

A Regional Perspective on University-Industry Interaction

Robert Huggins

**Centre for International Competitiveness
Cardiff School of Management,
University of Wales Institute, Cardiff**

Presentation at the Workshop on 'University-Business Interactions', UK-Innovation Research Centre, University of Cambridge, 5th June, 2009



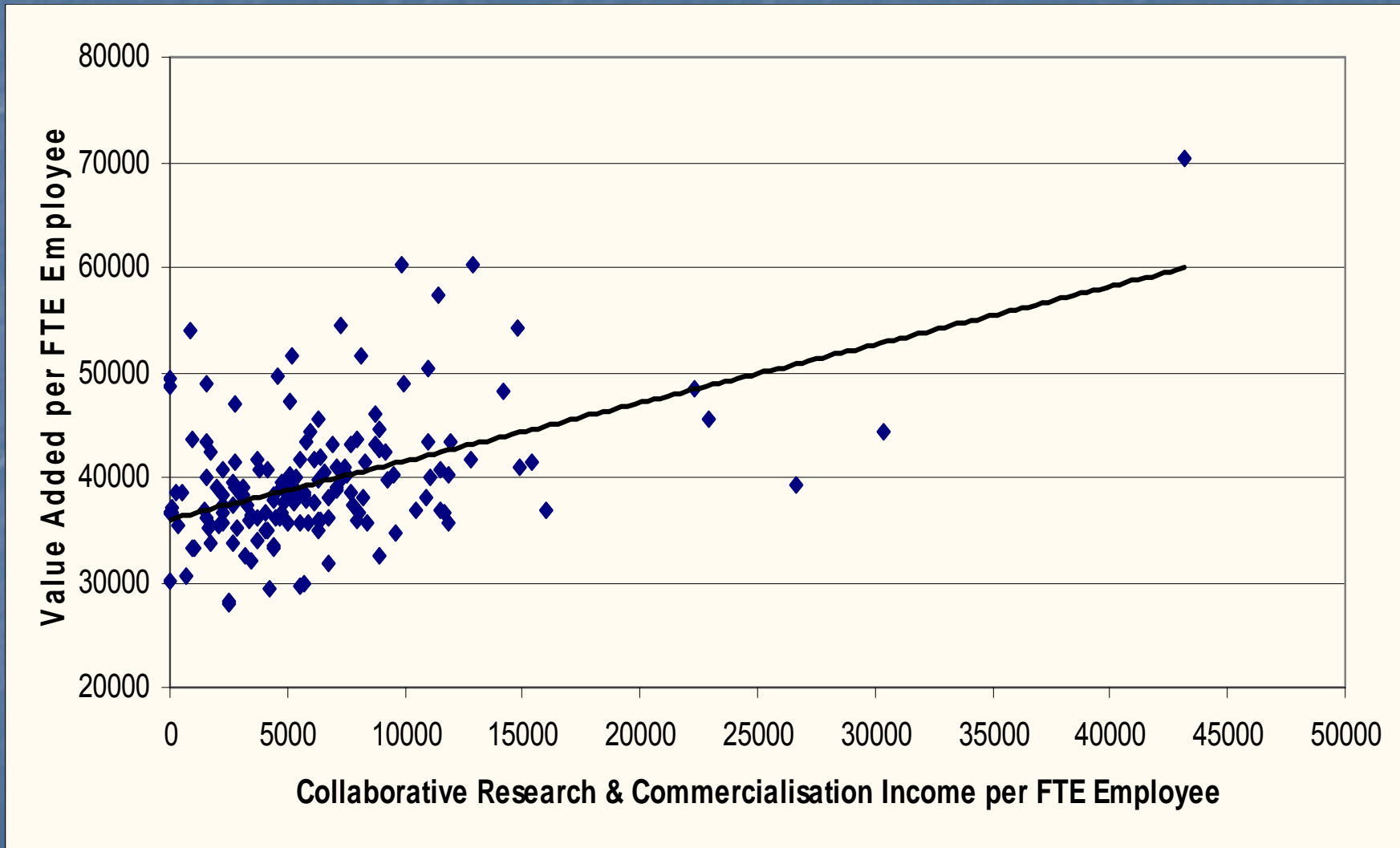
Context

- Universities are increasingly viewed as key institutions in the regional economic development process and are often described as central nodes of the knowledge-driven economy.
- University knowledge is increasingly viewed as almost a panacea for promoting knowledge-based economic development.
- In general, universities are portrayed as forming important actors within networks of regional clusters of knowledge-based activities or systems of regional innovation.
- Within the systemic view of innovation, regions are considered as 'laboratories' providing the crucial knowledge infrastructure for innovation.
- However, although local knowledge sources are utilised in the innovation process, global (or at least 'non-local') knowledge pipelines are also considered to be of growing importance to innovation.

Income from Collaborative Research and Knowledge Transfer per Employee (FTE) (2005/06) (£)

London Business School	43,133
Institute of Education	30,379
University of Wales Swansea	25,203
Cranfield University	22,669
University of Surrey	21,754
University of Durham	15,479
Heriot-Watt University	15,232
Imperial College London	14,775
London School of Hygiene & Tropical Medicine	14,207
North East Wales Institute of Higher Education	13,589
St George's Hospital Medical School	12,729
University of Strathclyde	12,533
University of Aberdeen	11,475
King's College London	11,418
Royal Veterinary College	10,807
University of Newcastle upon Tyne	10,538
University of Warwick	10,370
University of Northampton	10,369
Cardiff University	10,093
School of Pharmacy	9,989
University of Cambridge	9,835
University of Southampton	9,519
Loughborough University	9,343
University of Liverpool	9,044
University of Oxford	8,907
University of Bath	8,863
Royal Holloway, University of London	8,759
University of Glasgow	8,401
Queen Mary, University of London	8,160

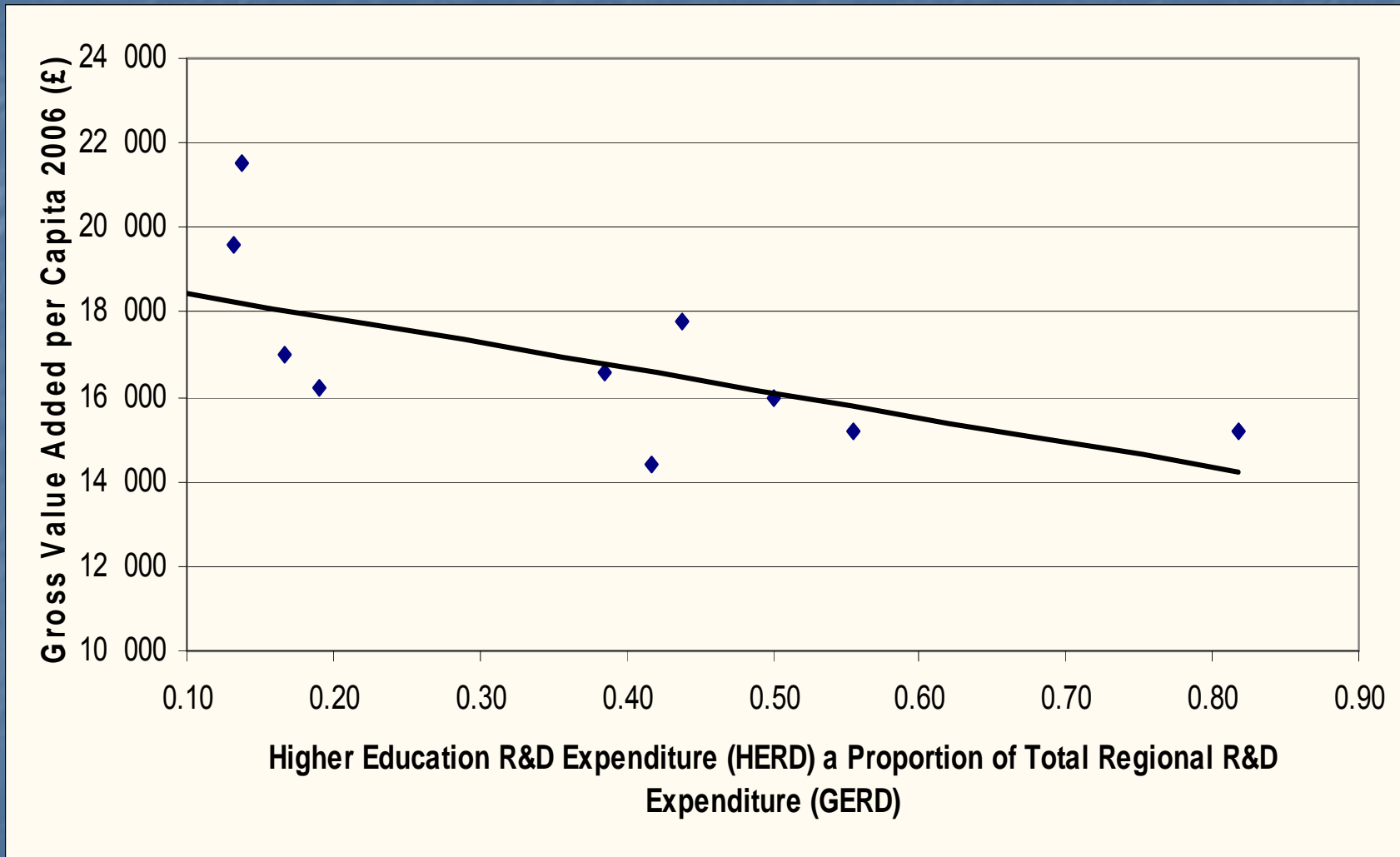
University Productivity and Income from Collaborative Research and Commercialisation



Income from Collaborative Research and Knowledge Transfer per Employee (FTE) (2005/06) (£)

Wales	8,751
North East	8,417
Eastern England	8,175
London	7,840
Scotland	7,678
South East	7,168
North West	6,077
West Midlands	5,955
East Midlands	5,438
South West	5,210
Yorkshire and the Humber	4,874
Northern Ireland	3,692
UK total	6,717

Higher Education R&D Expenditure and Regional Gross Value Added per Capita



HEI Value Added per Full Time Equivalent Employee in the UK 2005/06 (£s) by Institution/Region Type

Institution/Region Type	Value Added per Full Time Equivalent Employee (£)
Mean Average Pre-1992 HEIs	41,831**
Mean Average Post-1992 HEIs	37,551**
Mean Average HEIs in Competitive Regions	42,429**
Mean Average HEIs in Uncompetitive Regions	37,501**
Mean Average Pre-1992 HEIs in Competitive Regions	46,088**
Mean Average Pre-1992 HEIs in Uncompetitive Regions	38,319**
Mean Average Post-1992 HEIs in Competitive Regions	38,655**
Mean Average Post-1992 HEIs in Uncompetitive Regions	36,884**

Source: Based on data from the Higher Education Statistics Agency (** p ≤ 0.01 – non-parametric Mann-Whitney test of difference)

Research Questions

- The key question we seek to explore is the extent to which universities are engaged in regional or more non-local and globalised knowledge networks.
- In particular, we seek to analyse the extent to which university knowledge networking varies across regions and different types of universities,
- And how these network patterns are associated with the impact universities are able to have on the competitiveness of the regions in which they are located.

Research Method

- Postal survey sent to all UK HEIs (159 institutions) covering all 12 UK NUTS 1 regions.
- 59 usable responses, average 5 per region (multiple responses from all regions with exception of Northern Ireland), equalling a response rate of 37%.
- Responses included pre-92 institutions, post-92 institutions and specialist HEIs (i.e. Schools of music/agriculture) .
- 59 responses accounted for 71% of total research income for all HEIs.
- Responses accounted for at least 50% of total HEI research income in all regions.

Questionnaire – Single Key Question

- 'For each of the areas of knowledge transfer highlighted below, please provide the type and location of three external companies or organisations – in no particular order - which you consider your institution has most intensely interacted with over the last three years.'
- 'By intense interaction, we are referring to collaboration or cooperation that has involved strong relationships and networks developing between your institution (and relevant staff) and the external company or organisation.'

Types of Knowledge Links

Collaborative research	All activities which involve undertaking a project in partnership <i>with</i> a firm or other organisation
Contract research – SME	All activities which involve undertaking a project <i>for</i> a small or medium sized firm (less than 250 employees)
Contract research - non-SME	All activities which involve undertaking a project <i>for</i> a large firm (more than 250 employees)
Consultancy contracts	All activities which involve the provision of a specific service, facility or piece of equipment to another organisation
Courses for businesses	All activities which involve creating or providing education for the business community
Patents	All activities which resulted in the application or granting of a patent
Licences	All activities where the interaction involved the granting of licences
Spin-outs	All activities which involved interaction with any firm which is: <ul style="list-style-type: none"> • a spin-out with some ownership by your institution • a spin-out that is not owned by your institution • a staff start-up • a graduate start-up
Other	Any type of knowledge transfer not outlined above

Types of External Organisation

1	Multinational Enterprise (Company with plants/units located in more than one nation)
2	Large Domestic Enterprise (Company with more than 250 employees)
3	SME (Company with less than 250 employees)
4	Public Sector Research Establishments (E.g. Defence Evaluation Research Agency, Forensic Science Service, Institute of Food Research, Meteorological Office.
5	Other Public Sector/Government Departments, Authorities or Agencies)
6	University or Higher Education Institute
7	Funding Council or Other Funding Body
8	Private Sector Research Establishments (E.g. Microsoft Research or other independent research establishments funded/sponsored by the private sector)
9	Other – please state

Knowledge Links by Type of Link and External Organisation

	Multinational Enterprise	Large Domestic Enterprise	SME	Public Sector Research Establishments	Other Public Sector/Government Departments, Authorities or Agencies)	University or Higher Education Institute	Funding Council or Other Funding Body	Private Sector Research Establishments	Other	Total
Collaborative research	31.9	23.5	27.1	0.6	5.4	1.8	0.0	0.0	9.6	100.0
Contract research - SME	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
Contract research - non-SME	41.3	31.5	0.0	4.9	11.9	0.0	2.8	2.1	5.6	100.0
Consultancy contracts	19.4	23.0	24.2	0.6	16.4	0.0	3.0	3.0	10.3	100.0
Courses for businesses	21.3	23.2	23.9	1.3	19.4	0.0	0.0	0.6	10.3	100.0
Patents	37.9	19.0	36.2	1.7	1.7	0.0	0.0	1.7	1.7	100.0
Licences	23.8	23.8	40.5	2.4	0.0	0.0	4.8	4.8	0.0	100.0
Spin-outs	0.0	3.1	88.5	0.0	2.3	3.1	0.0	0.8	2.3	100.0
Other	5.0	0.0	40.0	0.0	15.0	0.0	0.0	0.0	40.0	100.0
Total	20.3	17.6	42.5	1.3	8.7	0.7	1.1	1.3	6.7	100.0
Total Old Universities	25.7	20.5	37.6	1.2	7.8	0.9	1.4	1.8	3.1	100.0
Total New Universities	12.3	15.8	48.3	1.2	10.3	0.2	0.5	0.5	10.8	100.0

Knowledge Links by Type of Link and Location of External Organisation

	Within Region	Other UK Region	Europe	International - Other	Total
Collaborative research	53.0%	39.8%	5.4%	1.8%	100%
Contract research - SME	80.6%	19.4%	0.0%	0.0%	100%
Contract research – non-SME	46.5%	41.5%	5.7%	6.3%	100%
Consultancy contracts	55.7%	37.7%	3.6%	3.0%	100%
Courses for businesses	68.8%	28.0%	1.9%	1.3%	100%
Patents	52.5%	42.4%	0.0%	5.1%	100%
Licences	59.6%	31.6%	1.8%	7.0%	100%
Spin-outs	86.2%	13.1%	0.0%	0.8%	100%
Other	94.7%	0.0%	0.0%	5.3%	100%
Total	63.9%	30.8%	2.6%	2.7%	100%
Total Old Universities	60.1%	33.8%	2.7%	3.4%	100%
Total New Universities	69.1%	26.6%	2.5%	1.8%	100%

Knowledge Links by Type and Location of External Organisation

	Within Region	Other UK Region	Europe	International - Other	Total
Multinational Enterprise	31.5%	49.8%	8.0%	10.8%	100%
Large Domestic Enterprise	59.0%	38.5%	2.1%	0.5%	100%
SME	79.5%	19.8%	0.0%	0.7%	100%
Public Sector Research Establishments	76.9%	23.1%	0.0%	0.0%	100%
Other Public Sector/Government Departments, Authorities or Agencies)	72.8%	27.2%	0.0%	0.0%	100%
University or Higher Education Institute	71.4%	0.0%	28.6%	0.0%	100%
Funding Council or Other Funding Body	45.5%	54.5%	0.0%	0.0%	100%
Private Sector Research Establishments	57.1%	42.9%	0.0%	0.0%	100%
Other	69.6%	20.3%	7.2%	2.9%	100%
Total	64.0%	30.6%	2.7%	2.8%	100%

Knowledge Links by Location of University and External Organisation

	Location of External Organisation														
Location of University	Scotland	Northern Ireland	North East	North West	Yorkshire and Humberside	East Midlands	West Midlands	Wales	East England	London	South East England	South West England	Europe	International - Other	Total
Scotland	54.5	0.0	3.0	5.1	0.0	1.0	0.0	0.0	3.0	14.1	7.1	1.0	1.0	10.1	100.0%
Northern Ireland	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0%
North East	10.7	0.0	67.9	7.1	5.4	5.4	0.0	0.0	0.0	0.0	1.8	0.0	0.0	1.8	100.0%
North West	0.0	0.0	0.0	73.6	3.3	3.3	1.1	1.1	0.0	7.7	3.3	0.0	1.1	5.5	100.0%
Yorkshire and Humberside	0.0	0.0	3.2	0.0	47.6	6.3	0.0	1.6	0.0	12.7	20.6	1.6	6.3	0.0	100.0%
East Midlands	1.5	0.0	0.0	4.4	4.4	69.1	1.5	1.5	2.9	4.4	8.8	1.5	0.0	0.0	100.0%
West Midlands	0.0	0.0	0.0	1.2	1.2	3.7	88.9	0.0	0.0	1.2	3.7	0.0	0.0	0.0	100.0%
Wales	1.2	0.0	0.0	7.2	0.0	1.2	3.6	65.1	0.0	6.0	2.4	2.4	6.0	4.8	100.0%
East England	1.1	0.0	3.2	1.1	4.3	3.2	0.0	1.1	67.0	4.3	10.6	1.1	2.1	1.1	100.0%
London	0.0	0.0	0.5	0.5	3.7	1.6	0.5	0.0	1.6	52.4	35.4	0.5	1.6	1.6	100.0%
South East England	0.9	0.0	0.0	1.8	0.9	2.6	1.8	0.0	7.0	26.3	48.2	1.8	7.0	1.8	100.0%
South West England	0.0	0.0	0.0	0.0	0.0	1.0	0.0	3.1	0.0	14.3	5.1	72.4	3.1	1.0	100.0%

Location of External Organisations Engaged in Inter-Regional Knowledge Links (i.e. excluding intra-regional links)

Region	% of Inter-Regional Links
Scotland	2.6%
Northern Ireland	0.0%
North East	2.3%
North West	6.0%
Yorkshire and Humberside	5.7%
East Midlands	6.5%
West Midlands	2.1%
Wales	1.8%
East England	4.1%
London	22.3%
South East England	30.3%
South West England	2.3%
Europe	7.0%
International - Other	7.0%
Total	100.0%

Location of External Organisations by University Regional Setting and University Type

	Core Regions		Peripheral Regions	
	Old Universities	New Universities	Old Universities	New Universities
Within Region	51.6%	61.2%	64.5%	74.6%
Other UK region	42.7%	35.0%	29.1%	20.8%
Europe	4.2%	2.2%	2.0%	2.7%
International - Other	1.4%	1.6%	4.4%	1.9%
Total	100%	100%	100%	100%

Universities and Flows of Knowledge

- Majority of links are with the private sector (i.e. commercial), with old universities engaged more with large and international firms, and new universities with SMEs.
- Contract research for SMEs and spin-out development are the main form of 'within region' knowledge flow.
- 'Outside region' knowledge flows mainly occur with actors in other UK regions.
- Old universities are significantly more internationally connected than new universities.
- Contract research for large firms and licensing are the most common form of international knowledge flows.
- Links with MNEs and other universities tend to be the most internationalised (links with other organisations tend to be either regional or domestic).
- New universities in peripheral regions have a far higher propensity to establish local knowledge links.

Concluding Remarks (1)

- There is significant variation in the wealth and knowledge generation capabilities of universities across UK regions.
- Weaker regions are more dependent on their universities for income and innovation, but often these universities under-perform in comparison to counterpart institutions in more competitive regions.
- Knowledge commercialisation activity is a source of productivity advantages for universities, but many of these advantages are accrued via networks beyond the region of location.
- Markets (or networks) for knowledge in under-competitive regions appear to possess demand-side weaknesses.
- The capability of universities to stimulate regional demand for knowledge is probably limited.
- Universities have their own bottom-lines to consider.
- Universities alone cannot shoulder the burden for transforming the innovation capabilities and knowledge economies of their regions.

Concluding Remarks (2)

- The onus being placed on universities to become the bases of commercialisable knowledge in many regions is probably too heavy.
- Universities - old and new - in less competitive regions are generally more introverted than their counterparts in more competitive regions – is this a good or bad thing?
- 'Research rich' universities are more outward looking – should they be pushed more toward the local level?
- Problems appear to be more demand than supply led – like firms, universities follow the money.
- Third Stream funding may create quasi-markets more than sustainable knowledge networks.
- Spin-outs may offer best (long-term) opportunity to impact on regional competitiveness (build-up the demand side).

Thank You