PHOENIX INDUSTRIES OR CURSED LEGACIES?

The Changing Geography of Advanced Manufacturing in Britain

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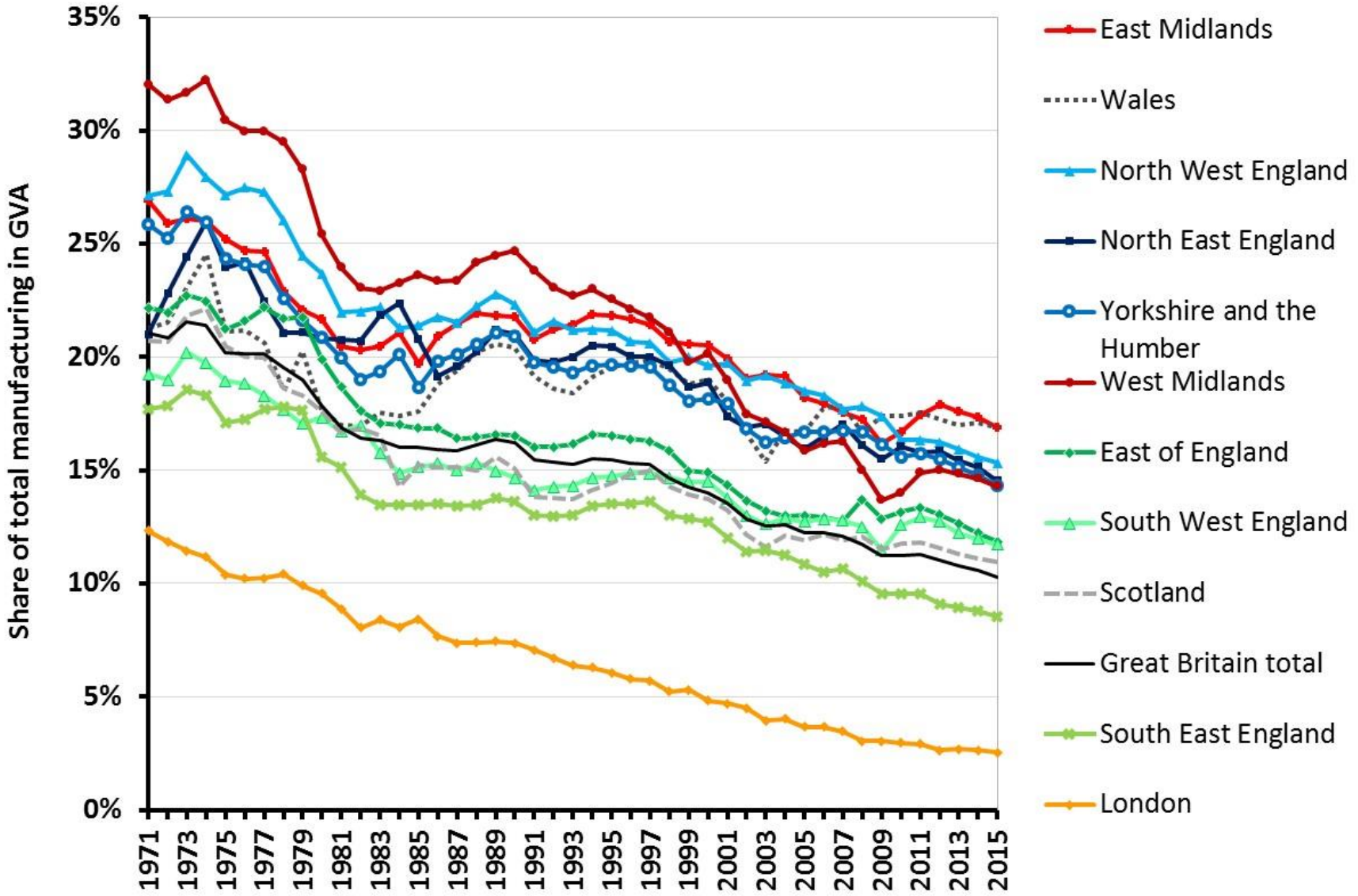
Outline

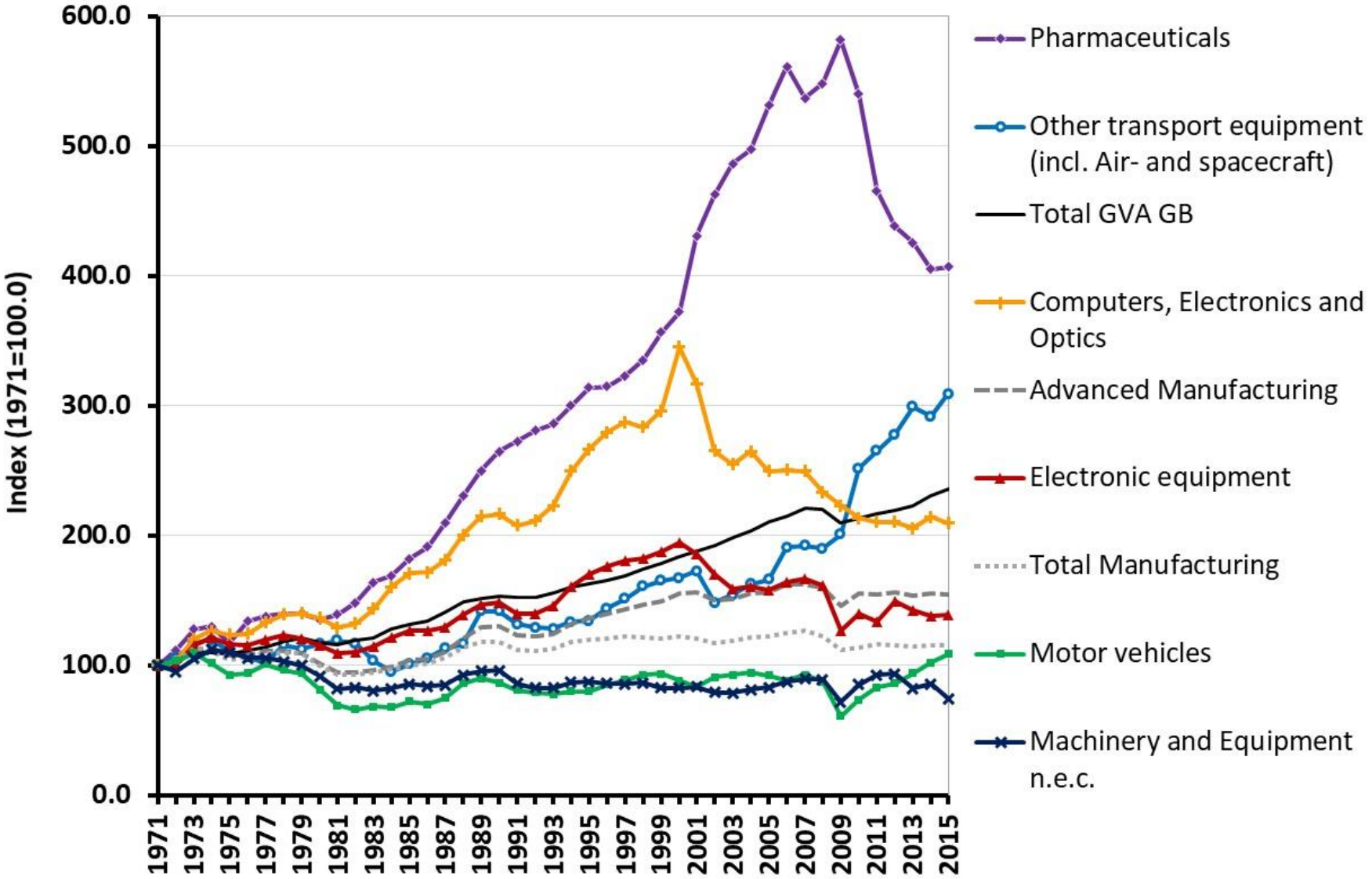
1. Context and research project
2. The changing geography of advanced manufacturing in Britain:
   - Patterns of concentration or dispersal?
   - ‘Renaissance’ in (traditional) industrial regions?
3. Overall conclusions and future work

Context and Research Project

Deindustrialisation in terms of output across regions in Britain



Development of output in different Advanced Manufacturing industries in Britain 1971-2015



Policy context

- Political concern to ‘rebalance’ economy both sectorally and spatially.
- Is rebalancing possible through (place-specific and place-based) support of advanced manufacturing, and if so how exactly?
- Cluster potential, opportunities for ‘reshoring’ – ‘Phoenix’ industries, servitisation, ‘Industry 4.0’.
- But – eroded supply chains, Brexit uncertainties, skills shortages.

“Manufacturing Renaissance in Industrial Regions?”-project

- Overall objective – investigate the evolution of advanced manufacturing across Britain, to develop better and more complete evidence-base for policy.
- Understand differential performance of advanced manufacturing industries across Britain.
- Do Traditional Industrial Regions provide a conducive context for advanced manufacturing to flourish?
- Role of clustering, horizontal and cross-sectoral agglomeration economies, and localised/regionalised ‘ecosystems’?
- What’s the potential for sectoral and spatial re-balancing?

www.southampton.ac.uk/geography/research/projects/manufacturing-renaissance-in-industrial-regions.page

Research Design and Data

1. NUTS2 level-data for a number of sectors for 1971-2015; and LAD-level data for more detailed sectoral breakdown for 1991-2015
2. Micro-data source: Annual Respondents Database manufacturing firms 1973-2016
3. Online survey of firms in four industries (aerospace, pharmaceuticals, electronics / electrical equipment, and motor vehicles)
4. Interviews and focus groups in four industrial regions

Debates on Concentration (1)

- Some theory foresees **increasing concentration** of advanced manufacturing:
  - New Economic Geography predicts concentration to realise local externalities with falling transport costs (up to a certain level) (Krugman, 1993; Brülhart, 2001).
  - In knowledge-intensive industries, local spill-overs and ‘brain-hubs’ are increasingly important (Moretti, 2013; Storper, 2013).
  - Localised ecosystems and ‘industrial commons’ are needed for the health of advanced supply chains (Helper et al, 2012).
  - Foreign direct investment attracted by agglomerations (Barrell & Pain, 1999; Jones, 2017).

Debates on Concentration (2)

- But, alternative perspectives envisage de-agglomeration and **increasing dispersion**:
  - Long-term dispersal of manufacturing – urban-rural shift, rising need for space, contraction effects (Crafts and Klein, 2017; Dauth et al, 2015); life cycles in manufacturing clusters increase closures.
  - Functional specialisations produce new non-sectoral, task and stage geographies (Baldwin, 2016).
  - Leading foreign direct investors have little incentive to cluster (Shaver & Flyer, 2000).

Traditional Industrial Regions

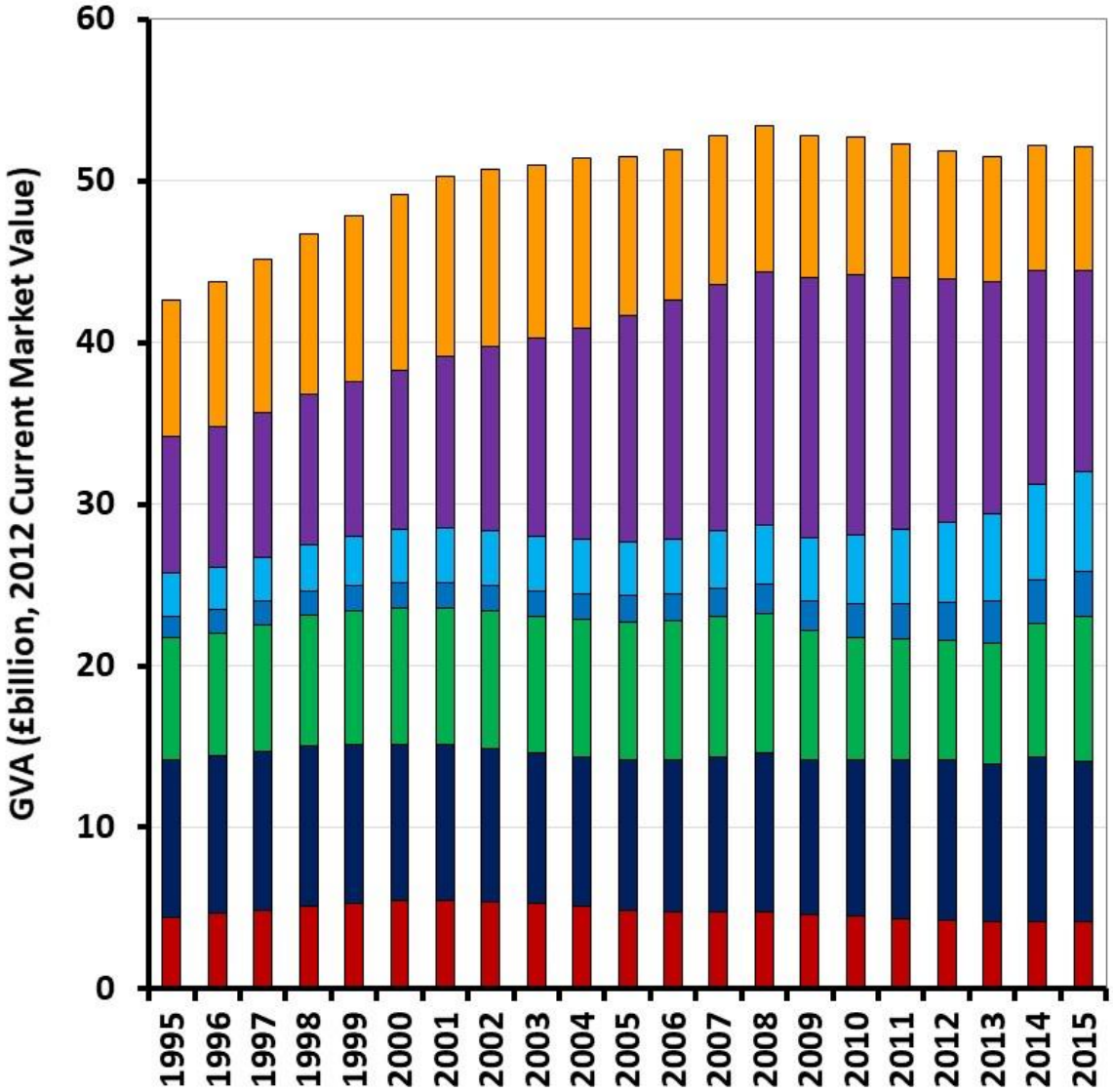
- Some theory sees traditionally industrial areas as **obstructive** to AM growth:
  - Glaeser (2012) 'cursed legacy' of heavy industry - low-skill, outdated infrastructure, problems of 'lock-in' and hysteresis.
  - Higher technology industry has distinctive location requirements (Hall et al, 1987).
- Alternative theory suggests these areas are **conducive**:
  - 'Phoenix industries', SMEs re-use knowledge assets and networks (Christopherson, 2009), continuity and revival of research institutions.
  - Relatedness of other manufacturing produces diversification.

The Changing Geography of Advanced Manufacturing in Britain

University of Southampton
University of Cambridge
Durham University
Newcastle University

Question #1: Is advanced manufacturing becoming more concentrated or more dispersed?

Advanced Manufacturing industries



Very High Technology:

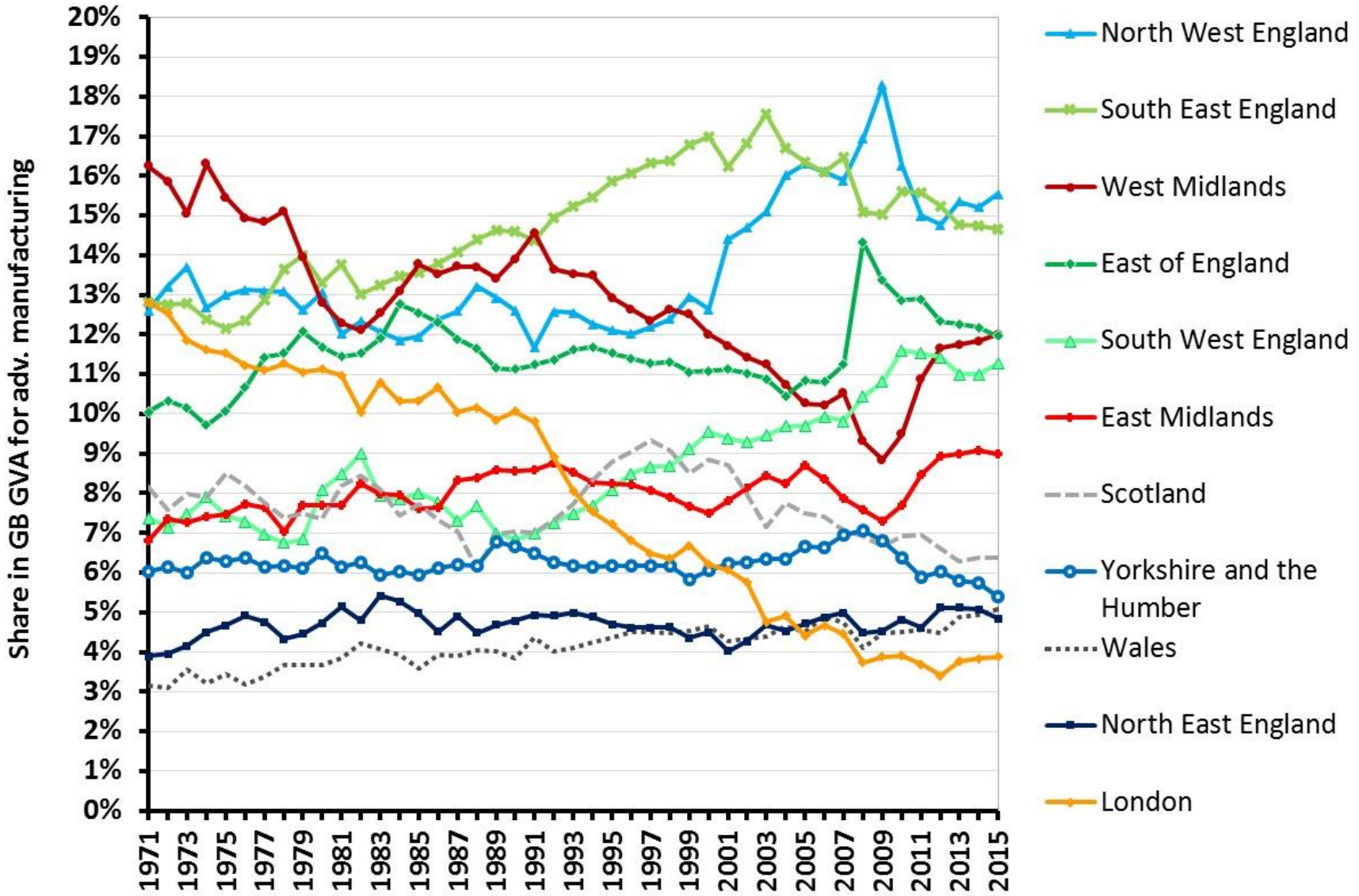
- Computers, electronic and optical products (SIC 2007: C26) (0.57%)
- Pharmaceuticals (SIC 2007: C21) (0.93%)
- Air- and spacecraft (SIC 2007: C30.3) (0.46%)

Moderately High Technology:

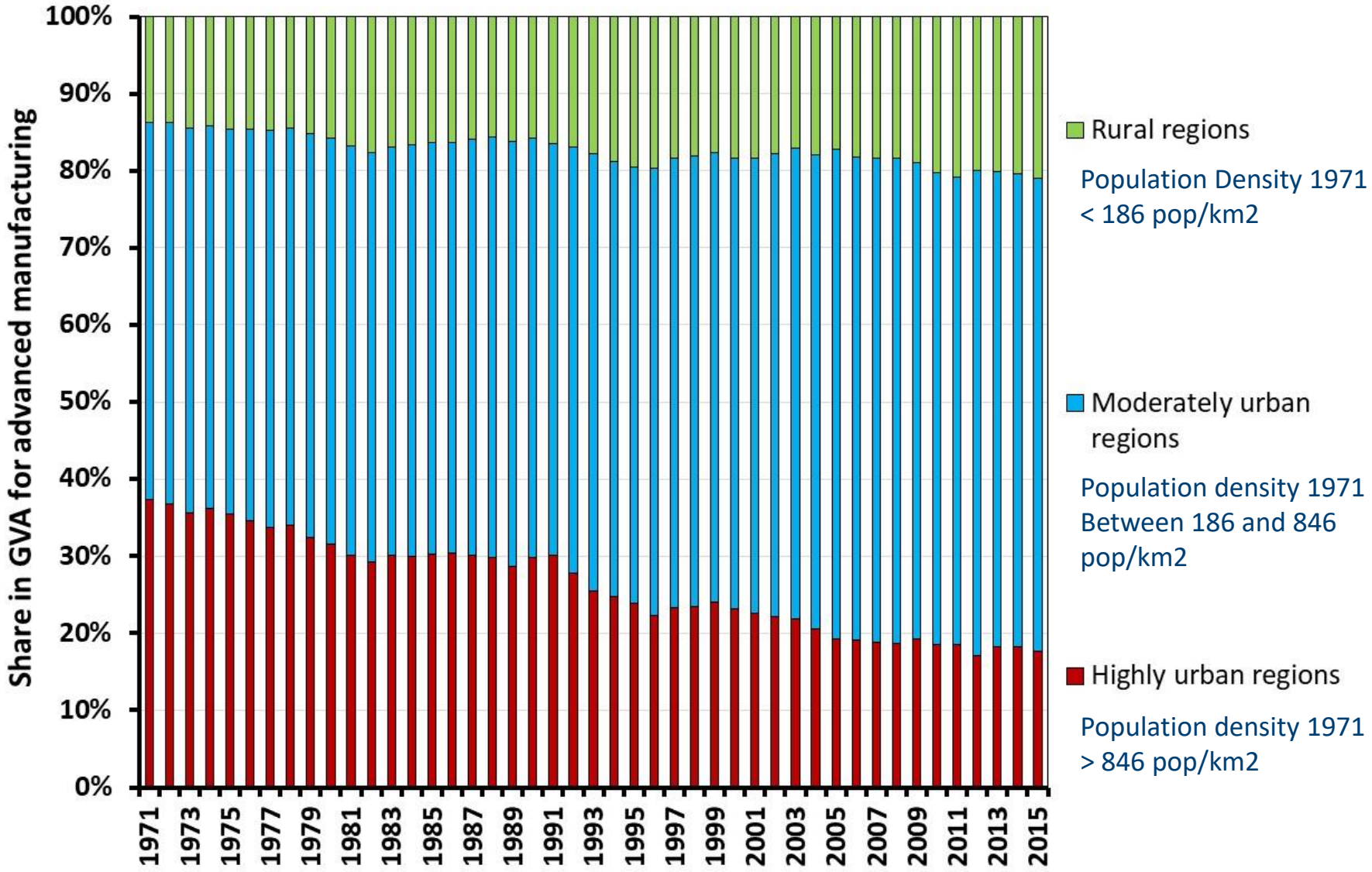
- Other transport equipment, other than Air and spacecraft (SIC 2007: C30 excl. C30.3) (0.20%)
- Motor vehicles, trailers and semi-trailers (SIC 2007: C29) (0.67%)
- Machinery and equipment n.e.c. (SIC 2007: C28) (0.73%)
- Electrical equipment (SIC 2007: C27) (0.31%)

Based on shares of science and engineering occupations of employment in industry. According to Helper et al., 2012, Table 1, p. 7.

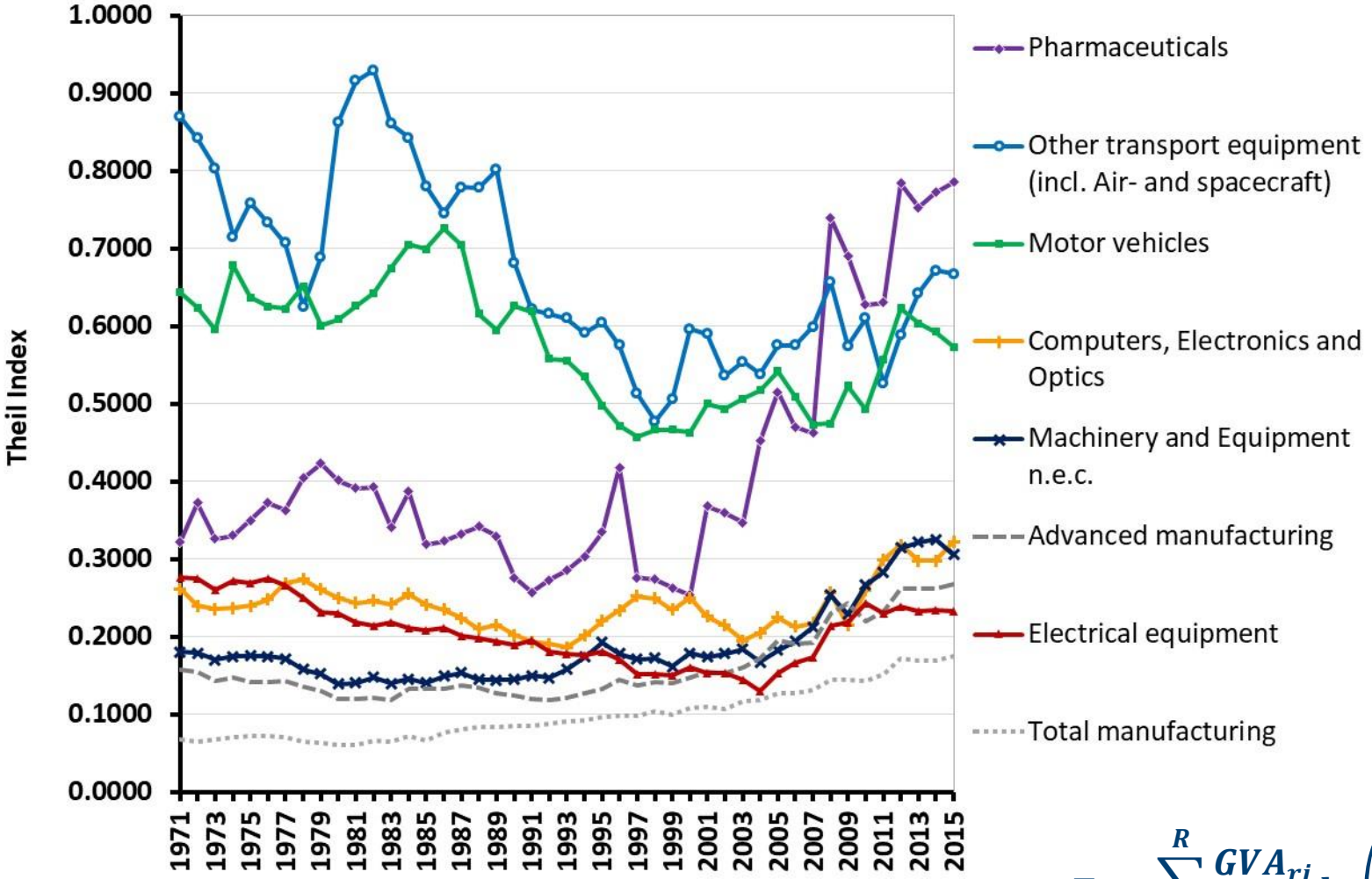
Regional Shares of Advanced Manufacturing GVA



Development of shares by type of region (NUTS 2) in GVA Adv. Manufacturing

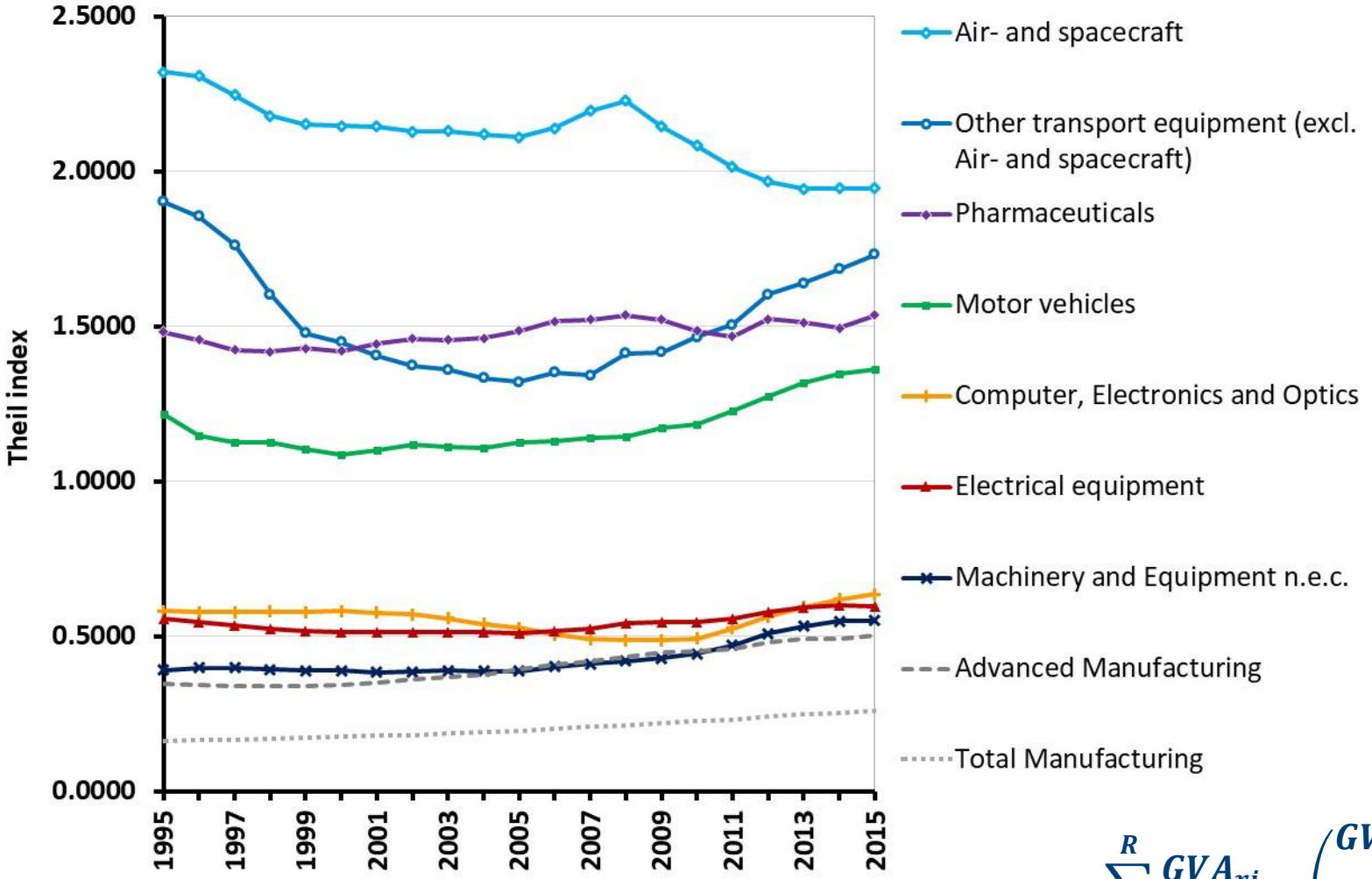


Development of Theil index for AM industries based on shares in GVA of NUTS2-regions



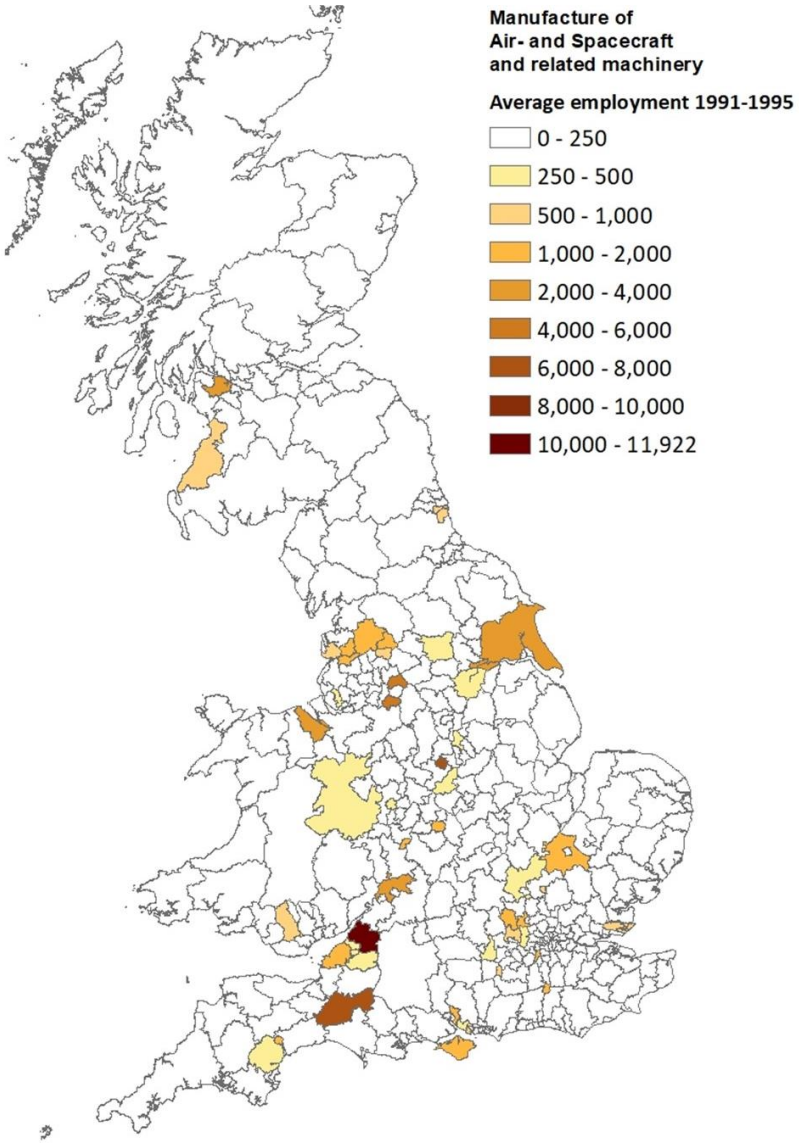
$$T_i = \sum_{r=1}^{R} \frac{GVA_{ri}}{GVA_i} \ln\left(\frac{GVA_{ri}/GVA_i}{GVA_r/GVA}\right)$$

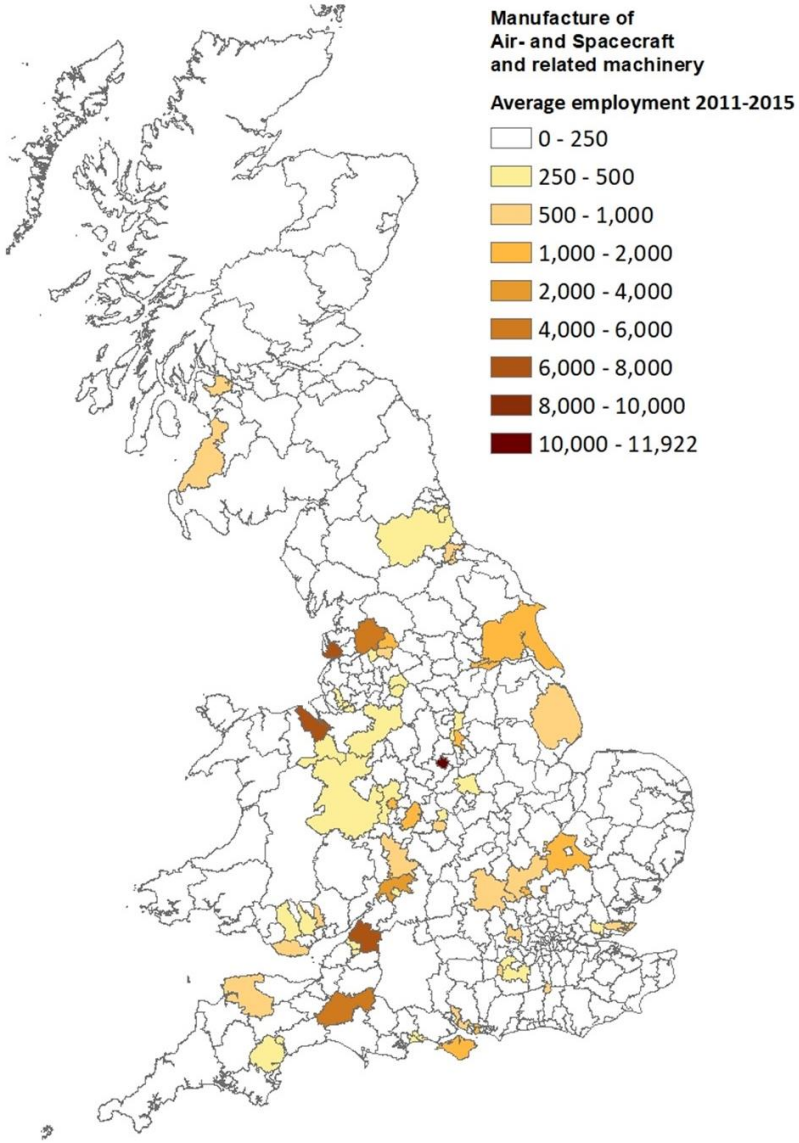
Development of Theil index for AM industries based on shares in GVA of LADs



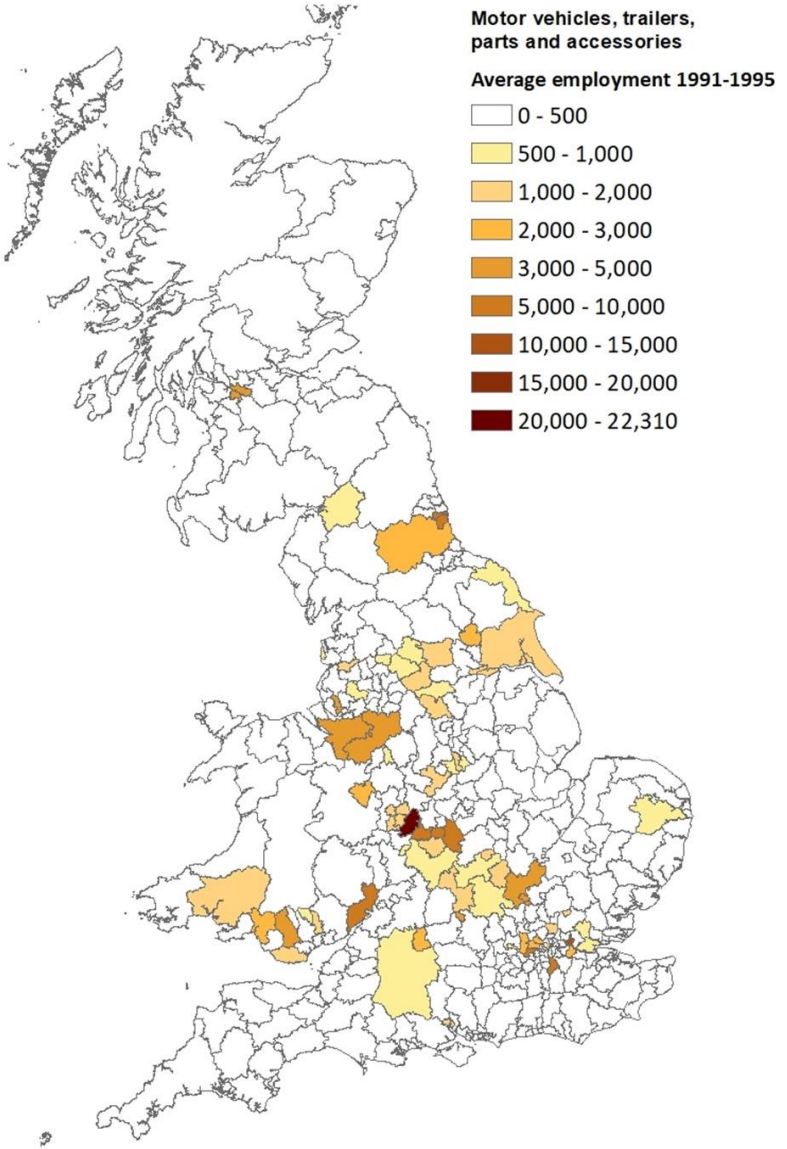
$$T_i = \sum_{r=1}^{R} \frac{GVA_{ri}}{GVA_i} \ln \left(\frac{GVA_{ri}/GVA_i}{GVA_r/GVA} \right)$$

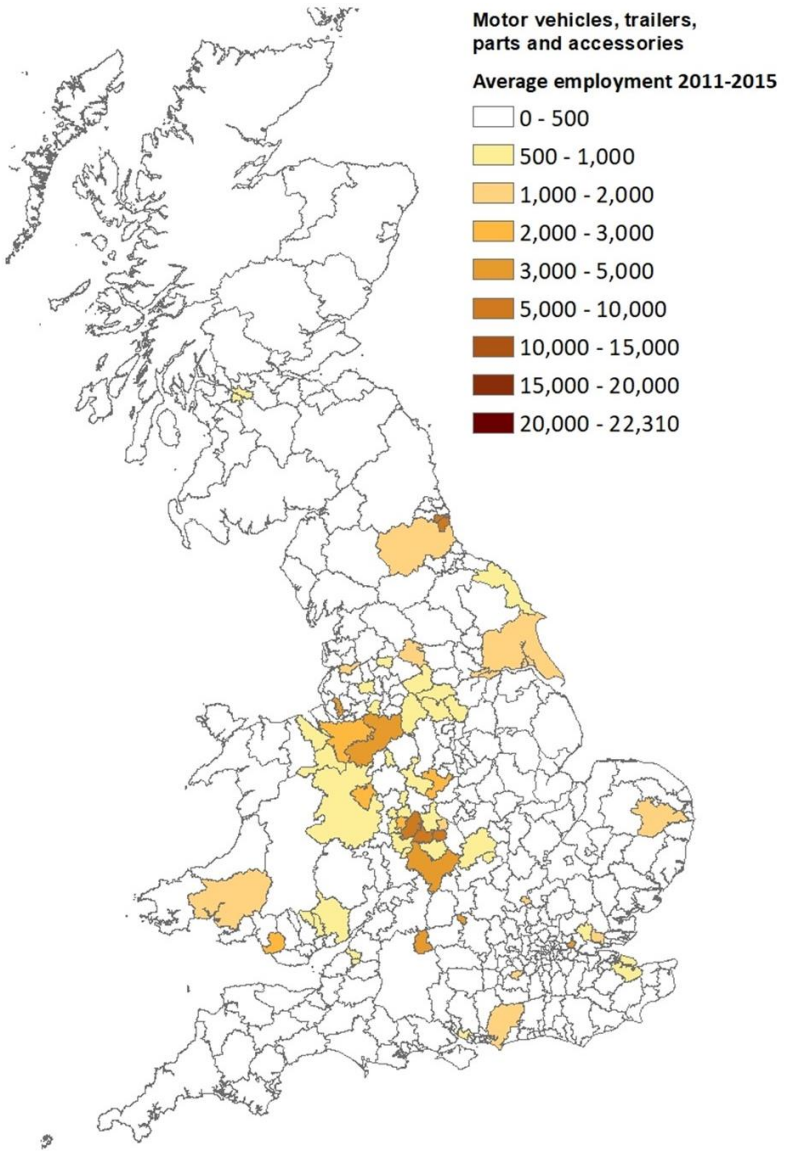
Employment in Aerospace across LADs, 1991-1995 and 2011-2015



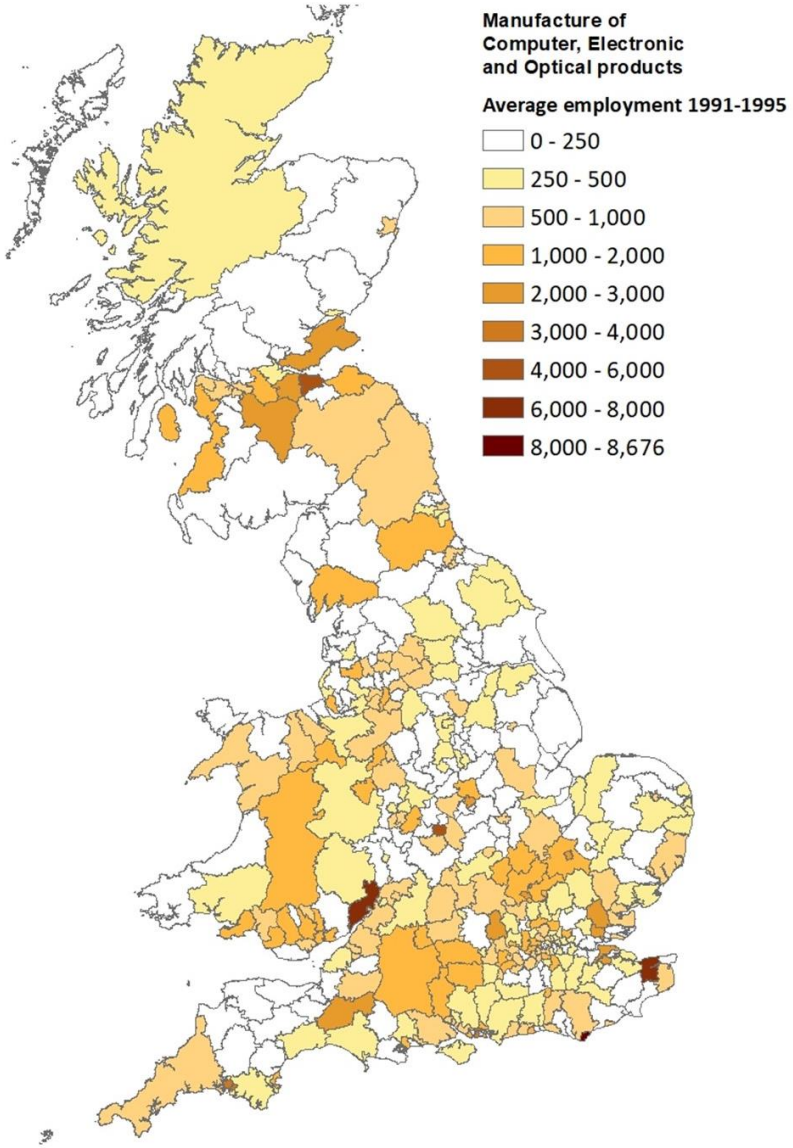


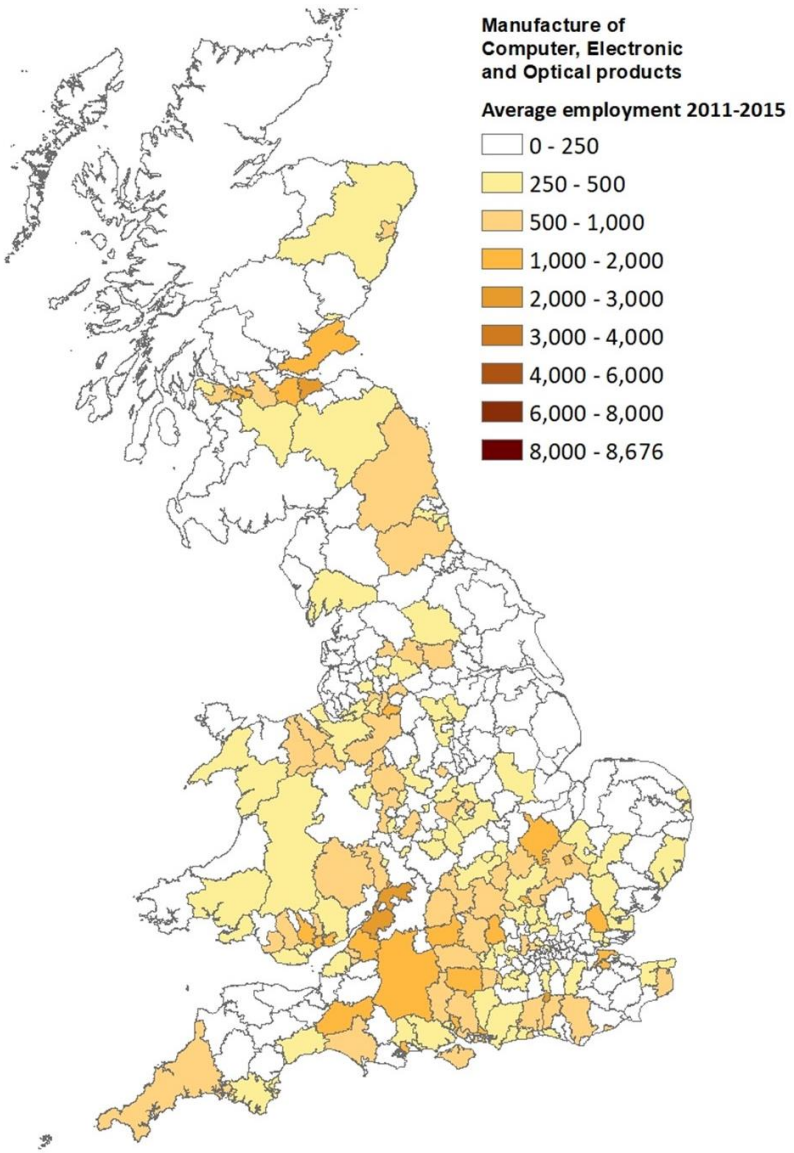
Employment in Motor vehicles across LADs, 1991-1995 and 2011-2015





Employment in Computers, Electronics and Optics across LADs, 1991-1995 and 2011-2015



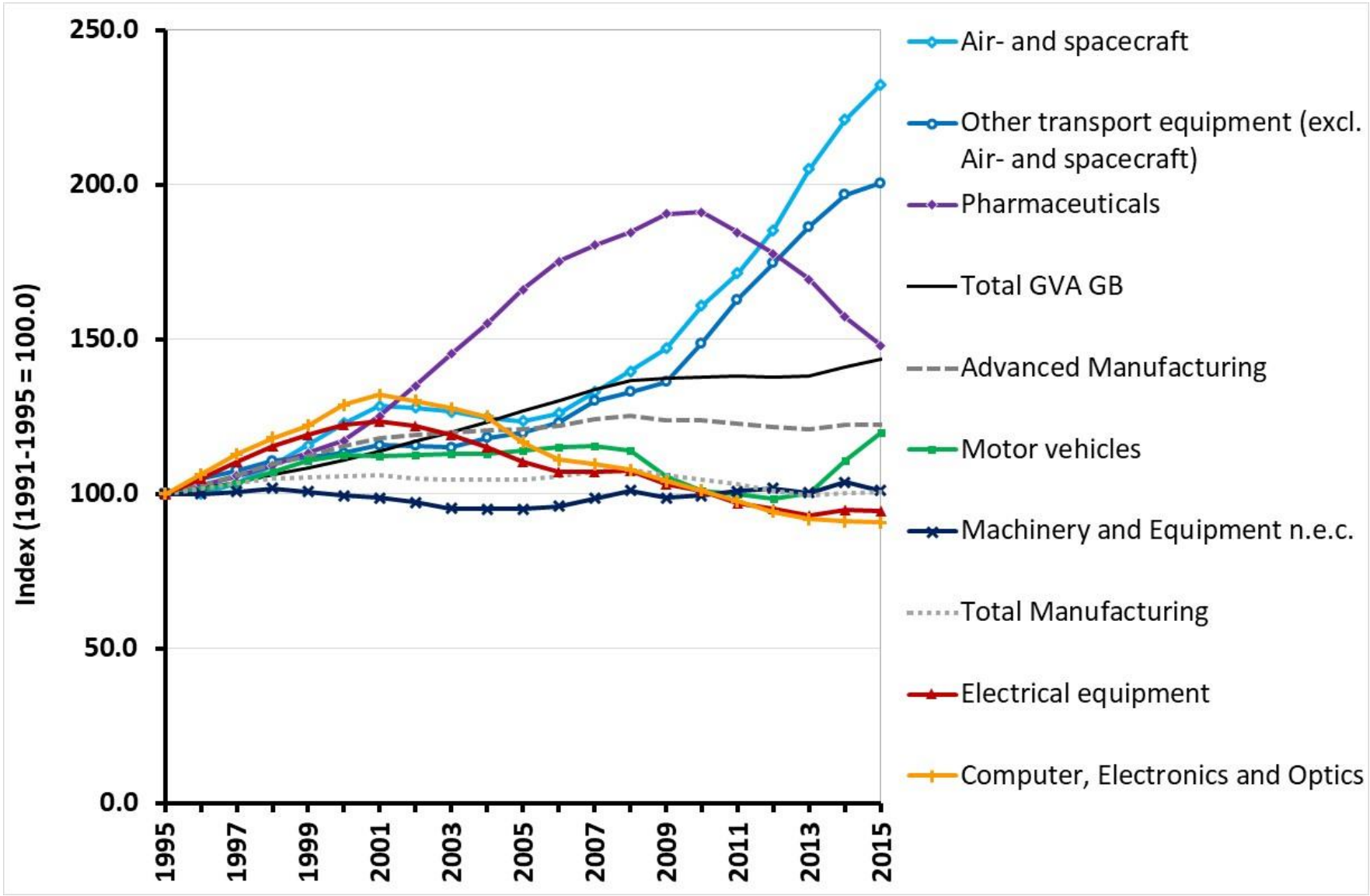


Conclusions Question #1

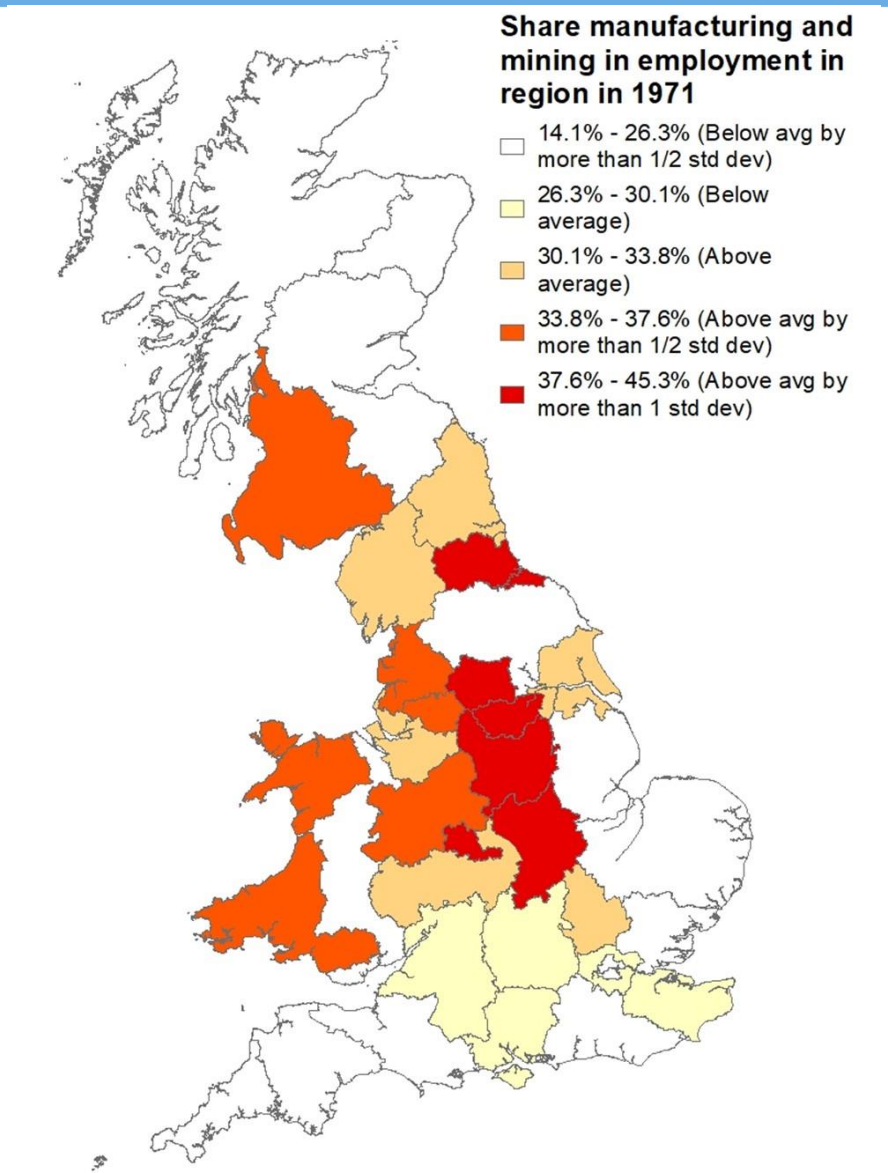
- Advanced Manufacturing industries show very different but persistent patterns of distribution across Britain.
- Clear concentrations only observable in several industries at this level of aggregation:
  - In Aerospace, Motor vehicles, Pharmaceuticals, and Other transport equipment (excl. Aerospace).
  - Other industries much more dispersed, including Computers, Electronics and Optics.
- Slight tendency towards increasing concentration in more recent years in majority of industries. Consolidation in some locations, and thinning out in others?

Question #2: Do traditionally industrial regions provide a favourable context for advanced manufacturing growth?

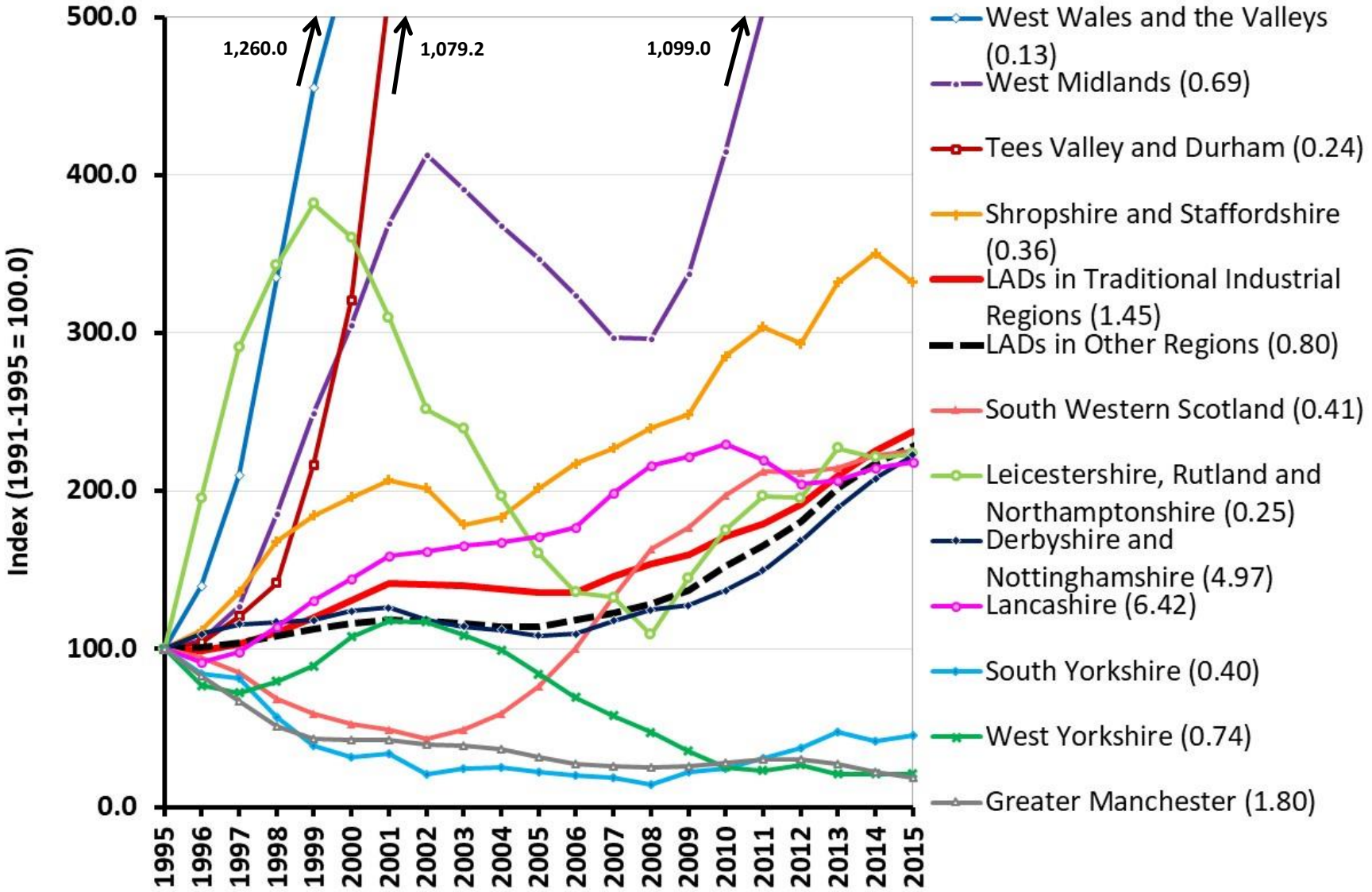
Development of Advanced Manufacturing industries (5-year moving averages 1991-2015)



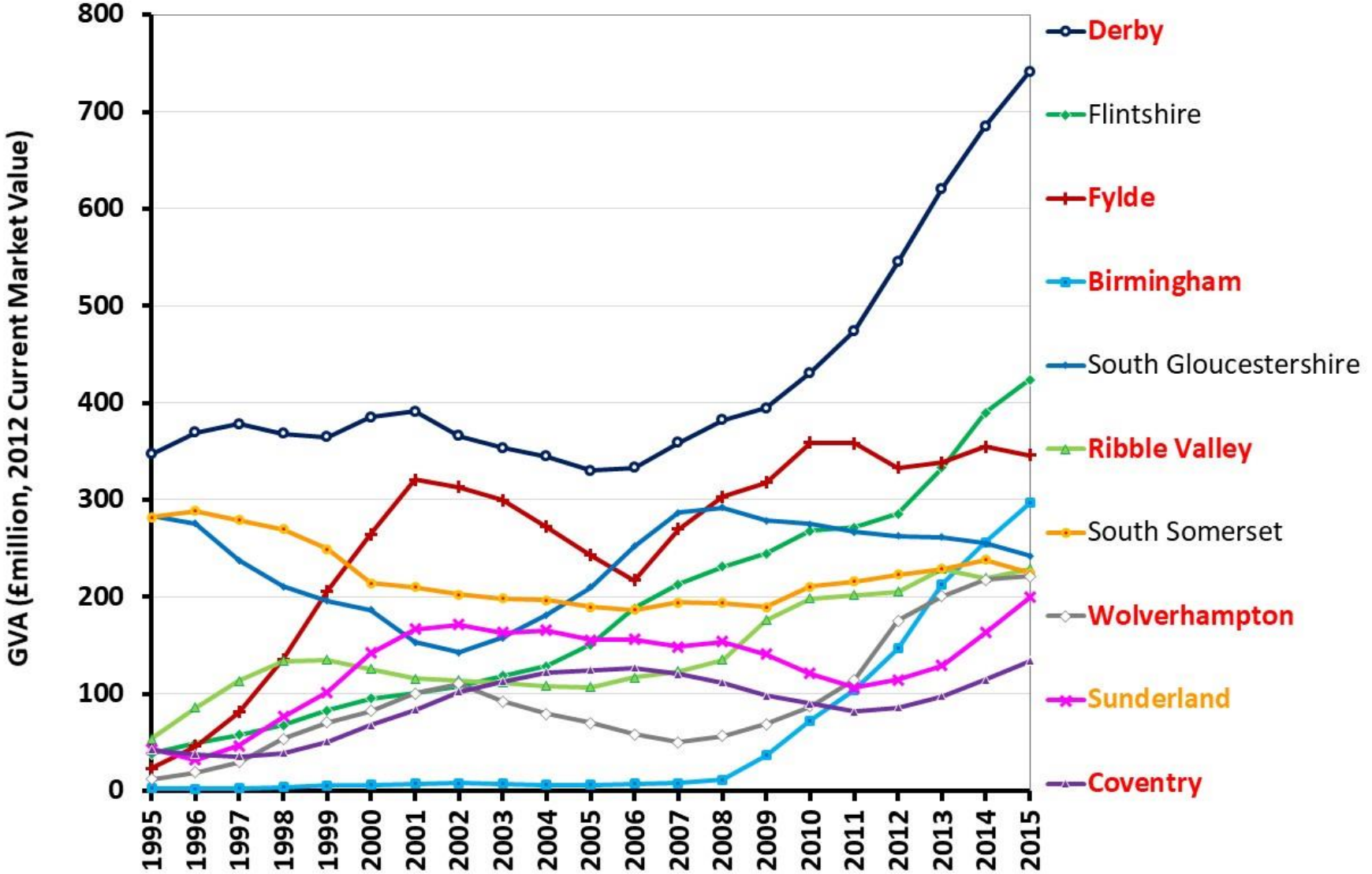
Traditional Industrial Regions: Manufacturing and Mining share of employment in 1971



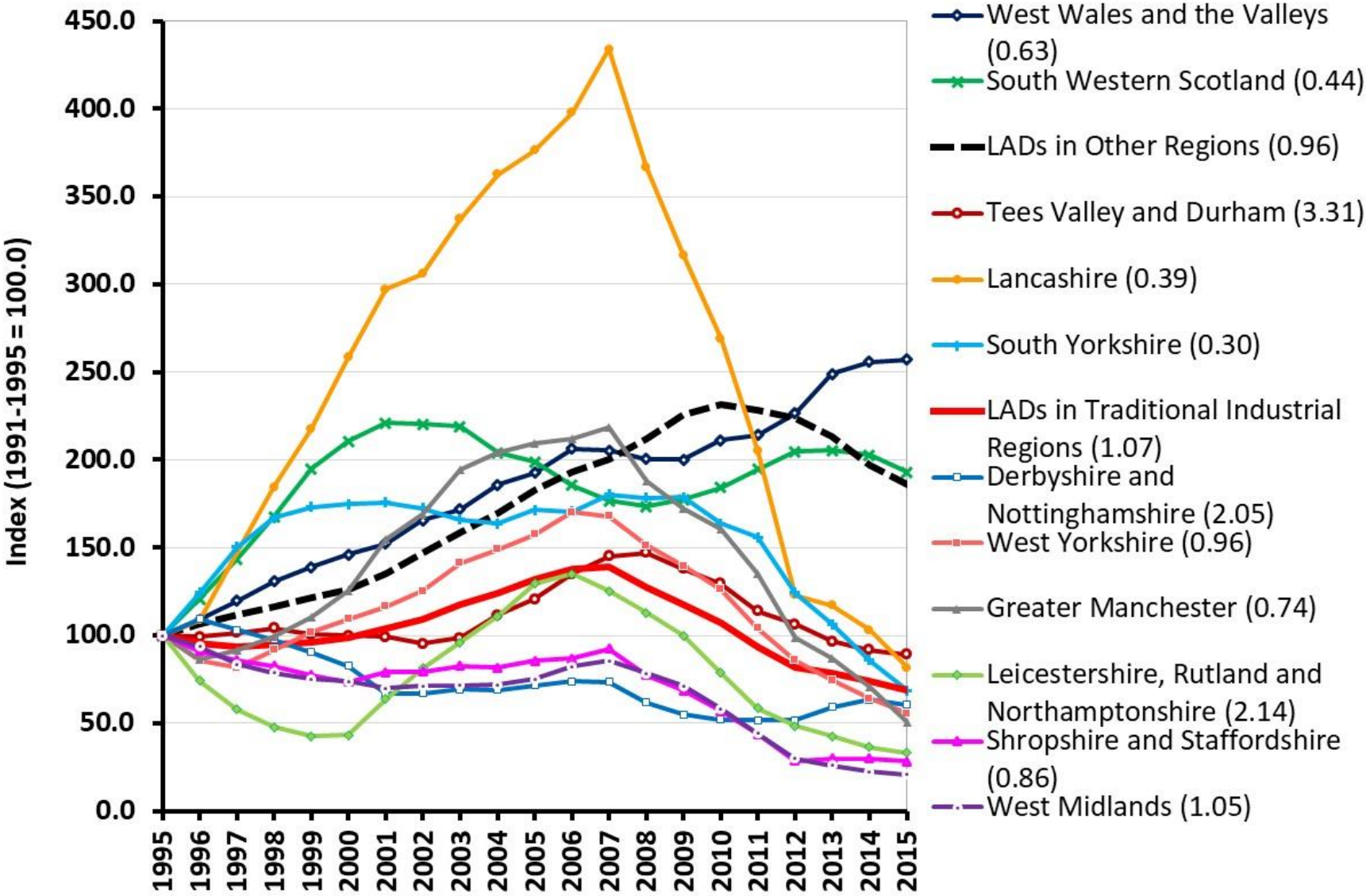
Development of Aerospace across TIRs (indexed development of GVA, 5-year moving average)



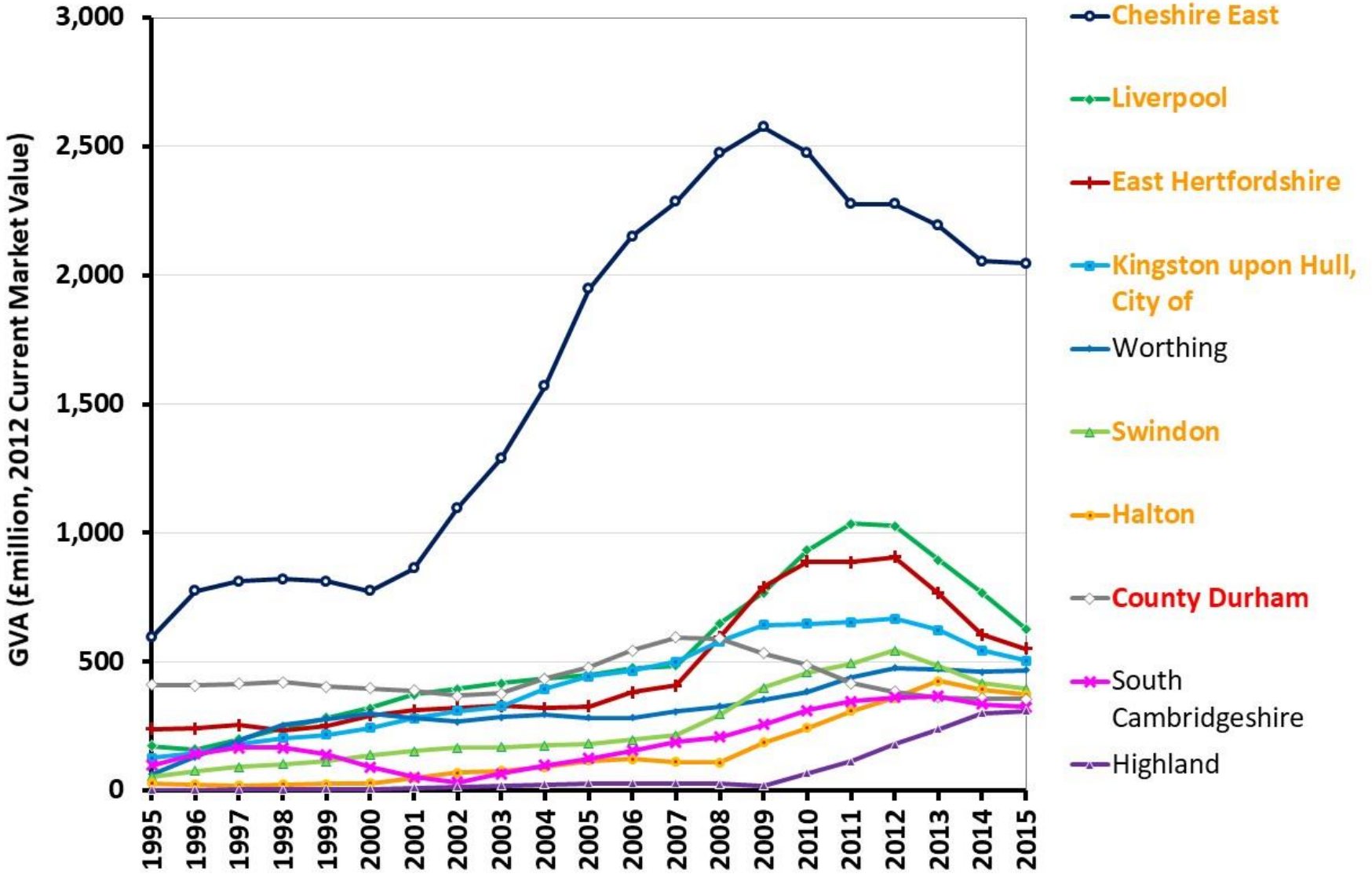
Development of GVA of current Top 10 LADs for Aerospace (5-Year moving average)



Development of Pharmaceuticals across TIRs
(indexed development of GVA, 5-year moving average)



Development of GVA of current Top 10 LADs for Pharmaceuticals (5-Year moving average)



Conclusions Question #2

- Many segments of Advanced Manufacturing offer little growth prospects (and performance in TIRs is moreover worse than in other regions).
- But within some more dynamic Advanced Manufacturing industries, some evidence of 'Phoenix industry'-effects:
  - Centres in TIRs continue to do well; and some new expansion into other TIRs (but also into non-TIRs).
  - In Aerospace, but also Other transport equipment, and Motor vehicles.
  - Especially in East Midlands, North West and West Midlands.
- TIRs seem to provide a less favourable environment for Pharmaceuticals.

Overall conclusions and Future work

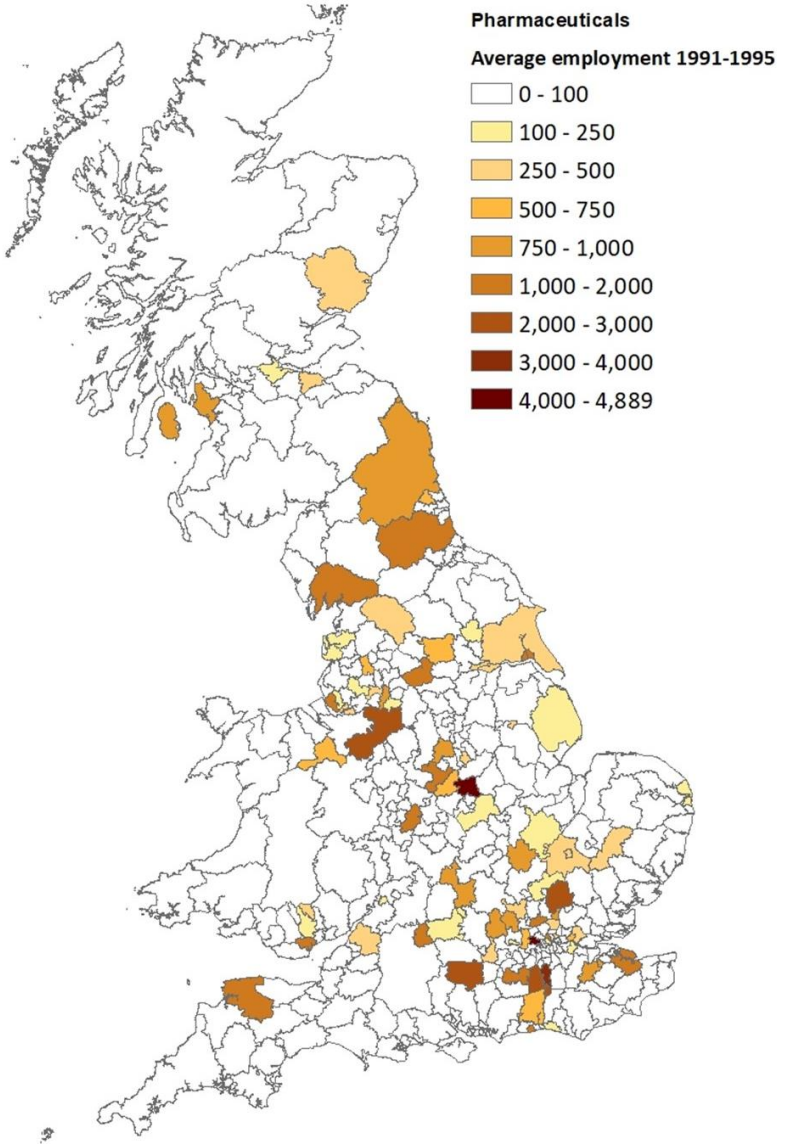
Overall conclusions and Future work

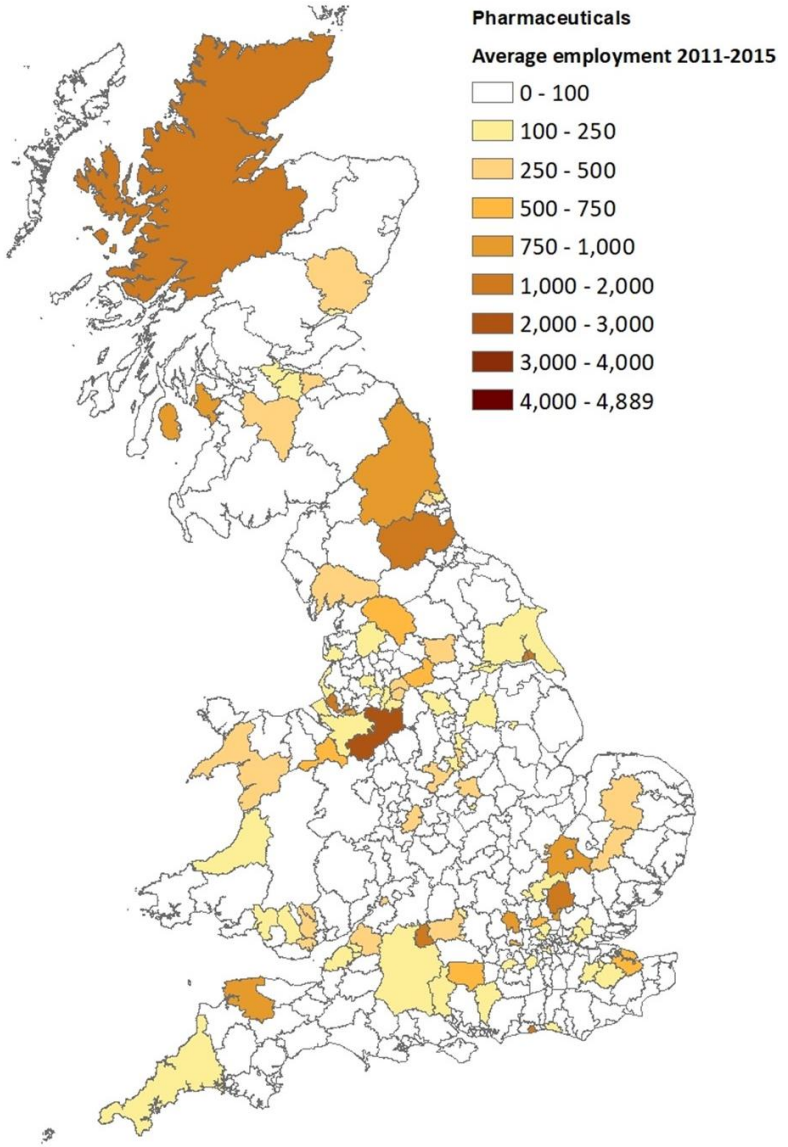
- Important differences between various AM industries, and between various TIRs.
- For ‘rebalancing’, most promising industries seem to be Aerospace, and perhaps Motor vehicles and Other transport equipment.
- What role for localised ecosystems, ‘industrial commons’, and knowledge spillovers, esp. in differences in performance between areas? → Survey.
- Continue data-analysis and publish results.
- Also work on effects of clustering on Total Factor Productivity in Advanced Manufacturing industries (based on micro-data).

Thank you for your attention!

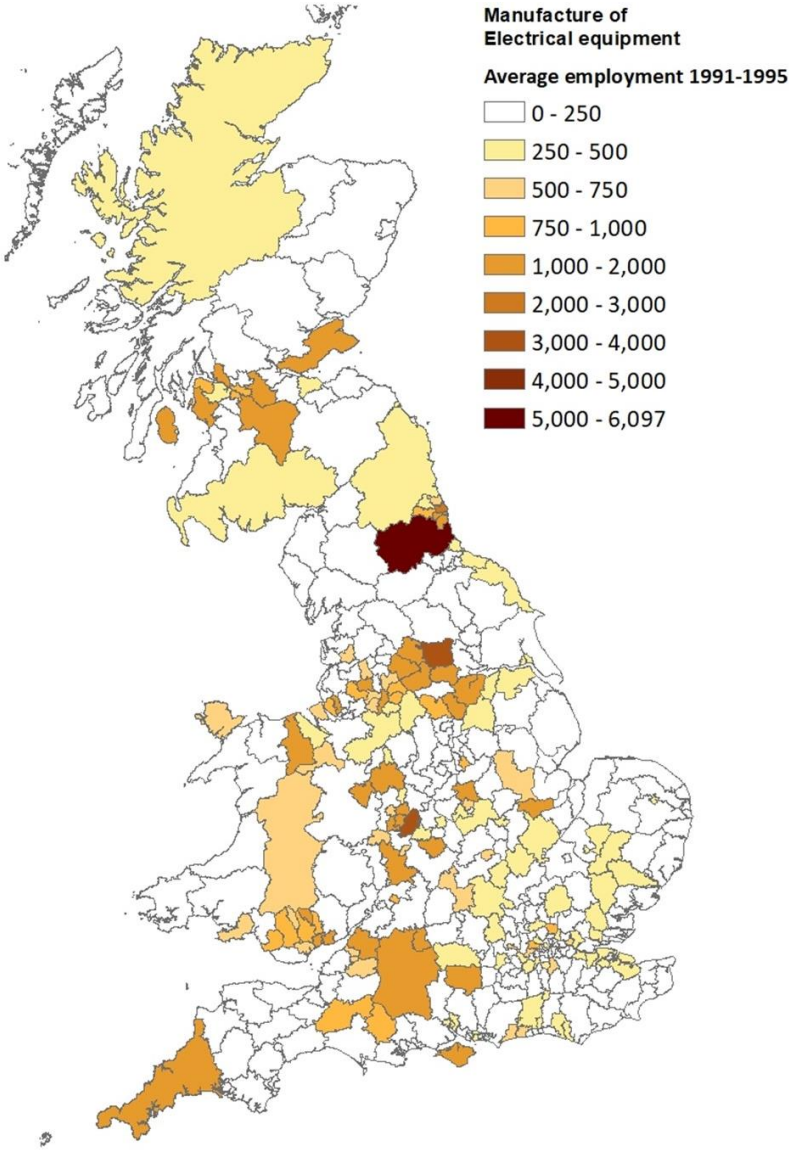
Spare slides

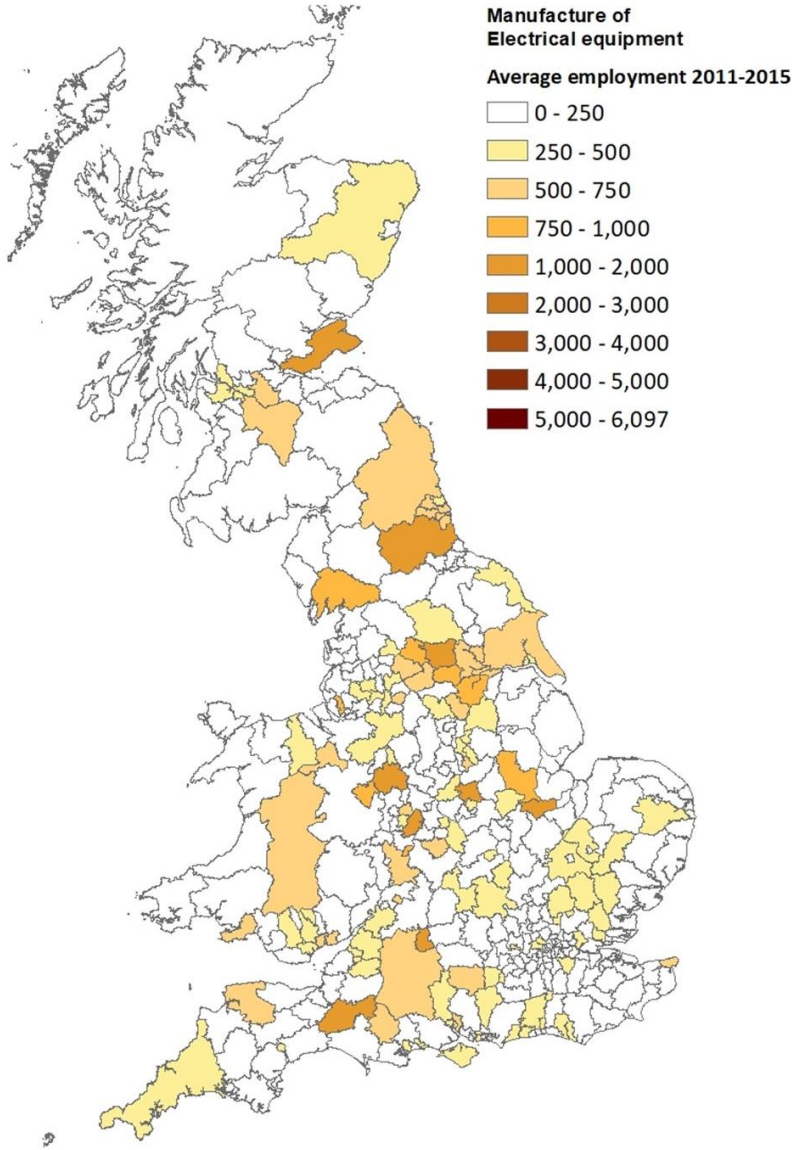
Employment in Pharmaceuticals across LADs, 1991-1995 and 2011-2015



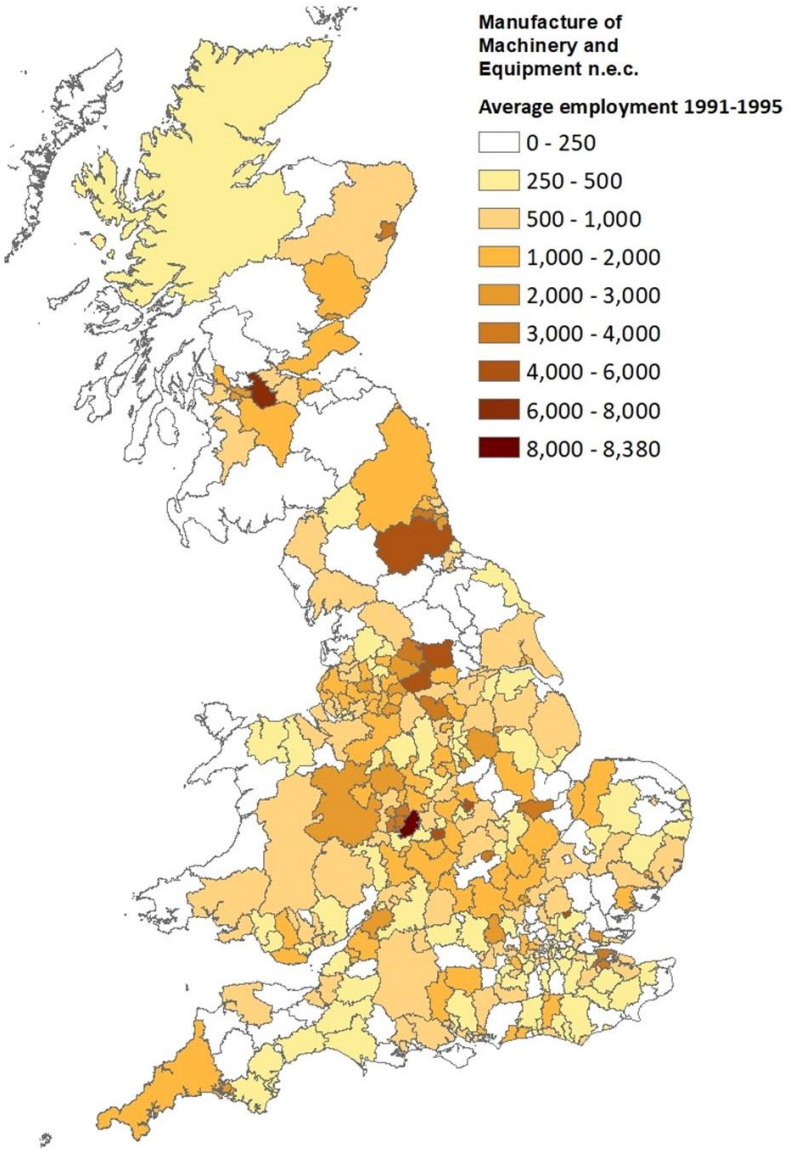


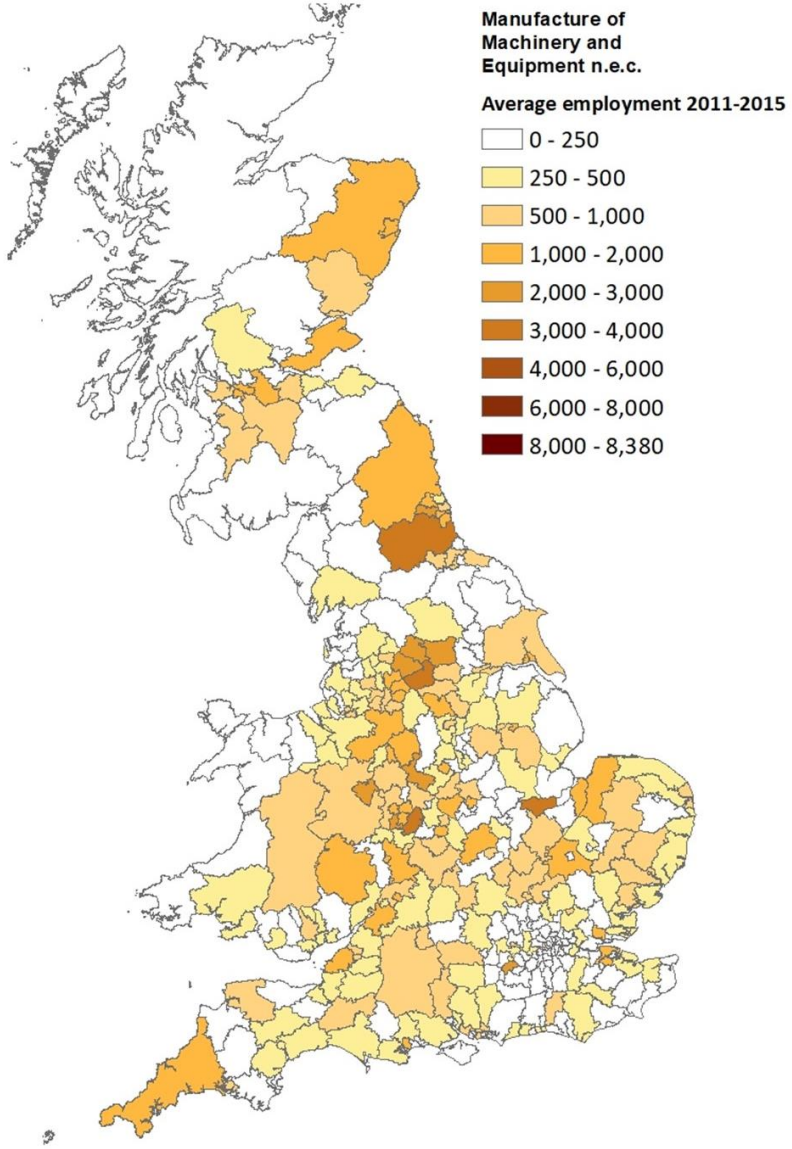
Employment in Electrical equipment across LADs, 1991-1995 and 2011-2015



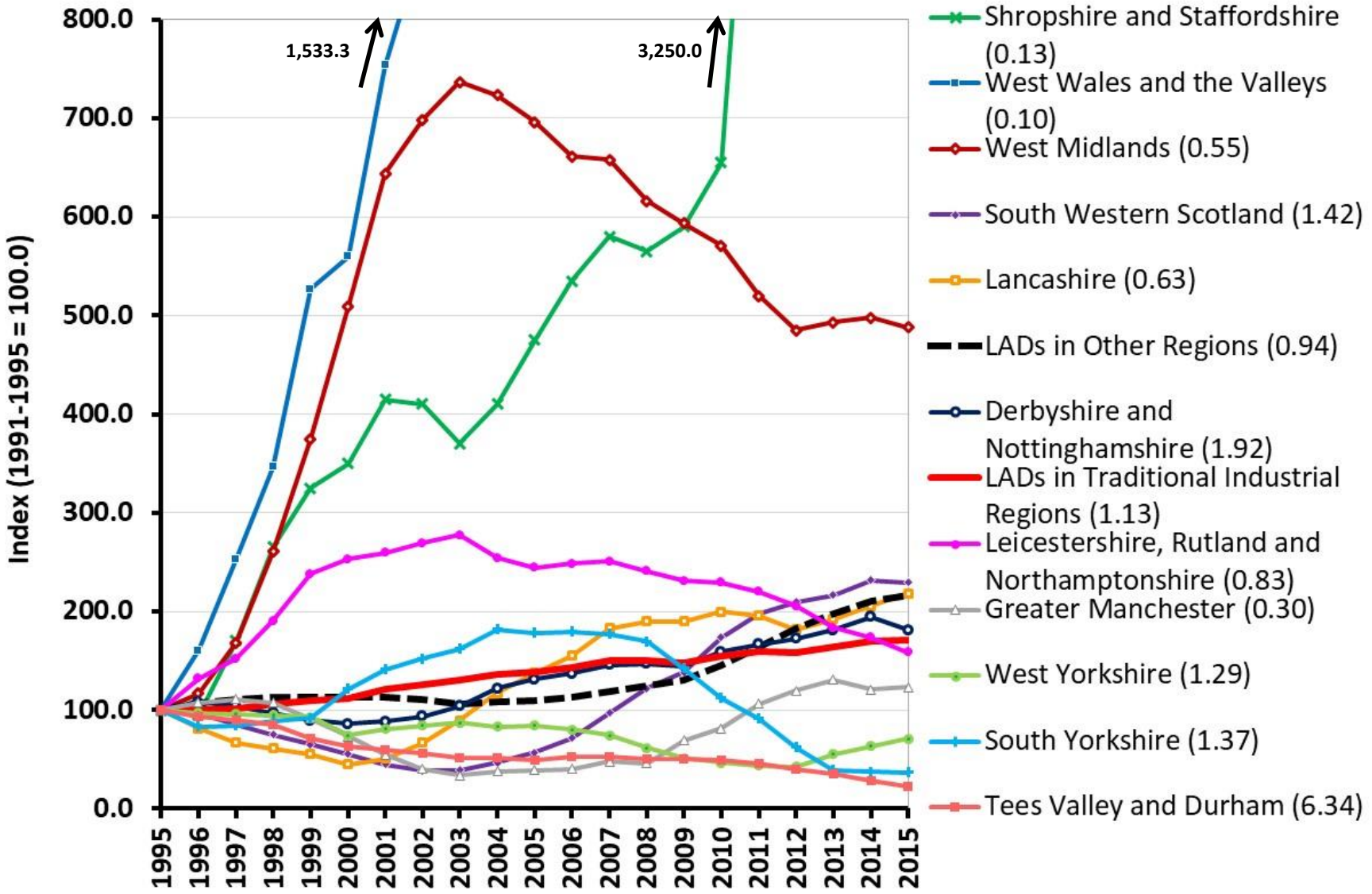


Employment in Machinery and Equipment n.e.c. across LADs, 1991-1995 and 2011-2015

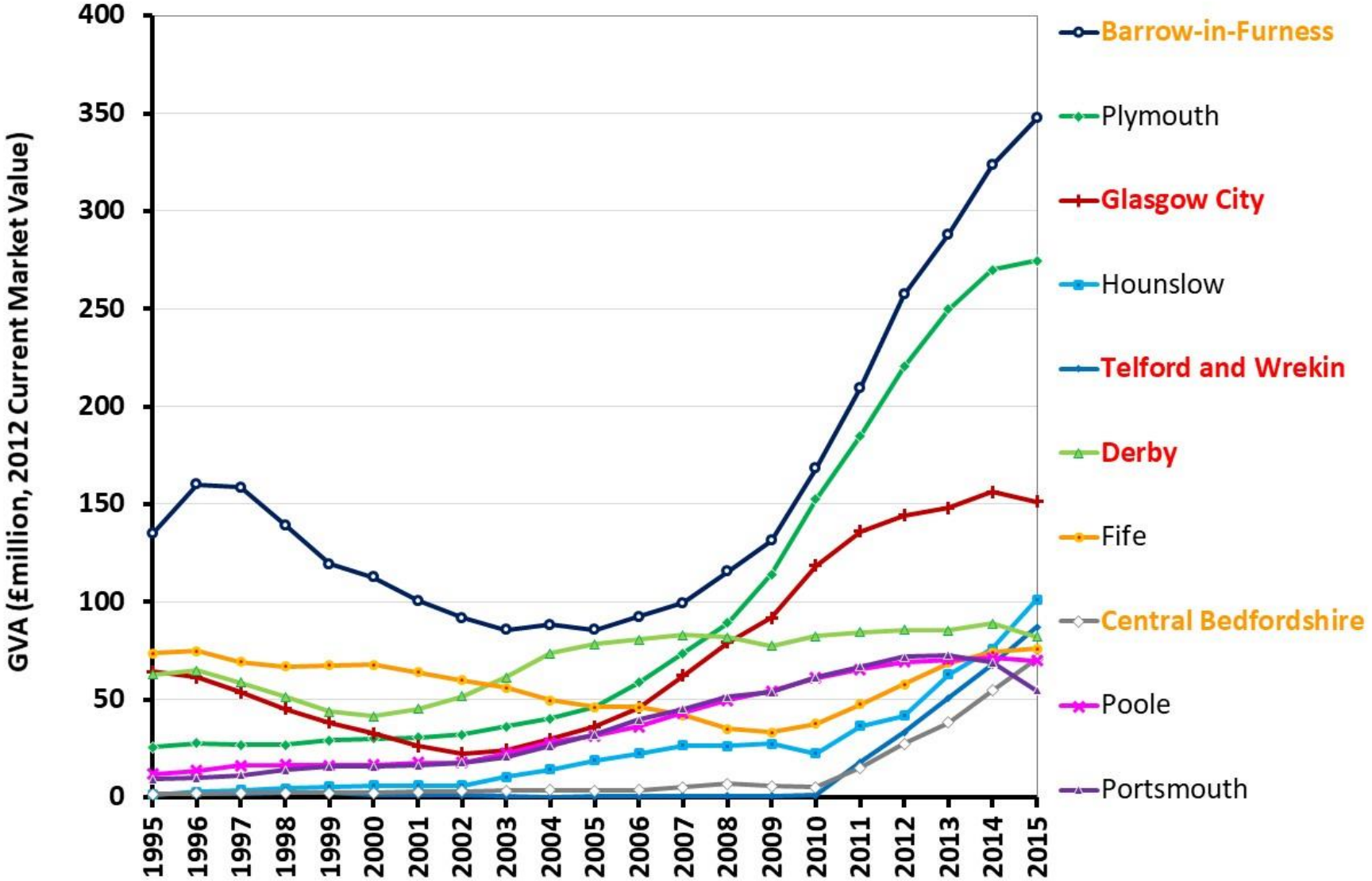




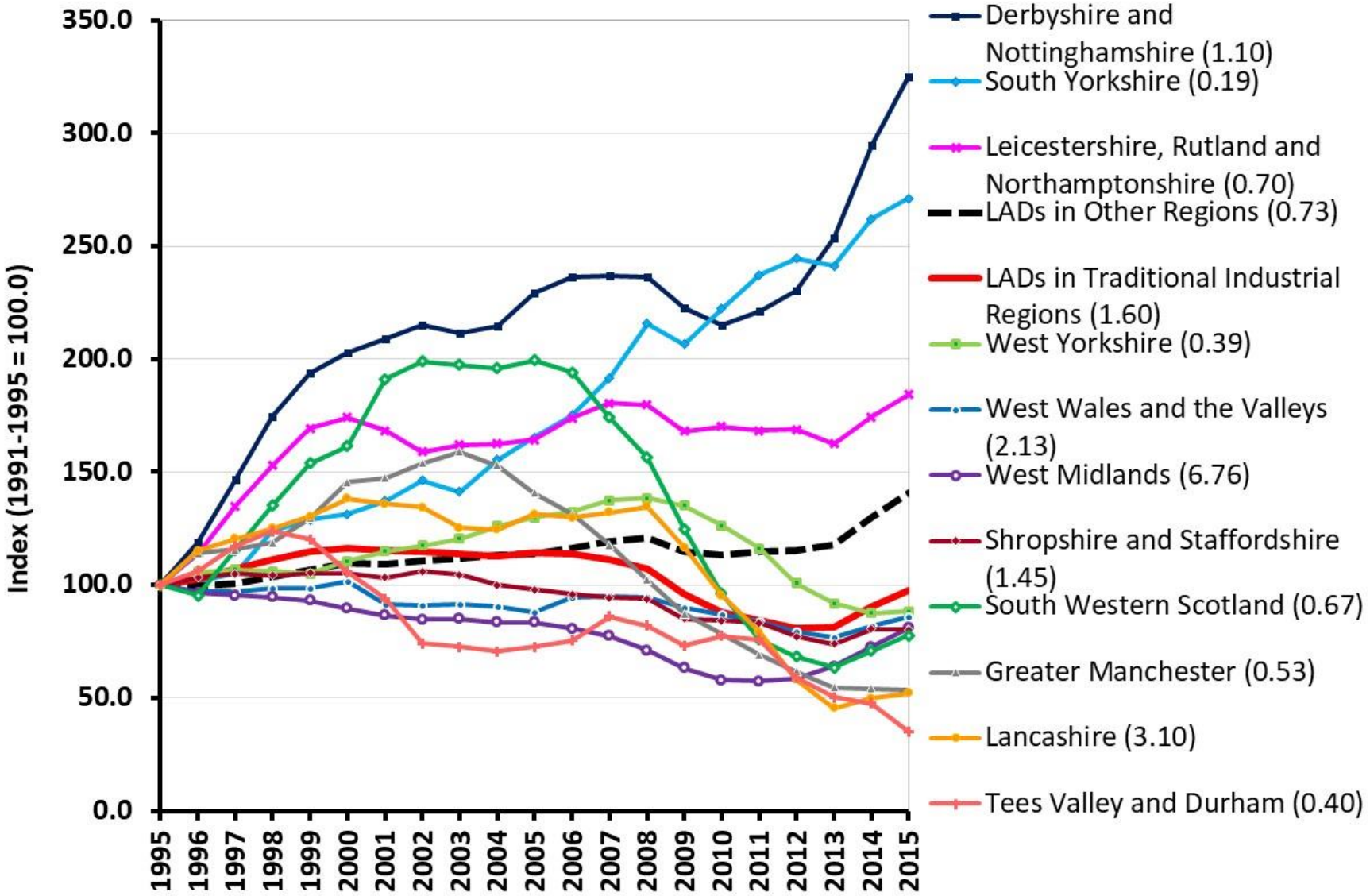
Development of Other tr. equip. excl. air- & spacecraft across TIRs (indexed development of GVA, 5-year moving average)



Development of GVA of current Top 10 LADs Other tr. equip. excl. air- & spacecraft (5-year moving average)



Development of Motor Vehicles across TIRs
(indexed development of GVA, 5-year moving average)



Development of GVA of current Top 10 LADs for Motor Vehicles (5-Year moving average)