Economic perspectives – Glasgow Special Issue

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Introduction by Professor Sir Jim McDonald
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Introduction and Background

It is timely that the Fraser of Allander Commentary turns its analytical attention to Glasgow, Scotland’s largest city and the centre of Scotland’s only true metropolitan economy. As the Scottish Government and the UK Government’s Technology Strategy Board (TSB) recognise, cities and city-regions are increasingly the drivers of economic recovery and growth. This is also increasingly true for many of the world’s largest and most dynamic companies – Siemens, GE, Mitsubishi, CISCO, IBM, ARUP etc. – who recognise that cities are driving demand for new smart infrastructure and technologies. That Glasgow has been chosen by the TSB (from over 50 UK cities) to be the UK exemplar to test, develop and deploy SMART city technologies, is testament to the fact that Glasgow is well-positioned – institutionally, academically and economically – to take advantage of an upturn in global demand. Not only is there increasing demand for smart solutions to urban living we can - and must - use this to attract new research-led and high value work to develop and extend the city’s export base. Such a development is a world away from the deep structural economic changes that buffeted this great city and its citizens from the early 1980’s. This sea change in the city’s economic experience is evidence, I would argue, that Glasgow is well into its ‘second wave’ of post-1980’s economic development (the first was the McKinsey / Glasgow Action focus on financial services, software and tourism). This ‘second wave’ recognises and builds on the first while refocusing on Glasgow’s – and its wider city region’s - historic role and contemporary reality as Scotland’s engineering and technological heartland, and as a base for newer industries in the life sciences, creative media and low carbon / renewable technologies.

It is clear than any city, not least Glasgow, will have to both embrace a low carbon future, as well as develop industrial and business success in the development and application of low carbon technologies, innovation and business practices. It is in the latter area that Glasgow, with its engineering heritage, businesses and universities and colleges, needs to focus its efforts to create a new Industrial Revolution. We know from the literature on city growth that it is the application of innovation and its widespread use across all sectors of the economy – including digital and web-based technologies – that are critically important to underpin long-term growth and development.

The development of Glasgow, post the 2008 financial crash and subsequent deep recession – what in the US is termed, the ‘Great Recession’ – has been a journey to rediscover and renew Glasgow economic, civic and business roots. The establishment of the Glasgow Economic Commission in 2010, by the Leader of the City Council and the Glasgow Economic Partnership was a bold attempt to draw on the experience and expertise of the city’s private sector leaders to help focus public efforts to support and drive growth and employment. Similarly, the subsequent establishment of the Glasgow Economic Leadership Board brought together leading business figures – from engineering, finance, energy, life sciences, food & drink and retail - with the Leader (and CEO) of the City Council and senior leaders from Scottish Enterprise and, of course, academia. In essence, the aim of Glasgow Economic Leadership is to recreate the sense of purposeful engagement of the city’s civic, business and academic communities behind a single purpose: to grow and develop the Glasgow economy, attract investment and jobs and increase Glasgow’s contribution to Scotland’s growth and development.
To do this, the Leadership Board, following on from the advice and analysis of the Glasgow Economic Commission, established industry-led, key sector work streams - Low Carbon Industries; Engineering, Design & Manufacturing; Life Sciences; Financial & Business Services; Tourism & Events; and, Higher & Further Education - a sector which make a very significant contribution to the city’s economic, social and cultural life.

Each work stream was set a simple task: to identify (within a six month period) an Action Plan to help drive investment and jobs and contribute to the overall development of the city economy. Each drew on its own experience and knowledge - from business, public agencies and academia – to agree and then present their proposals to the Economic Leadership Board in June 2012. These Action Plans were grounded in fact and experience, and focused on Glasgow working to meet new global demands. Each Action Plan was set in a wider Scottish perspective and sought to identify the distinctive contribution that Glasgow could make to Scotland’s success. In Life Sciences, for example, the work stream focused on Glasgow’s pre-eminent role in Scotland for Stratified Medicine (or as it’s termed in the US, ‘personalised medicine’); on MedTech (medical and health technologies) where the city lies at the centre of Scotland’s largest concentration of MedTech companies; and on global pharma manufacturing with Scotland’s largest centre based at GSK in Irvine. Similarly in Tourism, the work stream sought to further enhance the economic contribution that Glasgow plays as Scotland’s centre for Business Tourism, its increasing focus on attracting Major Events, such as the Commonwealth Games in 2014, other major sporting (eg the city’s bid to host the 2018 Youth Olympics) and cultural events; and, the strategic and global exploitation of Glasgow’s unique Mackintosh legacy. In Low Carbon Energy – and as recognised separately by the Economist – the focus has been on capitalising on the world class research base at Strathclyde University together with the creation of an integrated corporate community to build strong supply chain opportunities and enhanced uses of technological innovation.

This issue of the Fraser of Allander Commentary includes a business perspective on Glasgow as a business and corporate centre by PwC. Glasgow is home to the headquarters of major companies, most notably the publically-listed, FTSE 100, Weir Group plc and Aggreko plc, plus Scottish Power, Clydesdale Bank, the privately-owned Edrington Group and a significant number of smaller, high-growth, technology companies such as Castle Precision Engineering, Linn Products, Graham Technology and Sgurr Energy to name but a few. These companies – and more - link Glasgow firmly to international markets and they utilise and develop Glasgow enviable skills and graduate base as well as attracting global talent to the city. An increasing number work in partnership with the city’s universities and colleges to develop not only the skills and innovation they need to succeed but in partnerships help take research into new industries and products. Importantly they help anchor investment and talent in the city – and in Scotland.

Glasgow’s ambitions to develop a low carbon economy and test and demonstrate the application of SMART city technologies is outlined by Dr Richard Bellingham of the Strathclyde International Public Policy Institute’s (SIPPI) Institute for Future Cities and a leading expert in Energy and SMART Cities analyses. Dr Bellingham outlines the work to date and how we must use these to help drive a new ‘smart’ industrial revolution in the Glasgow and the wider city region economy.

Dr Kristinn Hermannsson (research associate at the Fraser of Allander) analyses the economic impact of universities / HEIs in Glasgow. This work is UK-leading and reflects the expertise of the Fraser of Allander Institute in applied economics. Suffice to say, it is our students that are working out in the economy, make the largest economic impact on productivity and wealth - something we should never forget.

Grant Allan, Research Fellow at the Fraser of Allander and its Lead Forecaster, uses the latest economic data to analyse Glasgow’s 10-year economic performance and compares it to that of Scotland’s cities to draw out its strengths – such as the city’s strong skills profile with graduate numbers that compare favourably with major UK cities; and, of course, the city’s continuing challenges.

It is worth noting that Glasgow’s business leaders told the Glasgow Economic Commission that they compare Glasgow – what it offers and how it is developing - not with Scotland’s other cities, but to the UK’s larger cities: Manchester, Birmingham and Leeds as well as major European cities. This outward-looking economic perspective reflects Glasgow’s long trading tradition which saw it develop explosively from an important medieval ecclesiastical and academic centre to a great trading city, based first on the North Atlantic trade and then with the industrial revolution as a world leader in shipbuilding and
engineering. It is an intriguing thought as to whether Glasgow, post-2008 and into the early years of the 21st century, is returning to its economic roots as a global trading city – trading on its skills and talent, innovation, technologies and business acumen. This is a vision that Glasgow’s Victorian business and civic leaders, who oversaw this great city’s growth over a century ago, would recognise and strongly endorse.

This is an exciting time for Glasgow. The Fraser of Allander Commentary provides an opportunity to analyse where we are and some of the issues we face. However, it is for Glasgow Economic Leadership and all its partners in business, public agencies and academia to converge through collaboration in order to invest in where we want to be and what city we want to create for the benefit of all our citizens, longstanding or new. To let Glasgow flourish.

Professor Sir Jim McDonald
June 2013
Glasgow defined: a business perspective

PwC in Scotland

Introduction

PwC in Scotland support for the Fraser of Allander Economic Commentary is now in its sixth year and we are pleased to be able to contribute this business perspective on Glasgow.

Commerce, trade and business together with education have been the heart of Glasgow over the centuries. Glasgow played a central role in developing Scotland’s trans-Atlantic commerce and trade-based economy with the development of the tobacco trade. As the ‘second city of the empire’ in the late 1800s it was, as Findlay (2011) notes, a central player in the first industrial revolution with its textile, mining, iron and shipping industries. Glasgow’s leadership in the manufacture of ships, locomotives and heavy engineering reflected not only a highly skilled workforce, but equally a strong tradition of technological innovation and invention together allied to a strong financial and business services base.

Through much of the 20th century Glasgow, along with many other industrial cities, had to confront the problems of industrial change and rising social deprivation and experienced several cycles of decline, renewal and regeneration. However, the traditions of innovation, together with a strong higher education sector, and a vibrant culture and dynamism have enabled Glasgow to change and to renew its economy. Since the 1980s, Glasgow has been rebuilding itself through a series regeneration programmes including: the ‘Glasgow Miles Better’ campaign, the 1988 Glasgow Garden Festival, being European City of Culture in 1990 and, looking forward, hosting the Commonwealth Games in 2014. These, together with a series of development strategies, most notably the private-sector led Glasgow Action which led the implementation of a services-led McKinsey strategy from the mid-1980’s to the Joint Economic Strategy of Glasgow City Council and Scottish Enterprise set out in 2006 ‘Step Change’ strategy programme and – even more recently - the creation of the Glasgow Economic Commission and the private sector-led Glasgow Economic Leadership all illustrate the innovation and strength of commitment of civic, business and academic partners to continuing and strengthening Glasgow’s economic growth and renewal.

As we argue in our report ‘Good Growth for Cities’ (2012), cities have a significant role to play, as the engines of both local and national sustainable growth in the current economic climate of reduced public sector expenditure as well as policies of reducing the structural deficit and rebalancing the economy. In the UK cities account for 9% of the landmass but are the location of 53% of businesses, 58% of jobs, 60% of GVA and 82% of high skilled jobs (Centre for Cities 2013).

Recent Scottish evidence (Grant 2013) suggests the growth in economic activity in the three major cities of Scotland – Glasgow, Edinburgh and Aberdeen – has outperformed that of the Scottish economy as a whole in recent years. ‘Over the last eight years, the share of Scottish output that is produced in these three sub-regions has increased, and now accounts for almost one half of all output in the Scottish economy’ (Grant 2013).

Today cities, as centres of economic growth, are even more important to the Scottish economy. Since the 1990s Glasgow has, through a series of economic development strategies, sought to develop the framework and partnerships to promote economic growth and to cope with the changing economic context. But Glasgow, in common with other cities faces new challenges – sustaining growth and competitiveness in a period of austerity, the need to reduce energy consumption and to take full advantage of the opportunities of the digital age to work smarter and to integrate more cleverly the activities of the city and its citizens.

The Glasgow Economy

Business tends to see the Glasgow economy not in terms of Glasgow city, but a broader metropolitan area with a population of 1.2 million (Glasgow Economic Commission 2011), encompassing North and South Lanarkshire, Renfrewshire and East Renfrewshire, East Dunbartonshire and Inverclyde together with
Ayrshire and West Dunbartonshire. The Glasgow Economic Review (2011) estimated the Glasgow metropolitan economy to be worth some £35 billion per annum with some 53,000 private sector enterprises (Scottish Corporate Statistics) with its further and higher education institutions generating £1.6 billion of output and increasingly acting as ‘magnet’ for business research and innovation: for example the Inchinnan-based Advanced Forming Research Centre (AFRC) focused on the aerospace market; the Cumbernauld-based Power Networks Demonstration Centre (PNDC) based on the energy transmission market and city centre-based Technology Innovation Centre the focus of Glasgow’s strength in low carbon industries and, in particular, renewable technologies and innovation.

Glasgow has a diverse economy with more than ten companies with a turnover of over £500 million per annum, two FTSE 100 HQ companies (Weir Group PLC and Aggreko PLC), some 30 companies with an annual turnover of £200 - £500 million, 40 companies with a turnover of between £100 - £200 million, over 50 companies with a turnover of £50 - £100 million, over 75 companies with an annual turnover of £20 - £50 million per annum, together with almost 100 SMEs with a turnover of over £10 million per annum (data from Scottish Business Insider). Metropolitan Glasgow is also home to a greater than expected proportion of high growth companies [Glasgow Economic Commission, Economic Analysis (2011)]

What makes a competitive city?

Simplistically what companies want is a place where they can do business, be competitive and grow. For some Scottish cities this means a clear focus on the core business sector, for example for Aberdeen this is clearly a focus on developing and sustaining the oil and oil supply chain and renewable energy and hence a combination of public and private sector policies which facilitate the supply of skilled staffs and a modern infrastructure.

In recent years academics, policy makers and business have recognised the importance of modern, high quality information and communication networks and the potential economic advantages to be gained when cities embrace the commercial possibilities of integrated and advanced information and communication technologies. The development of ‘silicon’, ‘cyber’ ‘digital’ and ‘Smart’ city policies highlight the desire to accelerate the introduction and integration of information and communication technologies into city and business life in order to grow cities and regions have been widely adopted. There have been considerable differences in the emphases in such policies; some have focussed on a single objective (IT infrastructure and interconnectivity), others have stressed a broader programme of infrastructure improvements; and an emphasis on energy reduction and sustainability is a popular third theme. Additionally IT and information companies have recognised the value of the smart city concept as a marketing tool and have developed sets of factors to enable cities to benchmark and improve their smart working.

MIT Media Lab – City Science has developed six broad themes, embracing both current and emerging technologies, which need to be integrated in the future to sustain cities, arguing ‘we must deploy emerging technologies to create a nervous system for cities that supports the ability of their government, energy, mobility, work and public health networks’. Similarly Giffinger et al (2007) in an EU funded study to rank European medium sized cities in terms of ‘smartness’ developed six criteria based largely on traditional regional approaches to regional growth; a smart economy, smart mobiltiy; a smart environment; smart people and smart governance. Likewise IBM (2009) has published both a view of smarter cities and tools for assessing and monitoring progress to optimise core city systems.

We believe, as IBM also recognise (2010), that an emphasis on the need for cities to focus on modern and effective information technologies and integrated data management systems can possibly underplay the importance education and learning, cities with a combination of high quality university based research and well developed business and financial networks have been areas of rapid economic growth and business start-ups. A city’s competitiveness depends not only on the infrastructure but equally on the skills, creativity, knowledge and willingness to absorb innovation of its citizens and of those who want to work in the city. It is important not to forget that Glasgow, and Scotland, have benefitted from a long tradition of successful entrepreneurs who, with a long term vision, have created large, successful companies.

For these reasons we support the approach adopted by the Glasgow Economic Leadership that, following Parkinson (2003 and 2005) and others, there are a number of key characteristics which can be used to define city competitiveness (see Slims Consulting 2011 for a fuller discussion of these themes), namely:
Innovation in firms and organizations;
A skilled and educated workforce;
Connectivity – both physical and electronic;
A broad economic base;
A thriving higher education and research sector;
A good quality of life;
A strategic capacity to mobilise and implement long term strategies
Smart governance.

Good and effective growth

Traditionally growth has been measured in terms of economic data - growth, employment, income, GVA, infrastructural improvements together with measures of social equality and inclusion. More recently, broader indicators, popularly reported as ‘happiness’ indices have been developed. In 2012 the Office for National Statistics published a national well-being index based on additional questions added to the Integrated Household Survey, Oxfam produced a humankind index for Scotland (2012) entitled the ‘New measure of Scotland’s prosperity, in PwC we produced in 2011, in collaboration with Demos, ‘Good Growth’ a report on economic wellbeing and followed this in 2012 ‘Good Growth for Cities’. All of these indicate that successful cities are ones which identify the quality of jobs, income levels, health and work-life balance, housing and transport infrastructure and the environment as important factors to improve.

Looking forward: Issues for business

In terms of the cities agenda businesses are frequently asked the question ‘What do you want, or need, or looking forward what are your priorities?’ But there are no simple answers to such questions; much depends on the particular issues confronting a business sector and the stage in the business’s life cycle. Equally the answers will be different for incoming firms and those well established in the community. Simplistically all businesses want to be able to grow and develop, employees to enable this and an infrastructure that facilitates such growth and development. The Glasgow Economic Commission, drawing on Parkinson’s work identified eight key factors driving successful city economies and identified a number of sectors with the potential to generate significant wealth and employment.

Our work with the business community leads us to suggest four broad issues:

Physical infrastructure Modern work requires good and modern workplaces which are energy efficient interconnected and well designed to be attractive places to work and do business;

Connectivity A modern transport system with good interconnectivity between the main components and good links to the main markets. Excellent and smart digital connectivity and working for business and for the main aspects of city life. Open, strong and effective networks between local government, business, higher education and the community. A city which has good links to export markets.

Innovation An effective governance, industry and higher education sectors which attract and retain skilled employees; a community which values innovation irrespective of whether it is scientific, business, cultural or artistic;

A vision Cities need a vision for the future, a plan to achieve that vision and a commitment by the main city agencies to work to achieve it.
Conclusions

As the UK and Scottish economies begin the recovery from recession it is evident that the economic context has changed, there are severe and continuing pressures on public sector budgets, markets continue to experience ever-more competition, and energy and other mineral costs continue to rise. Glasgow has weathered an extensive economic restructuring over the past twenty to thirty years and is now, arguably, again at a crossroads. It can react to the current economic climate by accepting more modest ambitions and reduced rates of economic growth and business innovation, or use the current, challenging economic climate to innovate and engineer a future that embraces the opportunities offered by smarter ways of working.

Glasgow should be rightly proud of its successes in developing the renewables and the low carbon industries, in its excellence in engineering and the life sciences, in its growing financial & business services, as well as its world class research led higher & further education sector and it should not forget the importance of its artistic and cultural sector which adds to the contribution tourism makes to the West of Scotland. Much has been achieved, nevertheless, future progress along the route to a future vision for Glasgow will require leadership, brave decisions to be made, and policies which encourage sustain and value private sector engagement and strong links between local government, higher education and business remain, as they have for previous generations, at the heart of Glasgow’s future.

References:


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Smart & Sustainable Cities

Richard Bellingham & Nicholas Purshouse, University of Strathclyde

Summary

The University of Strathclyde is creating a new Institute for Future Cities that aims to improve the quality of human life across the world through innovative research that enables cities to be understood in new ways, and innovative approaches to be developed for the way we live, work, learn and invest in cities. The new Institute will create a focus and strategy to coordinate academic research on urban themes, and partnerships with cities, businesses, research institutions and governments across the world.

This paper outlines the wider context and issues for urban policy and research, and describes some of the key objectives and activities of the Institute for Future Cities - including the €3.7 million EU FP7 STEP UP project on sustainable city planning and implementation, a new ESRC research programme on crime prediction, and the City Observatory within the £24 million TSB Future City Demonstrator in Glasgow.

Background

Over half the world’s population now lives in cities – this simple fact, whilst it emphasises the global importance of urban society and its impacts, conceals a much more complex picture of change across the world. Some projections estimate that global urban population will increase from around 3.6 billion in 2011 to reach about 5 billion by 2030 and 6.2 billion by 20501, with significant consequences for economies, environment, resource utilisation and governance – as well as significant opportunities for integration and transformation of urban systems. Current and projected growth in city populations will occur mainly in the developing world – with many developed world cities having broadly flat or shrinking populations.

Cities are also the drivers of many economies across the world. Urban areas currently account for 70% of global GDP (World Bank, 2010)ii, and according to MGI (2011)iii 600 metropolises will contribute more than 60% of world GDP growth in 2025. In Korea, Hungary, and Belgium the capital city accounts for around half of total GDPiv.

Urbanisation has often been considered a process that needed to be curbed and controlled, however policy makers are increasingly recognising urbanisation as a powerful force in support of economic growth and poverty reduction (World Bank, 2010). China plans to move hundreds of millions people into cities over the next 20 years in an effort to lift a larger proportion of its population out of poverty.

As well as growth of cities there are powerful processes driving other types of significant on-going change in cities. The role and relevance of different drivers varies according to the individual context of each city.

Some examples are given below:

- demographic change (eg increasing populations, aging populations, changing social structures)
- need to improve public services and reduce costs
- tackling social problems – crime, health, education
- economic growth or recession - opportunity and changing economic structures
- consumerism and the desire for improved quality of life
- policies to reduce environmental impacts (including carbon emissions)
- natural or man-made crises
- climate change
- political and cultural change
- opportunities for change created by new technologies and adoption of those technologies.

Cities in the developed world often have rigorous long-term planning systems and policies – but as the impacts of these drivers are not always fully understood, major strategic decisions are taken in the face of
unpredictable change, and therefore can result in the delivery of infrastructure and systems that are misaligned with the needs of cities and citizens as the ground continually changes beneath the feet of planners. The ability of cities to reduce risk and be successful in a range of possible futures is a critical issue for city planners and citizens.

Very different models of city governance are in place across the world – with some cities having strong powers, strong governance, and effective local systems; some cities with weaker powers (as more power is held by central government), and some largely chaotic cities struggle to create and implement effective policies and strategies at a city level (and are therefore particularly vulnerable to the above drivers for change).

Consumption of global resources is fundamentally linked to GDP and the total size of human population across the world. Cities interact with global consumption in several ways:

- due to system efficiencies cities enable larger populations to be supported;
- by increasing wealth and education they promote both consumption and production;
- by allowing people to become better educated and wealthier cities encourage lower birth rates.

Cities therefore have a significant role to play in meeting global policy objectives (and can be used to bypass national policy frameworks). The role of cities is increasingly recognised – for example, the European Commission created the Covenant of Mayors which promotes action at city level through political commitment to a process of reducing carbon emissions by at least 20% by 2020. Over 4000 cities across Europe have signed the Covenant but relatively few have produced credible strategies to deliver low carbon futures for their cities – and equally few have taken steps towards implementing those strategies in a co-ordinated fashion – though there are isolated examples of good projects in many cities. Increasingly influential networks of cities are being formed to exchange knowledge, improve skills, promote strategic thinking, develop multi-city strategies, and attract investment - such as C40, Eurocities, and the Scottish Cities Alliance.

Across the world we see growing interest from cities, governments, businesses and universities in the creation of smart sustainable cities – in the US cities like Chicago and New York show real political commitment, and in China some major cities are now signing the equivalent of the EU covenant of mayors.

Glasgow City and Strathclyde University together are becoming a growing focus of attention. In 2010 Glasgow published the Sustainable Glasgow strategy – this strategy aims to help Glasgow become one of Europe’s most sustainable cities. For Glasgow this means achieving a mix of objectives – reducing carbon – but also achieving urban regeneration; delivering jobs and training; helping change the city’s image; regenerating communities, and tackling fuel poverty. A set of major feasibility studies helped Glasgow understand its carbon emissions, and identify the technically and financially viable opportunities that could feasibly reduce the city’s carbon emissions by 30% within 10 years. Since 2010 we have started to see some of the report’s major recommendations being implemented – with the designation of district heating zones in City Plan 3; creation of a waste to energy plant at Polmadie capable of handling all the city’s municipal waste; and proposals to improve the efficiency of street lighting. Next year Glasgow will host a low carbon Commonwealth Games – watched by over 1 billion people worldwide – which includes the development of district heating for hundreds of homes and other facilities in the Commonwealth Games zone.

Strathclyde University built on its work creating the Sustainable Glasgow strategy to win €3.7 million in EU funding for the STEP UP programme, and to support Glasgow’s winning bid for the TSB’s £24 million Future Cities Demonstrator (see below) - a win that is drawing attention from around the world. Strathclyde is also currently creating the £89 million Technology and Innovation Centre that is forming joint academic/commercial research partnerships on agreed themes – including low carbon energy and future cities.

Given the global context, strong interest from commercial partners, local opportunity and resource, and the relevant strengths that Strathclyde has across multiple disciplines, the University decided to create a new Institute for Future Cities.
The Institute for Future Cities

The University of Strathclyde is creating a new Institute for Future Cities to improve the quality of human life across the world through innovative research that enables cities to be understood in new ways, and innovative approaches to be developed for the way we live, work, learn and invest in cities. The new Institute will create a focus and strategy to coordinate academic research on urban themes, and partnerships with cities, business and government across the world.

The Institute will tackle the large, complex and difficult issues and opportunities for cities across the world. The Institute will work in partnership – integrating and catalysing expertise and research from multiple disciplines within Strathclyde University and other research institutes and working with Glasgow and other cities across the world; commercial organisations and local and national government organisations.

Multiple disciplines need to work together to develop effective solutions, and to capitalise on the very significant opportunities offered by cities to deliver economic growth, reduce environmental impacts, and tackle major social issues (e.g. in crime, health, and education).

The University of Strathclyde and its partners have strengths in a range of relevant disciplines – such as sensors, communications, energy, engineering, computing, mathematics, sociology, health, public policy, architecture, design, law, business, and economics. Through a coordinated approach these strengths can work together to optimise research opportunities and outcomes, and deliver significant tangible impacts in the urban context.

Significantly increased public and commercial funding for research in the UK, Europe and across the world is creating opportunities to address key urban issues using the tools and the scale necessary to create innovative and relevant solutions that work in both current and future cities.

The Institute aims to create a world-leading centre for research and teaching on smart sustainable cities that integrates and catalyses expertise and research across sectors and multiple disciplines, to address challenges, seize opportunities, and inform decisions. The Institute’s research programmes and teaching aim to deliver tangible impacts on real cities - enabling policy makers to create strategies that have greater prospect of success, reduced risk, and greater positive impacts; citizens to influence and make better use
FRASER ECONOMIC COMMENTARY

of services, make informed decisions, live richer and more fulfilled lives; and businesses to identify new opportunities and create new business models. The Institute will work in partnership across the world - with cities, research institutions and commercial organisations to conduct research, share data, develop techniques, maximise impact, share experience and improve understanding in cities. Already the Institute is finding significant interest from major commercial organisations in joint research programmes. The Institute will also make a major contribution to the University's internationalisation agenda through creating links with cities and research institutions globally. These partnerships will develop and be enlarged throughout the life of the Institute.

The Institute will build on a series of existing projects and opportunities including:

- the €3.7 million EU FP7 STEP UP programme on planning and implementation of sustainable cities
- a new Masters degree on planning and implementation of sustainable cities
- a new ESRC research programme on crime prediction and crime reduction measures
- the City Observatory within the TSB Future City Demonstrator

Further details of these programmes are given below.

The Institute will also develop major new research programmes in areas such as:

- Risk, resilience and agile urban systems
- Health improvement in urban populations
- Citizen engagement in urban design and system management
- Key success factors in economic and social transformation of cities
- Effective governance and business models in urban environments
- Use of big data to model and simulate urban systems

STEP UP

The Smart Cities and Communities EU FP7 initiative, launched in June 2011, supports like-minded cities to work together to achieve their energy and climate goals – with a focus on assisting achievement of the EU’s 2020 CO2 reduction and renewable energy targets. Through creation of enhanced Sustainable Energy Action Plans (SEAPs) cities describe their low carbon strategies – with specific activities, measures and time frames. The initiative encourages cities to create demonstration projects and accelerate the deployment of best practice solutions for actions such as low carbon energy production (waste to energy, renewable energy, district heating and energy recovery); retrofitting building energy efficiency measures; low carbon transport and mobility; and energy demand management.

STEP UP (Strategies Towards Energy Performance and Urban Planning) is a €3.7 million EU FP7 Smart Cities and Communities initiative running Autumn 2012 to Spring 2015. The project, coordinated by the University of Strathclyde, consists of four partner cities: Glasgow (UK), Ghent (Belgium), Riga (Latvia), and Gothenburg (Sweden), their associated local authorities, as well as academic institutes and industry partners in each city. For Glasgow, the local partnership consists of Glasgow City Council, University of Strathclyde, and Scottish Power.

STEP UP is creating a coherent and easy-to-use model for energy planning. This model will be adopted in multiple cities to deliver faster and greater impacts for Europe’s 2020 energy targets – and wider policy objectives such as improving security of energy supplies, achieving urban regeneration, economic growth, and tackling fuel poverty – making these cities better places to live, work, learn, and do business.

The cities in the STEP UP partnership were deliberately selected so that they have similarities that enhance their ability to work with each other. The cities have all signed the European Covenant of Mayors and are therefore committed to significantly reducing their carbon emissions by 2020. The cities all have populations in the range 0.5 to 1 million, and are all historic port cities in Northern Europe - which leads to a number of common topologies, socio-economic factors, opportunities and issues.
STEP UP is a partnership of twelve organisations from city government, academia, and business. The combination of a local authority, commercial and research partner from each city, together with links into local partnerships and local stakeholder groups, ensures that STEP UP will be able to facilitate the delivery of real projects in participating cities by using a multi-disciplinary, multi-sector and integrative approach. The range of expertise and experience of the partners involved will ensure the provision of holistic solutions that deliver real economic, environmental and technological advances in each city with regards to sustainable city planning. The active involvement of city councils will ensure that the plans meet the needs of citizens, businesses and existing infrastructure. The involvement of the commercial sector (including energy companies and banks) ensures proposals are economically feasible.

Supported at the highest political level in all four cities, city leaders are playing an active role in the project throughout its life, ensuring it delivers on its objectives, and has clear and significant impact in the partner cities and beyond.

**An Integrated Approach**

The project is taking an integrated approach to energy planning, integrated project design and implementation by addressing three vital themes of energy and technology, economics, and organisation and stakeholders together:

The challenges associated with becoming more sustainable will be addressed by the project through:

- Creating an energy planning approach for developing and enhancing strategic energy action plans
- Demonstrating this approach works to deliver faster and greater positive environmental and economic impacts
- Disseminating and replicating this approach through a learning network to other ambitious cities across Europe (and beyond)
- Showcasing best practice innovative cross-sector low carbon solutions and projects
- Developing a “framework” for integrated project development and bringing several high level innovation pilot projects to the edge of application.
- Addressing economics, financing and stakeholder engagement to facilitate rapid deployment and replication.
STEP UP will identify and promote existing best practice on integrated cross sector energy solutions, such as industrial waste heat integrated into district heating networks or electric vehicles linked to smart electricity grids. STEP UP partner cities will draw inspiration from the winning elements of these lighthouse projects and develop common innovative projects which contribute to tackling their joint climate and energy challenges and opportunities. These innovative projects aim to show that integrated planning achieves better energy outcomes and economics as compared to the traditional approach which segments projects and sectors.

The programme will engage other cities in a Learning Network where skills and expertise on energy planning and best practice on integrated cross sector energy solutions are shared and supported. A small number of cities will become companion cities to the STEP UP partners and receive close guidance, coaching and training. Nuremberg is Glasgow’s companion city – and an additional companion city is expected to be identified in the next few weeks.

The approach for enhancing Sustainable Energy Action Plans will be documented, replicated in companion cities and disseminated via the STEP UP web portal. Lighthouse demonstration projects will also be promoted via the web portal. Study tours of the STEP UP partners’ cities will be run for city planning professionals and commercial enterprises interested in energy planning and the Step Up approach to integrated cross sector project development. Training and learning initiatives will extend the impact of STEP UP beyond the life of the project and across a much wider range of cities. This includes the creation of a new Masters degree in sustainable city planning and implementation that will be taught jointly by the University of Strathclyde with partner Universities across the world.

**First Steps**

Since starting in November 2012, the project has formed a committed consortium of partners successfully working together across Europe. Each city has now completed detailed stakeholder mapping and engagement plans; is conducting a gap and issue analysis of current energy plans; as well as the mapping of energy flows throughout the city. Large sets of data for energy consumption and efficiency are compiled for each city and Geographical Information Systems (GIS) are used to model and visualise opportunities and to demonstrate scenarios for of future energy flows.

Cities are also in the process of identifying best practice (“lighthouse”) integrative projects from their region which will be promoted and used to identify common issues and opportunities that all partner cities can learn from. In order to encourage fast replication of successful models and practices, a learning network of cities across Europe is being created that will test how STEP UP approaches work in different situations, and improve expertise in the network by sharing knowledge.

To ensure availability of tools, expertise, and lessons learnt, the project has launched a website (www.stepupsmartcities.eu) and later this year will be holding workshops to pass knowledge to the
learning network of cities. To assist cities to work more closely together to develop enhanced smart and sustainable city energy plans an open conference involving all projects partners, and the wider learning network will be held in June 2013.

For more details please refer to the website at:  [www.stepupsmartcities.eu](http://www.stepupsmartcities.eu) or e-mail info@stepupsmartcities.eu

**Future Cities Demonstrator**

Last year, the Technology Strategy Board (TSB) launched a Future Cities Demonstrator competition; with the winner receiving £24 million to showcase large-scale solutions that demonstrate unique and functional methods of integrating city systems in an environmentally-sound, economical way to improve the overall quality of life for citizens.

From an initial list of 30 cities, Glasgow was shortlisted along with London, Bristol and Peterborough, winning the competition earlier this year with a strong, local authority led project proposal in partnership with business and academic communities. Glasgow is building on major projects such as the Commonwealth games to demonstrate quickly the impact of innovative city solutions to the world.

The Future City Demonstrator supports the TSB’s objective of accelerating economic growth by stimulating and supporting business-led innovation with aim of positioning UK companies – supported by a world-class academic and research base – to export innovative approaches to delivering efficient, attractive and resilient cities across the world. The TSB assess this sector as being worth £200 billion per annum globally. Their aim is for the demonstrator to act as a showcase for the impact of innovative urban technologies on real cities - helping UK companies accelerate development of viable solutions and technologies for the wider benefit of the UK economy (Technology and Strategy Board, 2013).
Future City Demonstrator – key themes

Led by Glasgow City Council in partnership with key public, private and academic organisations, including the University of Strathclyde, implementation of the Demonstrator project will be completed by mid-2014 and will demonstrate how providing new integrated services across health, transport, energy and public safety can improve the local economy and increase the quality of life of Glasgow’s citizens (Glasgow City Council, 2013).

The project will contribute to addressing some of the city’s pressing energy, transport and health needs and will also show how innovative use of technology can improve the Council’s service provision, while additional potential benefits include improved crime prevention, a reduction in anti-social behaviour and improvements in travel infrastructure. (Technology & Strategy Board, 2013).

The demonstrator will develop programmes to promote healthy living; deliver advanced street lighting to address community safety and perception of crime; and enhance building energy efficiency to provide affordable warmth. The University of Strathclyde’s Technology and Innovation Centre will host major elements of the City Observatory. This will allow academic and business and industry researchers to analyse hundreds of data sets about Glasgow - its health, economy, transport, energy use – enabling the city to be understood in new ways, new solutions to be developed and tested, and the city to be used as a “living lab”. A city dashboard and a management system will be created that allows policy makers to see the city as an integrated whole, and new interfaces created to improve service delivery to citizens. Opening up access to data should also create new business opportunities through creation of new services and business models.

The project proposals for the demonstrator are currently being developed – example projects include:

- Journey planning - providing citizens with a real time view of traffic levels, and checking that buses and trains are on time.
- Monitoring of energy levels across the city - including new Combined Heat and Power (CHP) systems, that could allow the city to store energy when demand is low and then use it during times when it is higher. This has the potential to cut fuel bills and help the city tackle fuel poverty.
- Monitoring footfall and retail demand to analyse economic performance within Glasgow and assist tailoring of public policy at a local level.
- Via smartphone apps citizens will be able to report issues like potholes or missing bin collections and monitor problem resolution.
- Improved identification and management of traffic incidents and emergencies by better integration of CCTV and traffic management.
- Improved crime prevention and detection of crime as well as, helping to reduce anti-social behaviour incidents through the improved use of camera technology and integration of data.
- Potential to give residents real-time information on waiting lists in hospitals around the city.
- Use of sensors to assist older and disabled people to live independently.

The city’s political leaders have made clear that they see the demonstrator as a huge boost to Glasgow’s ambitions to build a better future for the city and its people. They aim to use technology intelligently to integrate management of different city systems to make Glasgow a better place to live, work and do business - helping it to attract new businesses and residents. More widely, the results from Glasgow’s demonstrator are expected to assist UK businesses to test and develop innovative integrated urban solutions and technologies that can be sold around the world.
Predictive Crime

In June the Institute for Future Cities will start a new £300,000 ESRC research project that will analyse multiple live and historic datasets to understand the pattern of crime in the city in new ways, to influence policy and test new approaches to managing street environments to reduce crime.

Street crime and fear of street crime have significant adverse impacts on individual lives, the use and regeneration of urban areas, the ability to attract businesses and investment, the price of property, and the ability of citizens to live full and creative lives. Previous studies have examined the relationships between a range of social, economic and situational factors and levels and predictability of crime using a range of techniques. However the impact of altering these factors (where they can be influenced), and how such measures might be combined with other potential crime reduction measures is not necessarily fully understood. This research projects aims to achieve new insights into the pattern of crime in cities using big data analytics to analyse the relationships between multiple datasets and levels of crime and to derive innovative optimised strategies that result in lower levels of street crime, as well as balancing other objectives – such as lower service costs (e.g. from improved design of street lighting, and policing patterns), lower carbon emissions, and improved public confidence and acceptance. Subject to agreement from key stakeholders the project may test some of these strategies through using the city as a living lab.

This project aims to help to achieve several different goals at the same time:

- Reduce actual levels of street crime and the perceived risk of crime;
- Improve the confidence of people and increase positive uses of public street space;
- Attract investment and businesses;
- Redesign services (such as lighting) to reduce costs and carbon emissions.

The project will review and analyse the significant ethical issues raised by conducting this type of research. It will create an external reference group to consider the ethical issues of the proposed research which will include academics, city government, local community representatives, the police and other key stakeholders – and may include experts from outside the city. This reference group will assist in reviewing protocols for ethical use of big data analytics in urban environments.

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1 UN Urbanisation Prospects -2011 Revision.
4 “Smart Opportunities in Smart Cities” Frost and Sullivan
The importance of the city: A spotlight on Glasgow’s recent economic performance

Grant Allan, University of Strathclyde

“Cities are our species’ greatest invention. …Cities are the absence of physical space between people and companies. They are proximity, denseness, closeness. They enable us to work and play together, and their success depends on the demand for physical connection…” (Glaeser, 2011, p. 6)

Introduction

The Scottish Government purpose specifically acknowledges the heart of the debate on whether concentration of economic growth helps or hinders overall national growth. By aiming to assist the creation of “a more successful country, with opportunities for all of Scotland to flourish, through increasing sustainable economic growth” [emphasis added], the purpose target suggests that growth at the Scottish level is consistent with growth also at lower spatial levels. In a recent paper we reported that concentration of economic activity had increased over the last fourteen years, with the major cities – Aberdeen, Edinburgh and Glasgow – outperforming the Scottish economy and accounting for almost one half of all output in the Scottish economy (Allan, 2013).

In this short note we explore some details about the specific performance of the Glasgow economy in the recent past. In particular we explore to what extent the Great Recession has impacted on economic activity at the city level. We focus exclusively on the area as defined by the city council area. Although we therefore omit those regions surrounding Glasgow, our previous work suggested that it was principally in the major city economies that growth in Scotland was occurring. The most recent data for which an industrial breakdown of Gross Value Added (GVA) is available estimates that 17.0% of GVA in the Scottish economy was created within Glasgow. In the wider West of Scotland area, including Glasgow, 39% of Scotland’s GVA was created. With extensive commuting flows into the Glasgow area, concentration of economic activity didn’t persist to anything like the same extent when examining regional household wage income figures.

Through seeking to understand the particular details of Glasgow’s growth performance over the recent past we hope to uncover what has made Glasgow’s growth performance particularly strong.

Glasgow and Scotland: demographic highlights

We begin by examining levels and recent trends in headlines of the labour market in Glasgow and Scotland. These are shown in Table 1.

Table 1: Glasgow and Scotland labour market headlines

<table>
<thead>
<tr>
<th></th>
<th>Glasgow</th>
<th>Scotland</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Population</strong></td>
<td>Level</td>
<td>Latest</td>
</tr>
<tr>
<td></td>
<td></td>
<td>598,800</td>
</tr>
<tr>
<td><strong>Working age population</strong></td>
<td>Level</td>
<td>420,300</td>
</tr>
<tr>
<td>Rate*</td>
<td>70.2%</td>
<td>0.2%</td>
</tr>
</tbody>
</table>

Notes: * = 2011 figures; ** = 2012 annual figures; * rate is proportion of total residence population. Source: ONS mid-year population estimates.
Firstly we see that Glasgow’s population growth each year since 2008 has been higher than for Scotland as a whole. This reverses the historic trend in the relative population growth of these areas. Between 1981 and 2008 there was only one year (2001) in which Glasgow’s population grew faster than Scotland as a whole. The period since 2008 doesn’t coincide with weak population growth at the Scottish level – at around 0.6% between 2010 and 2011 the population of Scotland increased by its single largest percentage point increase over the last thirty years – but that Glasgow’s population increase has been striking.

Although we do not attempt to identify the causes of Glasgow’s recent population growth, the population can only adjust through natural factors (births and deaths) and migration decisions (net migration being the sum of (positive) in-migration and (negative) outmigration to an area). Taking migration first, one might speculate that migration could assist Glasgow’s recent population increases particularly through migrants being attracted to the Scottish cities, with their thicker labour markets and superior job opportunities in times of crises.

Interestingly, data on migration by council area (GROS, 2012) is available and lets us test this hypothesis. While the resident population of Glasgow increased by 14,600 between 2008 and 2011 (2.5%), net migration to Glasgow accounts for 8,880 of this change. Looking at gross migration flows between 2008 and 2011, while in-migration to Glasgow has been broadly stable at around 27,700 per year, out-migration has fallen sharply over the last three years. This is certainly an interesting finding as falls in out-migration could be consistent with reduced labour mobility between the regions of Scotland. This could have implications for the regional pattern of employment over the short- and medium term. The link between declining out-migration from Glasgow and the much reduced levels of house prices and sales transactions would be one anecdotal area worthy of further investigation.

Interestingly, we can also see that the proportion of Glasgow residents of working age has increased in every year since 1993, a chain unbroken by the recession. Over the same periods the share of the Scottish population of working age has declined.

Glasgow’s recent economic performance and the impact of the recession

To examine Glasgow’s recent economic performance, we again refer to the dataset constructed for Allan (2013). This used current price (cash) values for GVA by ten industries for 23 sub-regions across Scotland, of which Glasgow was one. The process by which these data was converted into a real (constant price) series is detailed in that publication.

From these data we can make the following observations. Firstly, Glasgow’s economic growth was slightly stronger than Scotland as a whole. This finding applies to the period between 1997 to 2010 when annual growth in Glasgow and Scotland was by 1.9% and 1.8% respectively, as well as sub-periods, i.e. a “pre-recession” period of 1997 to 2007 (2.8% vs. 2.7%) and a “post-recession” period from 2008 to 2010 (-0.7% vs. -0.8%). Over the period Glasgow’s economy added 17.8% (£3.64 billion) of the growth measured at the Scottish level (£20.38 billion).

We can estimate the cost (between 2008 and 2010) of the Great Recession to the city economy. For this, we simply continue the historical growth rate over the 1997 to 2007 period into the years to 2010, and compare against the real GVA series since 2008 with the lost output being the difference between the two lines. These are shown in Figure 1. We can estimate that the output of the city economy would other things being equal have been £1.8 billion higher in 2010 without the recession, with the cumulative lost output to the Glasgow economy over the 2008 to 2010 period estimated at £3.8 billion.

Industrial contribution to city growth performance

While interesting, the aggregate figures mask some of the structural change which has taken place within the Glasgow economy over this short time period. Unfortunately these data do not allow for more detailed breakdown than ten industries, but, although this is reasonably aggregate, some patterns can be identified.
Figures 2a and 2b show the structure of the Glasgow economy in 1997 and 2010 respectively. Several points can be made. Firstly, the share of activity which is within the Production sector has declined by 4.2 percentage points. Secondly, the biggest increase in importance for the Glasgow economy has been in “Business service activities”, whose share has increased by 6.1 percentage points. The share of output in Glasgow in the other private services activities has remained broadly constant. The increase in the share of activity in “Business service activities” is greater than has occurred for the Scottish economy as a whole, demonstrating the new importance of this sector to the city economy.

Figure 2a: Structure of Glasgow economy, 1997
From our dataset we can also look at the time profile of sectors contributions to overall real growth in the Glasgow economy. We can break down the £3.6 billion real growth of GVA for Glasgow down to show the time period and the sector responsible. Over the period as a whole, 35.3% of the growth in GVA was in the “Business services activities”, with 16.5% in “Public administration, education and health”, 12.7% in “Information and Communication” and 12.2% and 11.8% in “Real Estate” and “Distribution, transport, accommodation and food” sectors respectively. The only one of the ten industries identified in the dataset which made a negative contribution to Glasgow’s GVA over the period was “Production”, which saw its real GVA fall by £113 million over the fourteen years. The negative contribution to growth by this sector in Glasgow mirrored its negative contribution to Scotland’s growth over the same period.

Figure 3: Absolute change in real GVA in Glasgow by time period and sector, £million
Interestingly, we can also breakdown these overall contributions by time period. These results are shown in Figure 3. For example, it becomes apparent that while “Production” activities made a negative contribution over the whole period, for the years between 2002 and 2007 its contribution was positive (£157 million) and fell in both the previous (1997 to 2002) and the recession period (2007 to 2010). Of the ten sectors identified, only four – “Real estate activities”, “Business service activities”, “Public administration, education and health” and “Other services” saw absolute GVA increase in the period post-2007. For the same ten sectors at the Scottish level, only “Real estate activities” and “Public administration, education and health” made positive contributions to aggregate GVA over the period since 2007 (Figure 4). This demonstrates in particular the importance of the growing “Business service activities” sector in Glasgow in alleviating what would otherwise have been a more significant decline in service sector activity for Scotland as a whole.

Figure 4: Absolute change in real GVA in Scotland by time period and sector, £million

Conclusions

In summary therefore, there is evidence that over the fourteen years to 2010 the Glasgow economy marginally outperformed the Scottish economy as a whole, although output did fall between 2007 and 2010 for both areas. Additionally, population growth in the city has outstripped Scottish population growth, even at a time of strong national growth in population. It appears from the data on council-level migration that this is largely explained by a fall in out-migration from the city, which raises interesting questions about recent labour mobility. Further, we have estimated that the Great Recession cost the Glasgow economy some £3.8 billion in lost activity between 2008 and 2010. Further, at the sectoral level we can see that significant change has occurred to the Glasgow economic structure over this short period of time, and the “Business service activities” sector has significantly increased its importance to the city.

There are a number of areas for future research suggested by these observations. Firstly, it would be useful to understand if the pattern of growth seen in Scotland’s largest city been repeated across other major cities of Scotland and the UK, or if these trends are unique to Glasgow. Secondly, it would be useful to explore more about the link between economic structure of city economies and their growth, understanding the contribution of city-specific factors and of more general sectoral trends. Thirdly, it would be useful to examine further the links between the Great Recession and sub-national labour mobility. Finally, it would be interesting to answer the fundamental question of policy and purpose: whether
economic growth in Scotland is helped or hindered by strong growth performances of the major cities or if there is a trade-off between growth and spatial economic equality in Scotland.

References


Expenditure Impacts of Higher Education Institutions and their Spatial Distribution: Glasgow City Region v the Rest of Scotland

Kristinn Hermannsson, University of Strathclyde

Several previous studies have established that higher education is a significant sector in the Scottish economy. The most recent of these find the expenditure of Higher Education Institutions (HEIs) and their staff support approximately 4% of gross output in Scotland, based on conventional multiplier based impact attribution. If the role of Scottish Government funding is discounted (due to the binding budget constraint imposed by the Barnett funding mechanism) this is still a sizeable 2%; indicating that higher education is a significant export sector (for details see: Hermannsson et al 2013ab). It has long been recognised that higher education as a sector is even more important for the local economies where the HEIs are concentrated. For example, in a 1966 issue of the Scottish Journal of Political Economy Blake and McDowell settle the argument, which is more important for the economy of St Andrews, the university or the golf course.

This article analyses the role of higher education in the economy of Glasgow (GLA) and the rest of the Strathclyde regions (RST). The aim is to compare and contrast the impact of the west coast institutions to the impacts of HEIs in the rest of Scotland (ROS). In particular the aim is to examine the degree to which the spatial distribution of HE activities between the West and the ROS is determined by Scottish Government funding decisions and to what extent this is driven by success at securing external students and funding.

This analysis is based on Hermannsson (2012), which utilises a comprehensive income and expenditure database for HEIs in Scotland (Hermannsson et al, 2010) constructed for the year 2006. This is augmented by analysing some broad income trends since 2006 to determine the subsequent changes in the Glasgow HE sector and its relative position vis-à-vis the rest of Scotland. The focus of this article is only on the role of the HEIs themselves. However, the associated impacts of students’ consumption expenditures are equivalent to about 20% of the expenditure impacts of HEIs (Hermannsson et al 2013 a).

As argued here the simple expenditure impacts of HEIs are significant and any changes in these are immediately felt in the institutions’ host communities. However, in the longer term probably the single most important economic impact driven by HEIs is through increasing the skills of participants in the labour market. Every year this increase in human capital enhances the productivity of the labour force, augmenting the capacity of the economy and stimulating competitiveness (Hermannsson et al 2010). Furthermore, there are a range of wider impacts from education in general and some from higher education in particular. These include technological spillovers, the benefits of education to private individuals (happiness, child rearing, marital success, longevity etc.) and various socioeconomic feedbacks such as on health, crime rates, civic institutions etc. These impacts are potentially very large although the evidence base is weaker than for the more directly observable labour market impacts. For details of this point see (McMahon 2004) and for a review of the available evidence on different types of economic impacts of universities I refer to Hermannsson & Swales (2010).
Expenditure impacts of HEIs

Determining the sub-regional and interregional expenditure impacts of the HEIs themselves is a relatively straightforward matter, given the Input-Output database, which identifies each HEI as a separate sector and furthermore identifies the spatial distribution of their expenditures. The figure below reveals the interregional Type-II output multipliers for the Glasgow HEIs (Caledonian, GSA, Glasgow, RSAMD and Strathclyde) and two aggregate sectors comprising the HEIs in RST and ROS, respectively.

The output multipliers show how £1 of final demand translates into an output impact and how it is distributed spatially across Scotland. For example, imagine that the University of Strathclyde were to receive an exogenous injection of £100m, say in the form of increased fees from overseas students, we can infer from the interregional Type-II output multiplier that this would result in a Scotland-wide output impact of approximately £210m. Output in Glasgow would be stimulated by approximately £160m, while output in the rest of the Strathclyde region and the rest of Scotland would be boosted by approximately £30m and £20m, respectively.

Figure 1 Interregional Type-II output multiplier of the HEI sectors identified in the 3-region GLA-RST-ROS HEI disaggregated IO-table.

As the diagram reveals, most of the knock-on impacts are incurred within the HEIs’ host regions, most markedly for the aggregated impacts of universities located in the larger regions RST and ROS. Glasgow is the most open region with significant knock-on impacts occurring in the other two regions, particularly in RST.

Figure 2 reveals the absolute output impact of individual universities located in Glasgow on the Glasgow, RST and ROS economies. Overall the Glasgow HEIs drive a Scotland-wide output impact of £1.2 bn. This amounts to approximately 0.7% of total output in Scotland. As the output impact is the product of the institutions’ final demand and its output multiplier, scale is a significant driver of impact. In this regard the University of Glasgow is the biggest institution, generating approximately half of the total impact of all five Glasgow HEIs.

As Figure 2 reveals these impacts are not confined solely to the institutions’ host regions, but are distributed through knock-on effects to other sub-regions. The output multipliers are a scale-independent measure of the HEIs’ expenditure impacts. However, Figure 3 serves as a reminder that the institutions
vary greatly in scale, which, given the similarity of Scotland-wide multipliers (Hermannsson et al, 2010b) is a key driver of total expenditure impacts.

**Figure 2** Interregional Type-II output impacts of HEIs in Glasgow. Horizontal bars represent absolute impact (£ millions), disaggregated by sub-region of impact.

The HEIs in ROS sector is composed of 13 HEIs in the ROS and the HEIs in RST is a composite of the two institutions in the Strathclyde region, Bell College and the University of Paisley, which in fact have now merged to form the University of the West of Scotland. The five Glasgow HEIs therefore represent approximately 30% of the total expenditure impacts of the sector in Scotland.

**Figure 3** Percentage-breakdown of the Type-II output impact of HEIs in Scotland
Interregional distribution of HEI activities and impacts within Scotland

Figure 4 reveals where the stimuli of the HEI-sector originate and how they spread across Scotland through knock-on impacts. The rows indicate the origin of the stimulus while the columns reveal the location of impact. For example, looking at the top row, this depicts the impact of HEIs in Glasgow and how these are spread across Scotland. Reading across we can see that Glasgow HEIs exert an impact of £904m upon Glasgow itself, drives £192m of output in the rest of the Strathclyde region and £106 in the rest of Scotland. The rightmost value sums this up to reveal a Scotland-wide impact of HEIs in Glasgow of £1,201m. If we work our way down the GLA column in the table we see what impacts the HEIs in different parts of Scotland exert upon Glasgow. The local HEIs cause an impact of £904m upon their host city while HEIs in the rest of Scotland drive an output impact of £67m in the city. The sum of the column reveals that all HEIs in Scotland drive £984m of output within the City of Glasgow. Generally, for the HEIs in each sub-region, most of the impacts are felt within their host region, although significant impacts spill over to other regions. For example the HEIs in the rest of Scotland (RST) generate a Scotland-wide output impact of £159m. Of this, £138m or 87% occur within the host region while £13m are felt in GLA and £8m in the ROS.

Figure 4 spatially disaggregated Type-II output impact of HEIs in Scotland. Rows indicate location of HEIs and columns reveal location of impact (£m).

<table>
<thead>
<tr>
<th>Location of impact</th>
<th>GLA</th>
<th>RST</th>
<th>ROS</th>
<th>SCO total</th>
</tr>
</thead>
<tbody>
<tr>
<td>GLA</td>
<td>904</td>
<td>192</td>
<td>106</td>
<td>1,201</td>
</tr>
<tr>
<td>RST</td>
<td>13</td>
<td>138</td>
<td>8</td>
<td>159</td>
</tr>
<tr>
<td>ROS</td>
<td>67</td>
<td>35</td>
<td>2,604</td>
<td>2,706</td>
</tr>
<tr>
<td>SCO total</td>
<td>984</td>
<td>365</td>
<td>2,717</td>
<td>4,066</td>
</tr>
</tbody>
</table>

- % of SCO total

HEIs in Glasgow receive approximately 31% of the income of the HEIs sector in Scotland. A noteworthy feature of these results, however, is that Glasgow only reaps 24% of the output impacts of the overall HEIs sector in Scotland. If we take a look at GLA and RST in conjunction (the whole of the Strathclyde region) we saw in Section 4.1 that HEIs in this area receive approximately 34% of the income of the overall sector in Scotland. However, the region receives approximately 33% of the output impact of the HEIs sector in Scotland. Thereby it is evident that a significant share of the spillovers from Glasgow are captured in the RST. On balance, however, it is clear that due to interregional linkages, the Strathclyde region captures less of the output impact of the HEIs sector in Scotland than the scale of the HEIs in Strathclyde (34% of the income of the Scotland-wide sector) would suggest. From the point of view of policy discourse in Scotland, this is of further interest as Glasgow and the Strathclyde region are perceived to host a relatively large share of the HEIs sector vis-à-vis the rest of Scotland, or at least command a respectable share of the sector given the relative scale of the area.

As we see from Figure 5, this perception holds from the narrow perspective of HEIs in Glasgow as part of Glasgow city. For the narrow city council area the HEIs are certainly over-represented relative to the city’s share of overall population in Scotland. However, as I argue in Chapter 3, Glasgow and the rest of the Strathclyde region are economically very interdependent and can be treated as a single functional entity. Looking at the Strathclyde region as a whole HEI capacity is relatively under-provided vis-à-vis the rest of Scotland. Due to the interregional economic structure of Scotland this imbalance is further exacerbated as the Strathclyde region as a whole enjoys less of the output impact of HEIs than the scale of the area’s HEIs sector would suggest.
Does this result imply that the HEIs sector is not equitably spread across space in Scotland, with the rest of Scotland being favoured at the expense of the Strathclyde area? As we know, just over one half of the sector's funding comes from the Scottish Government, so perhaps the question should be raised if spatial distribution of HEIs' income in Scotland reflects a relative underperformance of the HEIs in the Strathclyde area when it comes to competing for income from students' fees and research grants? HEIs in Glasgow and the rest of the Strathclyde area tend to be more dependent upon funding from the devolved government than HEIs in the rest of Scotland. To address this I turn to Figure 6, which shows the income by source for the aggregate HEI-sectors in each of the three regions.

Figure 6 Income of HEIs in GLA, RST and ROS disaggregated by source (Scottish Government and other funding) for 2006.

<table>
<thead>
<tr>
<th></th>
<th>GLA</th>
<th>RST</th>
<th>ROS</th>
<th>Scotland (GLA+RST+ROS)</th>
<th>Strathclyde area (RST + GLA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scottish government funding (£ millions)</td>
<td>364</td>
<td>65</td>
<td>700</td>
<td>1,129</td>
<td>429</td>
</tr>
<tr>
<td>% of row total</td>
<td>32%</td>
<td>6%</td>
<td>62%</td>
<td>100%</td>
<td>38%</td>
</tr>
<tr>
<td>Other income of HEIs (£ millions)</td>
<td>263</td>
<td>14</td>
<td>659</td>
<td>936</td>
<td>277</td>
</tr>
<tr>
<td>% of row total</td>
<td>28%</td>
<td>1%</td>
<td>70%</td>
<td>100%</td>
<td>30%</td>
</tr>
<tr>
<td>Total income of HEIs (£ millions)</td>
<td>627</td>
<td>78</td>
<td>1,359</td>
<td>2,065</td>
<td>706</td>
</tr>
<tr>
<td>% of row total</td>
<td>30%</td>
<td>4%</td>
<td>66%</td>
<td>100%</td>
<td>34%</td>
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</tbody>
</table>

Looking at the HEIs in the Strathclyde area as a whole they receive 38% of all Scottish Government funding for HEIs. This is still slightly less than the area's population share would imply. However, when we look at the other sources of funding it is the extent to which the Strathclyde area is at a disadvantage vis-à-vis the rest of Scotland that is striking. Only 30% of the other income of HEIs in Scotland can be attributed to the HEIs in the Strathclyde area, whereas 40% of the population reside, whereas the remaining 70% can be attributed to the HEIs in the rest of Scotland, where 60% of the population reside. What drives this relative underperformance of the HEIs sector in the Strathclyde area is beyond the capacity of this analysis to answer. However, as a large share of the other funding category is external to the Scottish economy (UK-wide and international research funding and tuition fees) it is clear that a considerable boost to the Scottish economy could be obtained by raising the share of exogenous income of the Strathclyde HEIs to the same level as for those institutions in the rest of Scotland.

Looking at the HEIs in Strathclyde in aggregate 61% of their income comes from the Scottish Government while 39% comes from other sources. The same ratios for the HEIs in the rest of Scotland are 52% and 48%. If Scottish Government funding were held constant but the HEIs in Strathclyde could raise their share of other income to 48%, this would mean additional income for the Strathclyde HEIs sector to the tune of £119 m ((429/0.52)-706=119). This amounts to just under 17% of the aggregated income of HEIs in GLA.
and RST. Whether this is possible seems to be granted by the performance of HEIs in ROS. Whether this is feasible is an altogether more complicated matter. For example, would additional efforts at drawing in external funding and students substitute or complement efforts to train the indigenous population? If research grants and external students are complementary to efforts at training graduates for the local labour market then the outcome is all-round positive. However, if these income earning activities are at the detriment of efforts geared towards the host economy then these goals are conflicting and it cannot be determined a priori if boosting the Strathclyde HEIs’ share of other funding is ultimately beneficial to the Scottish economy.

Trends from 2006

Figure 7 Scottish HEIs, total income in £000s, 2006-2012.

<table>
<thead>
<tr>
<th>HEI Name</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>The University of Aberdeen</td>
<td>156,983</td>
<td>172,563</td>
<td>186,253</td>
<td>216,723</td>
<td>227,091</td>
<td>221,026</td>
<td>217,014</td>
</tr>
<tr>
<td>University of Abertay Dundee</td>
<td>32,455</td>
<td>34,395</td>
<td>36,074</td>
<td>37,812</td>
<td>36,252</td>
<td>37,054</td>
<td>34,164</td>
</tr>
<tr>
<td>Bell College</td>
<td>19,924</td>
<td>21,748</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The University of Dundee</td>
<td>163,971</td>
<td>175,791</td>
<td>191,379</td>
<td>207,687</td>
<td>219,090</td>
<td>229,211</td>
<td>223,316</td>
</tr>
<tr>
<td>Edinburgh College of Art</td>
<td>14,707</td>
<td>17,147</td>
<td>16,945</td>
<td>16,503</td>
<td>17,966</td>
<td>26,157</td>
<td></td>
</tr>
<tr>
<td>Edinburgh Napier University</td>
<td>81,351</td>
<td>88,823</td>
<td>99,350</td>
<td>100,392</td>
<td>105,708</td>
<td>106,173</td>
<td>103,971</td>
</tr>
<tr>
<td>The University of Edinburgh</td>
<td>435,569</td>
<td>477,062</td>
<td>555,319</td>
<td>591,533</td>
<td>633,979</td>
<td>650,829</td>
<td>700,887</td>
</tr>
<tr>
<td>Glasgow Caledonian University</td>
<td>97,644</td>
<td>100,441</td>
<td>103,551</td>
<td>111,391</td>
<td>115,862</td>
<td>131,512</td>
<td>107,435</td>
</tr>
<tr>
<td>Glasgow School of Art</td>
<td>15,799</td>
<td>17,437</td>
<td>18,330</td>
<td>19,462</td>
<td>21,403</td>
<td>22,544</td>
<td>23,303</td>
</tr>
<tr>
<td>The University of Glasgow</td>
<td>312,372</td>
<td>361,743</td>
<td>397,005</td>
<td>421,152</td>
<td>439,471</td>
<td>450,195</td>
<td>439,839</td>
</tr>
<tr>
<td>Heriot-Watt University</td>
<td>99,545</td>
<td>110,564</td>
<td>117,620</td>
<td>134,501</td>
<td>142,682</td>
<td>150,359</td>
<td>155,647</td>
</tr>
<tr>
<td>Queen Margaret University Edinburgh</td>
<td>27,570</td>
<td>27,409</td>
<td>31,013</td>
<td>35,174</td>
<td>33,552</td>
<td>34,041</td>
<td>34,346</td>
</tr>
<tr>
<td>The Robert Gordon University</td>
<td>75,084</td>
<td>79,188</td>
<td>86,567</td>
<td>91,720</td>
<td>94,324</td>
<td>93,017</td>
<td>88,669</td>
</tr>
<tr>
<td>Royal Conservatoire of Scotland</td>
<td>10,378</td>
<td>11,765</td>
<td>12,790</td>
<td>13,169</td>
<td>14,749</td>
<td>15,648</td>
<td>16,543</td>
</tr>
<tr>
<td>The University of St Andrews</td>
<td>108,762</td>
<td>118,331</td>
<td>129,123</td>
<td>147,061</td>
<td>155,788</td>
<td>165,706</td>
<td>170,242</td>
</tr>
<tr>
<td>SRUC</td>
<td>43,659</td>
<td>44,096</td>
<td>44,878</td>
<td>47,424</td>
<td>49,776</td>
<td>55,002</td>
<td>54,540</td>
</tr>
<tr>
<td>The University of Stirling</td>
<td>83,663</td>
<td>88,872</td>
<td>92,922</td>
<td>96,946</td>
<td>101,948</td>
<td>102,184</td>
<td>99,086</td>
</tr>
<tr>
<td>The University of Strathclyde</td>
<td>191,054</td>
<td>203,994</td>
<td>219,275</td>
<td>230,654</td>
<td>230,664</td>
<td>230,016</td>
<td>224,965</td>
</tr>
<tr>
<td>University of the Highlands &amp; Islands</td>
<td>35,365</td>
<td>43,754</td>
<td>47,951</td>
<td>52,167</td>
<td>68,174</td>
<td>62,190</td>
<td>57,428</td>
</tr>
<tr>
<td>University of the West of Scotland</td>
<td>58,481</td>
<td>63,451</td>
<td>95,395</td>
<td>91,742</td>
<td>95,479</td>
<td>95,917</td>
<td>91,017</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2,064,336</td>
<td>2,258,574</td>
<td>2,481,940</td>
<td>2,663,203</td>
<td>2,803,938</td>
<td>2,860,781</td>
<td>2,842,412</td>
</tr>
</tbody>
</table>

Before concluding it is useful to have a quick look at headline indicators for the income of Scottish HEIs and the extent to which this is dependent on funding council grants. The two broad trends observed since 2006 is that the income of the HEIs has risen and they are less dependent on the Scottish Funding Council (and hence the Scottish Block Grant) for their income. I shall elaborate on each point in turn. As Figure 7 reveals the total income of the sector has grown significantly in absolute terms in the 7 year period since 2006. With most of the growth occurring in the first half of the period, while the sector has been stagnant in nominal terms since 2010. Over the 7 year period the average annual growth rate comes to about 4.7%, while average annual UK CPI inflation stood at approximately 3.4% in the same period. Hence there’s been a modest growth in real terms.

Going back to the regional definitions presented earlier there is marked difference in how this has affected individual sub-regions. Looking at Figure 8 it is clear that the income of HEIs in Glasgow has kept up with inflation, while the RST has shrunk in real terms and HEIs in the ROS have grown in real terms and above the Scottish average.

Given the current climate of public sector austerity it is interesting to analyse how the composition of the HEIs income has evolved over this period. A headline indicator that provides a succinct overview is the share of grants from the Scottish Funding Council in the total income of HEIs. A graphical summary of how this ratio has evolved is provided Figure 9. Over time this dependency on the funding council has
decreased for Scotland as a whole as well as for HEIs in Glasgow and the Rest of Scotland. Conversely the RST is increasingly dependent on funding council grants.

Figure 8 Scottish HEIs, total income in £000s, 2006-2012 aggregated by regions and average annual growth rates.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>GLA</td>
<td>627,247</td>
<td>695,380</td>
<td>750,951</td>
<td>795,818</td>
<td>822,149</td>
<td>831,915</td>
<td>812,085</td>
<td>3.8%</td>
</tr>
<tr>
<td>RST</td>
<td>78,405</td>
<td>85,199</td>
<td>95,395</td>
<td>91,742</td>
<td>95,479</td>
<td>95,917</td>
<td>91,017</td>
<td>2.2%</td>
</tr>
<tr>
<td>ROS</td>
<td>1,358,684</td>
<td>1,477,995</td>
<td>1,635,594</td>
<td>1,775,643</td>
<td>1,866,310</td>
<td>1,932,949</td>
<td>1,939,310</td>
<td>5.2%</td>
</tr>
<tr>
<td>Total (SCO)</td>
<td>2,064,336</td>
<td>2,258,574</td>
<td>2,481,940</td>
<td>2,663,203</td>
<td>2,803,938</td>
<td>2,860,781</td>
<td>2,842,412</td>
<td>4.7%</td>
</tr>
</tbody>
</table>

Conclusions

An analysis of the institutional expenditure impacts reveals that these clearly cut across sub-regional boundaries in Scotland. Most explicitly this was evident for the Glasgow HEIs where 25% of their Scotland-wide output impacts were felt outside their host region. This is due to the economic structure of their host sub-region Glasgow, which is very open, as reflected in the scale of wage payments to the rest of the Strathclyde region and to a lesser extent to the rest of Scotland. Perhaps unsurprisingly the HEIs in the largest sub region (ROS) exhibit the least tendency for impacts to spill-over onto neighbouring sub-regions, with 96% of the output impacts incurring within the region.

Figure 9 Ratio of total funding council grants to total income (%)
distribution of HEI funding across Scotland. However, this is not as straightforward as it may initially appear. Once HEIs income has been disaggregated into Scottish Government funding and other income sources it turns out that public funding is allocated approximately in line with population shares between the whole of the Strathclyde area (GLA+RST) and the rest of Scotland (though the Strathclyde area seems to be, if anything, slightly favoured by the Scottish Government). However, the HEIs in the rest of Scotland appear to be better able to draw income from sources independent of the binding public sector budget constraint imposed by the Barnett formula, i.e. external research funding and students’ tuition fees. In principle therefore the HEIs in the Strathclyde region should be able to emulate the success of their counterparts in the rest of Scotland. I calculate that if these were able to complement their public income with external funds to the same extent as the HEIs in the ROS this could result in an additional income of £119m for the Strathclyde HEIs (a 16.8% increase in total income). This should be technically feasible given the precedent of the other Scottish HEIs (although clearly not a light task). However, it is an open question whether this would be desirable for the Scottish economy. If a focus on external income complements the HEIs’ capacity for building human capital it is clearly a good thing overall. However, if there is some trade-off between focusing on external competitiveness of the institutions and their role in producing graduates for the local labour market, the outcome would be ambiguous. This is because the cultivation of human capital brings sizeable economic benefits through expanding the supply-side of the economy.

Looking at income trends since 2006 reveals that the income of HEIs in Scotland as a whole has risen in real terms during this period. However, this has occurred more slowly in Glasgow than the rest of Scotland. HEIs in Glasgow and the rest of Scotland have been able to grow their share of funding coming from sources independent of the Scottish Funding Council and decrease their exposure to funding from the Scottish Block Grant.

References

Hermansson, K. (2012), The Overall Economic Impact of Higher Education Institutions (HEIs) on their Host Sub-regions: Multi-sectoral Analysis for the City of Glasgow, PhD thesis, University of Strathclyde.


1 Universities are central place phenomena and therefore it may not be surprising that Glasgow, as Scotland’s largest city, benefits from their presence. A further interesting aspect is to what extent Edinburgh benefits from the presence of HEIs. In population terms Edinburgh is about 80% of the size of Glasgow, but maintains an HEI sector that in income terms is approximately 101% of the size of the Glasgow sector.

2 These numbers are extracted from the HEIDI database, maintained by the Higher Education Statistics Agency (HESA).

3 After amalgamation into the University of the West of Scotland this now just a single HEI.