Making an Impact: Universities and the Regional Economy

The Overall Impact of Scottish HEIs on the Economy of Scotland

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The presentation draws on joint research with K. Hermannsonn, K. Lisenkova and K. Swales

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http://www.impact-hei.ac.uk
Outline of the presentation

• Identifying the gaps in our knowledge of the overall impact of HEIs on their own regions

• Bridging the gap 1: Demand side
  – extending HEI-disaggregated input-output (IO) analyses
  – Building HEI-disaggregated computable general equilibrium (CGE) models and applying them to study the demand side impact

• Bridging the gap 2: Supply side
  – building HEI-disaggregate computable general equilibrium (CGE) models and applying them to study the supply side impact

• Future research in the project
Bridging the gap 1: Demand side HEI-disaggregated IO analysis

• Overall HEI Impacts on Demand: Under alternative assumptions about financing
  – Aggregate impact of £100 million spent on HEIs (in general): output, GDP, employment
    • Without offsetting reduction in government expenditure
    • With offsetting reduction

• The “demographic challenge” for HEIs (demand side effects):
  – Aggregate impact of declining number of students and associated decline in HEI income
Demand-side approaches

- Have been many studies - the best have used input-output (IO) analyses:
  - Clear methodology, useful description of linkages
  - Build on existing official Scottish IO tables
  - Extremely useful databases created-and results transparent
  - We extend existing literature in to the area of CGE analysis

- But, as the best practitioners (many of whom are on our team!) recognise, these studies:
  - Embody a restrictive view of host region’s economy (excess capacity, significant unemployment) – passive supply side
  - Focused on the demand-side effects and “one-shot” in nature

- The approach cannot capture:
  - Any of the potential supply-side impacts of HEIs
Impacts disaggregated by sector

GDP impact £m

-80 -60 -40 -20 0 20 40 60 80 100 120 140

- Total impact
- Other services
- HEIs
- Public sector
- Business services
- House letting and real estate services
- Banking and financial services
- Transport, post and communications
- Hotels, catering, pubs, etc.
- Distribution and retail
- Construction
- Manufacturing
- Primary and utilities

- Funding from Scottish Government
- Increased exports
The “demographic challenge” for HEIs

• Demographic changes in the UK are projected to result in a fall in the number of students

• Recent *Universities UK* report makes projections of likely numbers of students

• We provide a CGE analysis of likely impacts on Scottish economy of Universities UK scenarios

• Scenarios based on the reaction of Universities to the demographic changes
Scotland demographic challenge

Population aged 18-20
Scotland
2006-based principal GAD/ONS projection

-11.0%
-16.9%

thousands of persons
Projected total number of students (FTE*): UUK baseline

-11.4%

-6.9%
GDP impact of the loss of income by HEIs
Bridging the gap 2: Supply-side HEI-disaggregated CGE analysis

• Need to develop databases and evidence on key behavioural relationships:
  – Input-output and SAM databases with HEI sector separately identified for Scotland (also, Wales, NI, England)
  – Quantitative representations of the supply-side transmission mechanisms from HEIs to regional economies
  – Sources: existing literature and new analyses of microeconomic databases

• Proceed through development of a suite of regional *computable general equilibrium models* (CGEs) disaggregated to include HEI sector
  – Include supply-side – so allow for supply-side heterogeneity among host regions
  – In principle can accommodate impacts of e.g. technology transfer and any other supply-side impacts
  – though evidence required to specify and parameterise key relationships
The supply side impacts of HEIs

• Increased productivity of the labour force
  – Here focus only on this impact
  – Underlying assumption is that higher education increases productivity of workers and this is reflected in higher wages (new micro-econometric analysis)

• Knowledge spill-over impact
  – HEIs produce “knowledge” and facilitate its exchange, which benefits wider economy (new micro-econometric analysis)

• Wider positive impact of the HEIs
  – Improvement in health and life style
  – Decreasing crime rates
Measuring productivity

• In the absence of direct measures of individual productivity we base our analysis on the assumption that earnings are positively correlated with productivity.

• We compare earnings of graduates vs. non-graduates and calculate the so-called “graduate wage premium”.

• We assume that it reflects higher productivity of the former group.
Graduate wage premium

• There are a number of estimates of the graduate wage premium for different countries

• We are using our own estimates for Scotland based on the LFS for the past three years (2005-2007) as a baseline – 58%

• Sensitivity analysis around this value provides further evidence
Productivity vs. sorting

• There are two different schools of thought on relationship between education and earnings:
  – The theory of human capital (Shultz, 1961; Mincer, 1974; Becker, 1975) maintains that education directly augments individual productivity
  – The theory of sorting/signalling/screening (Spence, 1973; Arrow, 1973; Stiglitz, 1975) advocates that education merely provides a tool to differentiate between more and less productive individuals in the presence of asymmetric information
    • Strong signalling – education does not effect individual productivity and thus social returns to education are negative
    • Weak signalling – education has positive impact on productivity but private returns to education exceed social returns
• Most studies fail to confirm strong signalling hypothesis
• Lange & Topel (forthcoming) estimate that sorting represents only 10% of private returns to education
• We also provide sensitivity analysis around this value
**Scenario 1:** All future cohorts will reach the same share of graduates as the highest age-specific share in 2005-07 (37%)
Long run increase in GDP due to changing skill mix of the population in Scotland: Scenario 1

<table>
<thead>
<tr>
<th>Wage premium</th>
<th>Signalling</th>
</tr>
</thead>
<tbody>
<tr>
<td>50%</td>
<td>0%</td>
</tr>
<tr>
<td>5.4%</td>
<td>5.0%</td>
</tr>
<tr>
<td>58%</td>
<td>6.2%</td>
</tr>
<tr>
<td>70%</td>
<td>7.3%</td>
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</tbody>
</table>
Future research

• Explore demand impacts in more detail
• Extend the supply-side impact analysis:
  – composition of graduates by subject and related productivity effects differentiation
  – use sectoral distribution of graduates to inform distribution of productivity shocks
  – generate new micro-econometric evidence on knowledge transfer impacts
• Application to other countries of the UK
• Then extend to close other gaps in our knowledge
  – interregional impacts
  – wider effects of HEIs