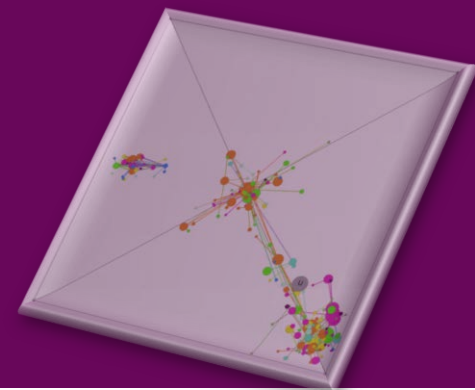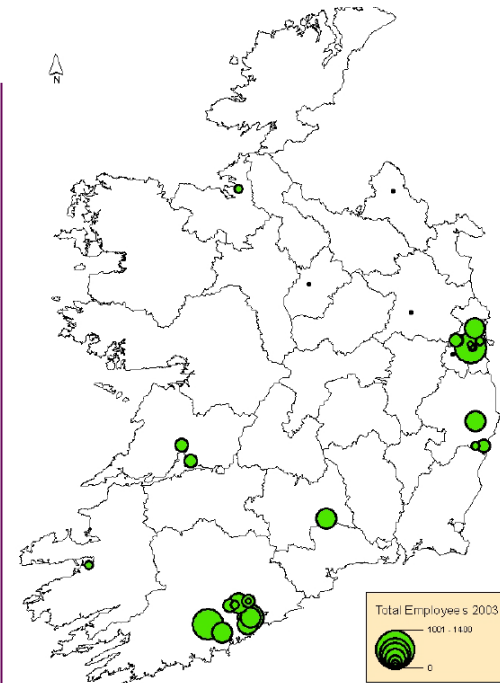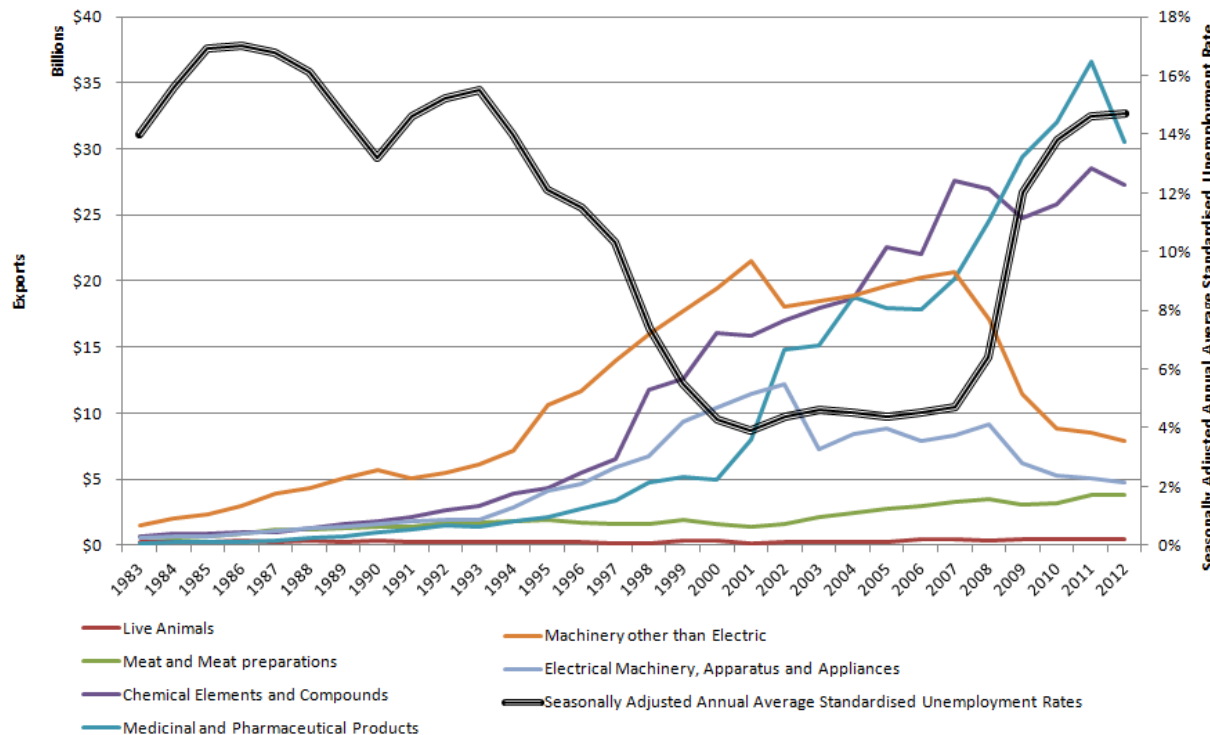# Building a Model of the Industry Space & Skill Space of Ireland

Eoghan Staunton, Petri Piiroinen, SrinivasRaghavendra, Jim Duggan

Our aim is to model and analyse uneven spatial economic dynamics using an agent-based simulation environment composed of multiple overlapping networks across space and time.

Unemployment v Exports

- Live Animals
- Meat and Meat preparations
- Chemical Elements and Compounds
- Medicinal and Pharmaceutical Products
- Machinery other than Electric
- Electrical Machinery, Apparatus and Appliances
- Seasonally Adjusted Annual Average Standardised Unemployment Rates
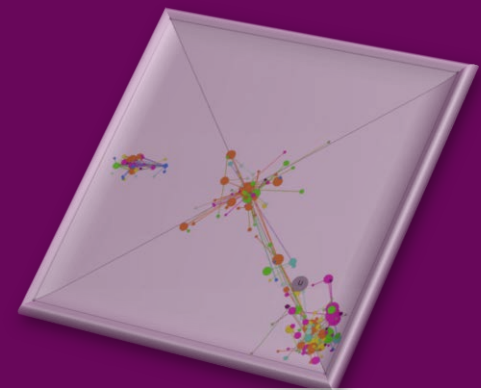

Total Employees 2003
1001 - 1400
0

NUI Galway
OÉ Gaillimh

Building a Model of the Industry Space & Skill Space of Ireland

Eoghan Staunton, Petri Piiroinen, SrinivasRaghavendra, Jim Duggan

- Industry Space - Spatial network representing firms in various industries.
- Skill Space - Spatial network representing universities with different graduate outputs.

- Firms grow due to growth in World GDP, agglomeration externalities & skilled labour:

$$n_t = Y_t H_t K_t n_{t-1}\left(1 - \frac{n_{t-1}}{N}\right).$$

Industry Space Network Generation

1. New node position is a random variable in the unit square.
2. Our new node, f, connects with each existing node, g, with probability

$$P(f,g) = \beta \ln(\hat{n}(g)+1)e^{-\alpha_1 d_T(f,g)}e^{-\alpha_2 d_P(f,g)}.$$

3. Our new node survives if and only if it forms a connection with at least one existing node.
4. Every m timesteps we allow connections to form between any pair of existing nodes.
5. We repeat this process until the desired number of nodes is reached.

NUI Galway
OÉ Gaillimh