Observed vs GSM predicted: NLP model: gemma2. OSM keys: shop, office, craft

K-S test: D=0.356, p-value=0e+00. Error Var: 0.001, SD: 0.033

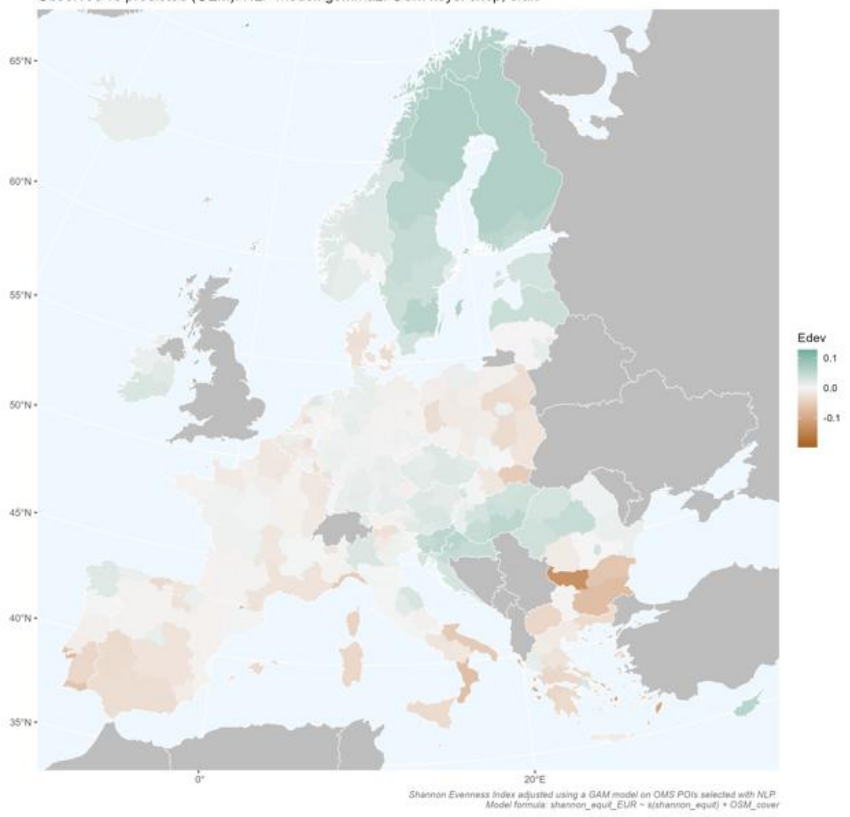


Observed vs GSM predicted: NLP model: gemma2. OSM keys: shop, office, craft, healthcare, military

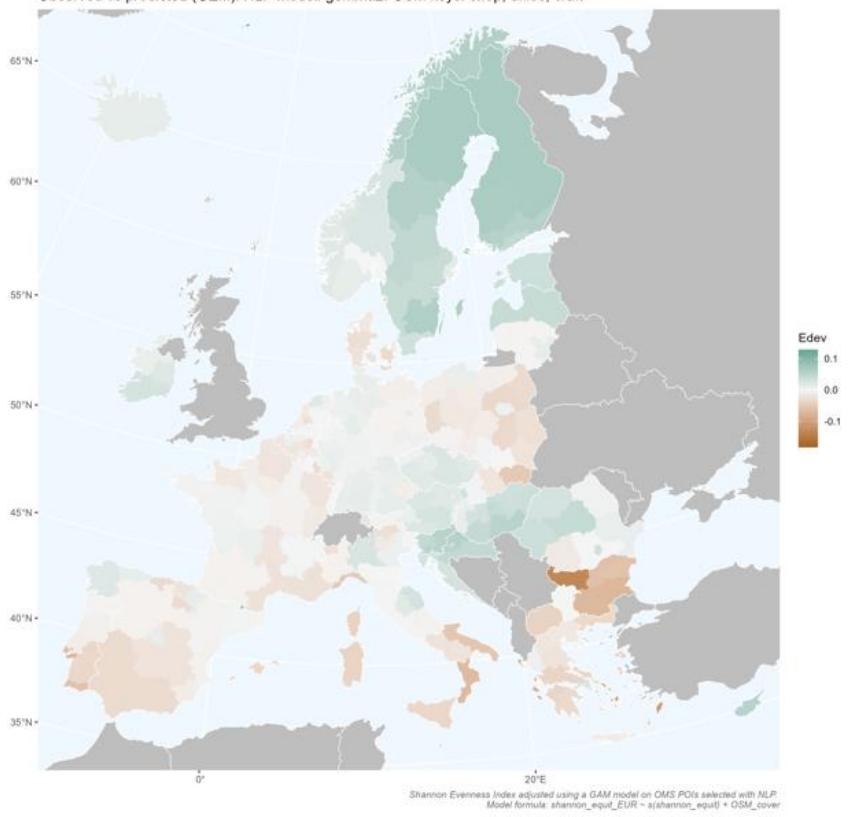
K-S test: D=0.267, p-value=0e+00. Error Var: 0.001, SD: 0.031



Observed vs predicted (GEM): NLP model: gemma2. OSM keys: shop, craft



Observed vs predicted (GEM): NLP model: gemma2. OSM keys: shop, office, craft



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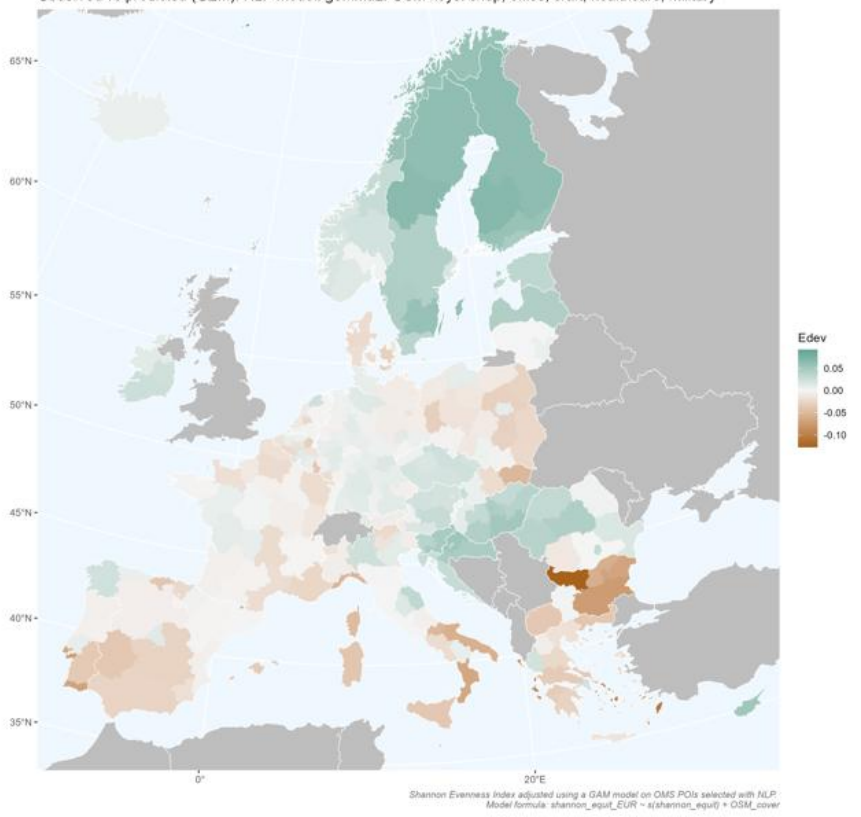
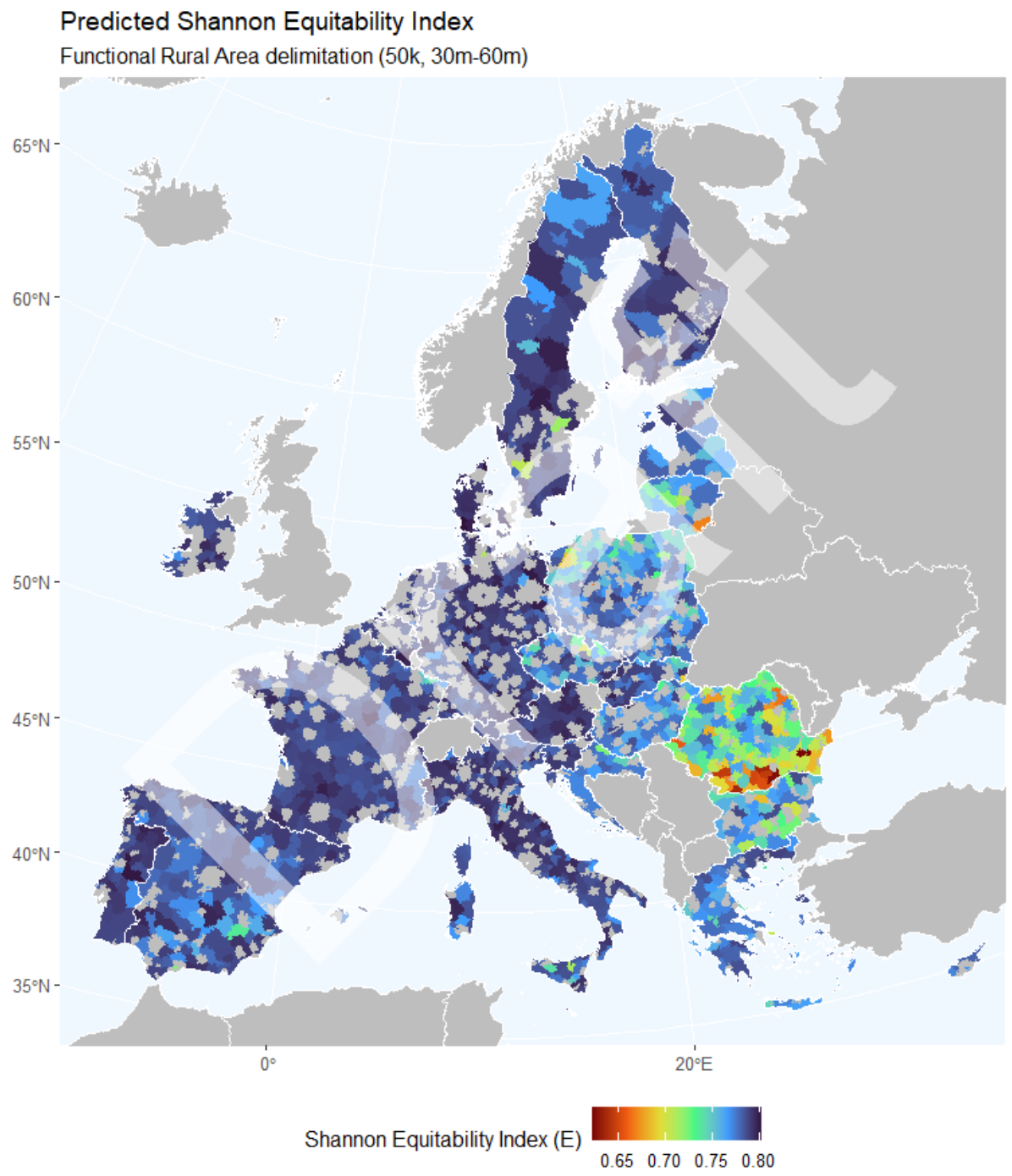


ECONOMIC RESILIENCE IN RURAL AREAS

Take aways

- Diversification is key for economic resilience
- Redundancy is also important
- Data limitations prevent a functional perspective
- OSM data is a precious resource
- ML and AI are very useful to classify text
- Preliminary results are promising



Source: Own calculations based on OSM data

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