

Impact of Higher Education Institutions on Regional Economies Joint Research Initiative

<http://www.impact-hei.ac.uk>

Research Brief Number 17

Graduates significantly enhance productivity and economic activity in Scotland

Producing ‘human capital’ is a fundamental role of universities. However, until now, little effort has been made to measure the extent to which university graduates impact on the economy of a region at a system-wide level.

This study measures the impact of Higher Education Institutions (HEIs) on the Scottish economy through the enhanced productivity of Scottish graduates relative to non-graduates. The research uses a purpose-built economic model (an HEI-disaggregated computable general equilibrium (CGE) model) to estimate the impact of the growing proportion of graduates in the Scottish labour force.

Until now, attempts to assess the overall impact of HEIs on regional economies have focused either on their spending in the local economy (the demand-side impact) or on a single dimension of the supply-side impact, which impacts through HEIs contribution to the ‘knowledge economy’ through stimulating innovation at the microeconomic level. There is no attempt to integrate the two approaches. Furthermore, there is a glaring omission: neither approach attempts to assess the impact of graduates on the host region’s economy.

This study provides a micro-*to*-macro approach that allows to measure the impacts of both demand and supply effects of HEIs in a single, unified framework. The CGE model is used here to simulate the supply-side effects of HEIs that arise through the impact of their graduates on the region. However, the approach can be applied to the other supply-side impacts of HEIs (such as technological spillovers in the knowledge economy, and social benefits), and to demand-side changes.

The purpose of the modelling is to determine the likely system-wide consequences of the improvement in labour productivity implied by the projections of the labour force composition. Using population projections and recent data on HE participation rates and graduate retention rates it is projected that the share of graduates in the Scottish labour force will increase significantly in the future,, augmenting human capital and productivity.

The study exploits the extensive micro-econometric evidence of the effects of HEIs to provide estimates of their likely macroeconomic impacts. Using this “micro-to-macro” approach, it identifies and calibrates the transmission mechanisms that lead to improved productivity (for example increased competitiveness), which operate at the micro/meso-level. It then simulates their system-wide impact.

In this way, the study provides an integrated demographic-economic analysis of HEI impacts that considers Scottish HEIs as a whole.

Key Findings

Universities exert a significant impact on regional economies through the skills with which they imbue their graduates

- Overall, the simulations suggest that the long-term supply-side impacts of HEIs boost regional GDP, although the precise results vary according to assumptions about future

graduate retention rates, the size of the graduate wage premium and the strength of the signalling effect.

The impact of graduates on regional economies is greater than the expenditure impact of universities when considered on a comparable basis

- The maximum possible impact of combined HEI and student expenditures is 2.6 per cent of GDP. This is based on university demand for goods from other Scottish firms and the consumption of Scottish goods by employees and students.
- The impact of graduates on the economy is projected to be 4.2 per cent of GDP, assuming they earn 45 per cent more than non-graduates, signalling effect explains 10 per cent of the wage differential and education policy does not change.
- This economic stimulus is likely to be achieved without an increase in HE participation rates, although the proportion of graduates in the labour force will rise as older members of the workforce retire and are replaced by younger ones with higher levels of education.
- The proportion of graduates in the labour force is projected to increase from 34 per cent in 2006 to 46 per cent by 2051.
- The simulations suggest that employment will increase in the long run: the stimulus to employment from improved competitiveness dominates the fact that any given level of output can now be produced with less labour input.

A key transmission mechanism is from improved regional competitiveness, which stimulates trade

- The enhanced productivity of graduates stimulates GDP and creates a downward pressure on prices.
- Exports to the rest of the United Kingdom and the rest of the world are likely to increase by 4.3 per cent and economic activity generally will be stimulated (assuming there are no changes in the economy of the rest of the UK).

Implications

Approaches of the type developed in this study will allow the exploration of the effect on the regional distribution of HEI impacts. The research can be extended in a number of directions, both through drawing on the existing framework, as well as bringing in additional evidence and model variants:

- The importance of graduates for other regions and for the UK as a whole could be assessed. This would identify the extent to which regional impacts depend on region-specific competitiveness.
- Inter-regional effects of the productivity shocks could be usefully investigated, since Scottish HEIs are an integral part of the UK system and Scotland is inextricably linked to the UK economy through migration and bargaining mechanisms.
- The system-wide impact of other supply-side transmission mechanisms, notably those coming through innovation and knowledge spillovers could be explored.
- Wider impacts of HEIs, for example social returns such as health or non-market private returns can be explored. This would allow evaluation of the Browne (2010) report, which proposes a reduction in public subsidy of undergraduate education in the UK.
- A comprehensive analysis that disaggregates graduates' impacts by location of HEIs could be undertaken. Given devolution within the UK, this would be of interest to both regional and national governments.

- If the HE sector becomes more market-driven following the Browne report, it would be instructive to incorporate aspects of this within the modelling system, particularly if devolved governments pursue differentiated policies.

Methodology

To simulate the system-wide impact of increases in labour productivity on the Scottish economy, the study employs a CGE model, AMOS, which explicitly identifies HEIs as one of its sectors. AMOS is a CGE modelling framework parameterised on data from Scotland. It is a fully specified, empirical implementation of a regional, inter-temporal, general equilibrium variant of the Layard, Nickell and Jackman (1991, 2005) model. It has three domestic transactor groups, namely the personal sector, corporations and government; and four major components of final demand: consumption, investment, government expenditure and exports.

By using a micro-*to*-macro approach, the study is able to isolate the system-wide ramifications of any particular demand or supply-side impact associated with HEI activity. In this case, the focus is on modelling the system-wide impact of the productivity stimulus associated with graduates. In contrast, the macroeconomic (growth) approach can at best identify the *aggregate* impact of HE activity, including the effects of any externalities.

Based on the most recent evidence, this study attributes the earnings power of graduates to their additional productivity, most (but not all) of which is driven by their training in universities, rather than their innate abilities. In baseline simulations 10 per cent of the earnings differential is attributed to signalling of innate abilities.

The results of the simulations illustrate the likely orders of magnitude of the impact of graduates on the Scottish economy, if current higher education policy is maintained, and demand for graduates keeps pace with the supply, in line with recent trends. Any one of the assumptions may prove to be incorrect, but the study seeks to illustrate their likely importance through a sensitivity analysis, which varies assumptions about the evolution of the labour force, the scale of the wage premium and the strength of the signalling effect.

Further Information

The study was carried out by Kristinn Hermannsson, Katerina Lisenkova, Patrizio Lecca, Peter G McGregor, and J Kim Swales at the Fraser of Allander Institute, Department of Economics, University of Strathclyde.

To contact the authors of this research:
Kristinn Hermannsson
Department of Economics
Rm. 7.15, Sir William Duncan Building
University of Strathclyde
130 Rottenrow
Glasgow
G4 0GE
Scotland, UK
Tel: +44 (0) 141 548 3956 (EXT. 3956)
Email: kristinn.hermannsson@strath.ac.uk