



Regional Science  
Association International  

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British and Irish Section

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**41st ANNUAL CONFERENCE  
and  
2nd ANNUAL DOCTORAL  
COLLOQUIUM**

**J.E. Cairnes School of Business and  
Economics  
National University of Ireland, Galway,  
Ireland**

28th to 30th August, 2012

# Programme

## Programme Schedule

**Tuesday 28 August 2012**

### **13.00 onwards**

Registration for the Doctoral Colloquium and Annual Conference at NUIG

### **13.30 – 15.30**

#### **Doctoral Colloquium Session 1**

Gerard Brady, University College Cork  
Beste Yildiz, Queens University, Belfast  
Claire Davis, University College Cork  
Kieran Reilly, University College Cork

### **15.30-16.00**

Coffee /tea

### **16.00 – 18.00**

#### **Doctoral Colloquium Session 2**

Daniel Norton, National University of Ireland, Galway  
Huiyuan Yao, University College Cork  
Lisa Noonan, University College Cork  
Paul Hildreth, University of Salford

Doctoral Colloquium Ends

## Annual Conference Begins

**Tuesday 28 August 2012 20.00**

**20.00 Meet and Greet Social Event – McSwiggans Bar, Eyre Street, Galway**

**Wednesday 29 August 2012 (NUIG)**

**8.30 Onwards – Registration**

**9.00 – 10.30**

**Plenary Session 1 – Challenges for Regional Policy Practitioners**

Dirk Ahner – Former Director-General in DG Regional Policy

Kieran Moylan – Assistant Director, Border, Midland and Western Regional Assembly

**10.30 – 11.00**

Coffee /tea

**11.00 – 13.00**

**Parallel Sessions 1**

Session 1.A	Session 1.B	Session 1. C
<p><b>The impact of education on regional growth and productivity: an analysis of the experience of the provinces of China</b> <i>John Hicks and Parikshit Basu</i></p>	<p><b>Valuing Marine Environmental Characteristics Associated with Changes to the EU Bathing Water Directive in Ireland</b> <i>Stephen Hynes, Dugald Tinch, Nick Hanley, Caitriona Scully and Alphonsus Browne</i></p>	<p><b>Responsibility v. Attribution for GHG Emissions</b> <i>Stuart G. McIntyre, Hugh McLachlan and Kim Swales</i></p>
<p><b>Agglomeration effects on labour demand: Establishment level evidence from Germany.</b> <i>Uwe Blien and Oliver Ludewig</i></p>	<p><b>Valuing Changes to the EU Bathing Water Directive in the UK using a Choice Experiment approach</b> <i>Dugald Tinch</i></p>	<p><b>Energy and Emissions Conflicts in Asia (2006-2010)</b> <i>Abdelkadar Touria and Fernando Barreiro-Pereira</i></p>
<p><b>The Geographical Spread and the Economic Impact of the Agri-Food sector in Ireland – Implications for Regional Development</b> <i>Mary Carey</i></p>	<p><b>A case study of small scale Aquaculture</b> <i>Peter Cush</i></p>	<p><b>The subsidy cost of achieving emissions targets in Scotland</b> <i>Grant Allan, Patrizio Lecca, Peter McGregor and J. Kim Swales</i></p>
<p><b>Exploring the Role of Innovation Intermediaries in the Irish Food Innovation System</b> <i>Hatice Beste Yildiz, Maeve Henchion and Nola Hewitt-Dundas</i></p>		

**13.00 – 14.00**

Lunch

**14:00 – 16:00**

<b>Parallel Sessions 2</b>		
<b>Session 2.A</b>	<b>Session 2.B</b>	<b>Session 2.C</b>
<p><b>Science parks in The Netherlands: stimulating innovation or just iconic for firms?</b> <i>Jacques van Dinteren</i></p> <p><b>The effect of Innovative Human Capital on Firm-Level Innovation: Empirical Evidence and Implications for Policy</b> <i>Helen McGuirk, Helena Lenihan and Mark Hart</i></p> <p><b>Agglomeration Economies in Ireland: Implications for Firm Productivity</b> <i>Lisa Noonan and Eoin O'Leary</i></p> <p><b>Market Potential and the Geography of Entrepreneurship in Chile</b> <i>Félix Modrego, Philip McCann, William E. Foster and M. Rose Olfert</i></p>	<p><b>Social Integration and Externalities in the Netherlands</b> <i>Inge Noback</i></p> <p><b>A spatially-related Note on Entrepreneurship and Economic Growth</b> <i>Torben Klarl</i></p> <p><b>Is Health Care a Necessity or a Luxury? New Evidence from a Panel of U.S. State-Level Data</b> <i>Donald Freeman</i></p>	<p><b>The Spatial Impact of the Economic Downturn in Ireland 2006-2011</b> <i>Cathal O'Donoghue, John Lennon, Jason Loughrey and David Meredith</i></p> <p><b>Exploring micro-macro perspectives on the socio-economic future of the Scottish Western Isles.</b> <i>Eveline van Leeuwen, Graham Clarke, Grant Allan, Peter McGregor, and Kim Swales</i></p> <p><b>Smart Specialization Policies and New Directions for Regional Development: Challenges for Irish Policymakers</b> <i>Claire Davis and Eoin O'Leary</i></p> <p><b>Labour market escalators and remote island communities: creative industries and wage premia</b> <i>Mike Danson</i></p>
<b>Session 2.D</b>		
<p><b>Gender patterns in academic entrepreneurship: beyond patenting and licensing</b> <i>Maria Abreu and Vadim Grinevich</i></p> <p><b>Exploring complexity in the relationship between entrepreneurial knowledge exploration and exploitation: Individual assigned patents in Ireland, 1976-2009</b> <i>Marie O'Connor and Nola Hewitt-Dundas</i></p> <p><b>Agriculture, The Smart Economy and Regional Development</b> <i>Kevin Heanue and David Meredith</i></p> <p><b>Applying experimental methods in industrial policy evaluation: An RCT+ evaluation of Creative Credits</b> <i>Hasan Bakhshi, John Edwards, Stephen Roper, Lorraine Morley, Judy Scully and Duncan Shaw</i></p>		

**16:00 – 16:30**

Coffee /tea

**16:30 – 18.00**

**Parallel Session 3**

Session 3.A	Session 3.B	Session 3.C
<p><b>Modelling the Location and Consequences of Aircraft Accidents</b> <i>David Pitfield</i></p> <p><b>Analysis of the Transnational Freight Transport in the Southwestern European Border</b> <i>Fernando Barreiro-Pereira</i></p> <p><b>The Impact of New Motorway Construction on Regional Airport Accessibility: An Analysis of the Implications for Irish Air Transport Policy</b> <i>Amaya Vega and Aisling Reynolds</i></p>	<p><b>The Impact of Regional Migration on Regional Wage Inequality: A Semiparametric Approach</b> <i>Heather Dickey</i></p> <p><b>The Escalator Hypothesis Revisited: Is geographic mobility the key to career progression, or just being in the right place or in the right sector?</b> <i>Ian Gordon, Tony Champion and Mike Coombes</i></p> <p><b>An Analysis of Firm Deaths in Ireland</b> <i>Bernadette Power, Geraldine Ryan and Justin Doran</i></p>	<p><b>New firm formation and its effect on employment growth in declining regions</b> <i>Heike Delfmann and Sierdjan Koster</i></p> <p><b>Cognitive synergy and poverty</b> <i>William Orlando Prieto Bustos</i></p> <p><b>An investigation of the participation decision in the Rural Environment Protection Scheme (REPS): a conditional logit approach using simulated counterfactual data for farmers</b> <i>Geraldine Murphy, Cathal O'Donoghue, Stephen Hynes and Eithne Murphy</i></p>
Session 3.D		
<p><b>Export led growth and territorial emissions targets: a paradox?</b> <i>Stuart McIntyre, J. Kim Swales and Karen Turner</i></p> <p><b>Counterfactual impact evaluation of EU cohesion policy: the case of Slovenia</b> <i>Sonja Šlander and Črt Kostevc</i></p> <p><b>National Resilience: An Analysis of the Persistence of Economic Shock in European Countries</b> <i>Justin Doran and Bernard Fingleton</i></p>		

**19:00**

**Social event:**

Traditional Irish Music – The Crane Bar

**Thursday 30 August 2012**

**9.00-10.30**

**Plenary Session 2 – Smart Specialisation in European Cohesion Policy**

Gabriel Crean, Vice President, CEA Technologies, Direction de la Recherche Technologique (DRT). Key Enabling Technologies (KET) High-Level Expert Group  
Edward Feser, Head of Division of Innovation, Management and Policy at Manchester Business School and Professor of Urban and Regional Planning at  
University of Illinois

Chair: Philip McCann, University of Groningen and Chair, RSAIBIS

**10:30 – 11:00**

Coffee /tea

**11:00 – 13.00**

**Parallel Session 4**

<b>Session 4.A</b> <b>Early Career Best Presentation</b>	<b>Session 4.B</b>	<b>Session 4.C</b>
<p><b>Path Dependence in the Innovation Performance of Previously State Owned Russian Firms</b> <i>Gerard Brady and Justin Doran</i></p> <p><b>Estimating the value of marine and coastal ecosystem goods and services in Irish marine waters using benefit transfer</b> <i>Daniel Norton</i></p> <p><b>How important is Innovation for the Productivity Performance of European Firms?</b> <i>Frank Crowley</i></p>	<p><b>The Distribution Dynamics of Industrial Impacts</b> <i>John Dewhurst</i></p> <p><b>Specialisation, Adaptation and Connectivity in Staving Off Technology Cluster Extinction</b> <i>Paul Ryan, Majella Giblin, Johanna Fahy and David Collings</i></p> <p><b>Using regional IO tables to forecast regional Final Demand</b> <i>Steve MacFeeley</i></p> <p><b>A quantitative method of Industry Linkage Analysis: A New Method for Comparable Studies</b> <i>Richard Moloney, John Hobbs and Michael Walsh</i></p>	<p><b>Continuous-Time Estimation of a Spatial Endogenous Growth Model</b> <i>Clifford R. Wymer, Kieran P. Donaghy, Gianfranco Piras and Giuseppe Arbia</i></p> <p><b>'Commuter fuel poverty': A spatial microsimulation approach</b> <i>Robin Lovelace and Dimitris Ballas</i></p> <p><b>Multisectoral modelling of demand disturbances when these are temporary and known to be temporary</b> <i>Grant Allan, Patrizio Lecca, Peter McGregor and Kim Swales</i></p> <p><b>Linking acute psychiatric administrative data within a spatial microsimulation model to examine the prevalence of mental illness in Ireland</b> <i>Karyn Morrissey, Cathal O'Donoghue and Graham Clarke</i></p>

**13.00 – 14.00**

Lunch

**14.00 – 15.00**

AGM – All welcome

Coffee Dock Available as Needed for Afternoon

15:00 – 17.00

Parallel Session 5		
Session 5.A	Session 5.B	Session 5.C
<p><b>Opportunism over Strategy - A review of Regional Policy in Ireland</b> <i>Steve McFeely</i></p> <p><b>Whether Gold Price as a Hedge against Inflation Risk in Gold Producing Countries</b> <i>Wei Xiong and Fergal O'Connor</i></p> <p><b>Shocks, Regional Employment and Output: Evidence on policy options for UK Regions</b> <i>Bernard Fingleton</i></p> <p><b>The Modelled Impact of a Devolved Corporation Tax in Scotland</b> <i>Grant Allan, Patrizio Lecca, Peter McGregor and Kim Swales</i></p>	<p><b>The impact of human capital composition on Chinese regional growth: 2002-2010</b> <i>Huiyuan Yao and Declan Jordan</i></p> <p><b>The Contribution of Local Enterprise Partnerships to British Productivity Growth</b> <i>Richard Harris and John Moffat</i></p> <p><b>Process innovation in small businesses</b> <i>Juan A. Martínez-Román, Maria Plotnikova and Isidoro Romero</i></p> <p><b>Measuring the Impact of Regional Business Networks on Firm Performance</b> <i>Helena Lenihan and Nicola Lynch</i></p>	<p><b>Spatial analysis of housing markets: the Portuguese urban housing context</b> <i>João Lourenço Marques, Eduardo Castro and Arnab Bhattacharjee</i></p> <p><b>Beyond Intermediates: The Role of Wages, Consumption and Commuting in Accurately Estimating Metropolitan Level Input-Output Tables</b> <i>Kristinn Hermannsson</i></p> <p><b>The City and the Region: Is there a Real Difference?</b> <i>John Parr</i></p>

17.30 – 18.30

**Committee Meeting** (Committee members only)

20:00

**Conference Dinner**

**End of Conference**



# Abstracts

Abstracts are listed in alphabetical order, based on the surname of first author.

## **Gender patterns in academic entrepreneurship: beyond patenting and licensing**

Maria Abreu and Vadim Grinevich  
University of Cambridge

A small number of studies have investigated the role of gender in academic entrepreneurship. The results suggest that female scientists are less likely to commercialise their work. A number of explanations have been provided, although none has been found to explain the entire effect. We analyse the role of gender in relation to academic interactions which go beyond market-based commercialisation activities, to see whether the gender gap still persists there. We find that some of the critical issues identified in the literature, such as risk-aversion and the ethics of commercialisation, are less relevant in the context of interactions with the public and third sectors. The analysis also shows a gender dimension to the distance at which interactions occur. Our analysis is based on a recently completed survey of UK academics, providing micro-data on over 22,000 academics in the sciences, social sciences, arts and humanities. The data are complemented using institution-level information on financial and logistical support for entrepreneurial activities.

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## **Multisectoral modelling of demand disturbances when these are temporary and known to be temporary**

Grant Allan, Patrizio Lecca, Peter McGregor and Kim Swales  
University of Strathclyde

Input-Output (IO) and Computable General Equilibrium (CGE) methods are widely used to explore the impact of changes in levels and/or patterns of demand disturbances. Conventional IO modelling gives the equilibrium level of activity as being driven by demand. An implication of this is that demand changes cause immediate changes in economic activity and output (and no price effects). Others (McGregor *et al*, 1996) have shown that the IO result for a permanent demand change is consistent with a long-run equilibrium outcome of a CGE approach, and that this applies whether agents are forward- or backward-looking (Lecca *et al*, 2011). There is, however, little modelling work on the economic impacts of *temporary* demand disturbances, to which both IO and CGE models are routinely applied. In many of these applications, the fact that disturbances are temporary is often ignored. In addition, the implications of temporary demand disturbances being *known* to be temporary are unexplored in the literature. This paper compares results from a demand shock under IO assumptions to those from a CGE model with forward- and backward-looking behaviours to demonstrate the empirical implications of these modelling assumptions.

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## **The Modelled Impact of a Devolved Corporation Tax in Scotland**

Grant Allan, Patrizio Lecca, Peter McGregor and Kim Swales  
University of Strathclyde

There is increasing interest in devolving tax powers to Scotland with a policy goal of the Scottish Government to have a competitive tax structure. This paper models

the impact of a modest fall in the headline rate of Corporation Tax from 23% to 20% implemented in Scotland alone. This tax reduction is assumed to be introduced in 2015. The tax change is fiscally neutral in that any subsequent change in the total tax take in Scotland has to be met by an offsetting change in Scottish Government expenditure. This procedure is consistent with Scotland's pursuing a devo-max or independence scenario. The simulations suggest that there is a long run stimulus to the economy even without an increase in Foreign Direct Investment. However, the outlook over the short run time period is much more uncertain.

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## **The subsidy cost of achieving emissions targets in Scotland**

Grant Allan, Patrizio Lecca, Peter McGregor and J. Kim Swales  
University of Strathclyde

In this work we investigate about the size of the potential scale of subsidies to renewables industries to ensure that emission targets are achieved in Scotland. Particularly, we are interested in identify the scale of the funding that a Scottish Government might face under enhanced devolution (e.g. *devo max*). We do this using AMOS, a computable general equilibrium model for Scotland.

We run the model by imposing a target portfolio of electricity generating capacity (80% renewable) that satisfies UK and Scottish emission targets. The net outcomes would reflect the aggregate effects of the decisions of households and firms. We use the model to solve for the level of subsidy that would be required to induce private transactors to produce a particular portfolio of generating capacity. So that, we solve the model for the level of subsidy required to render the "80%" renewables generation portfolio consistent with a situation in which all markets are simultaneously in equilibrium and there is no incentive for further change.

We also explore the sensitivity of these results to assumptions about technological change through "learning" in renewable technologies which improves the cost competitiveness of renewables and makes it easier to hit renewables targets. Learning is determined within the model, and is positively linked to capacity of the affected renewable technologies.

Results are highly sensitive to assumptions about learning rates: from £9 billion to £1.3 billion subsidy with learning rate of 20% in renewables.

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## **Applying experimental methods in industrial policy evaluation: An RCT+ evaluation of Creative Credits**

Hasan Bakhshi<sup>1</sup>, John Edwards<sup>2</sup>, Stephen Roper<sup>3</sup>, Lorraine Morley<sup>3</sup>, Judy Scully<sup>2</sup> and Duncan Shaw<sup>3</sup>

1. NESTA
2. Aston Business School
3. Warwick Business School

Experimental evaluation methods using randomised allocation of subjects to a treatment and control group are widely used in medical and educational research but are rare in industrial policy. In this paper we outline the main issues which arise in applying experimental methods to industrial policy evaluation, and develop an experimental mixed-methods evaluation approach we call RCT+. This comprises: (i) random allocation of firms between the treatment and control groups; (ii) a longitudinal data collection strategy; and, (iii) a mixed-methods empirical approach. The aim is to combine robust impact assessment with a test of the ‘causative’ elements of the intervention’s programme theory. We outline an application to Creative Credits, a B2B innovation voucher scheme which aimed to link SMEs and creative service providers to stimulate new innovation.

Random allocation of incentives has significant methodological advantages. It circumvents standard issues of selection bias in the evaluation rather than needing to ‘correct’ ex post for selection bias. Issues of internal and external validity remain important, however, in terms of drawing appropriate inferences from policy effects. Substitution biases related to other forms of business support and randomisation biases, where firms may either opt in or out of a scheme due to the randomised allocation mechanism, may also be important. Economic arguments also support randomised allocation, however, where, as in Creative Credits, the monetary value of incentives is small. Randomisation may also have other economic benefits, however, related to the avoidance of adverse selection of risky projects, transparency, rapid decisions and costs.

In the application to Creative Credits the RCT+ approach proves effective in providing a robust indication of project outcomes despite significant issues with respondent attrition during the study period. The mixed methods element of the RCT+ methodology also prove effective in shedding light on the causal mechanisms shaping scheme outcomes. Particular insights surround the reasons for projects’ success or failure and the importance of partner choice and ‘brokerage’.

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## **Exploring the Role of Innovation Intermediaries in the Irish Food Innovation System**

Hatice Beste Yildiz<sup>1,2</sup>, Maeve Henchion<sup>1</sup> and Nola Hewitt-Dundas<sup>2</sup>

1. Teagasc
2. Queen’s University Belfast

It is well recognised that innovation is essential for competitiveness and sustainability (Yusuf, 2008; Cantner and Graf, 2006; Batt and Purchase, 2004; Hoang and Antoncic, 2003). However, innovation has become increasingly dependent not only on building internal capabilities within firms, but also on developing appropriate external relationships, which can be achieved through networks (Kirkels and Duysters, 2010; Pittaway, et al., 2004; Rosenfeld, 1996). In essence, situating in a network can help firms to access external resources and overcome internal constraints, as well as enabling survival and growth (Henchion and Sorenson, 2011; Lechner, et al., 2006).

As the variety of actors in innovation networks has increased due to the increasing attention on ‘open innovation’ thinking, research on the roles of the actors and the links within a network has earned prominence (Yusuf, 2008; Howells, 2006). This is particularly the case for intermediary organisations (public or private bodies) who execute a variety of roles within networks (Howells, 2006). Such roles may include one or more roles from within the broad classification of (1) co-development of innovation, (2) network facilitation roles and (3) network governance roles in innovation networks.

In this paper we explore the relationship between intermediary organisations and business innovation. More specifically we consider how the various roles played by intermediary organisations effect business innovation across a network. The lens we use to study this is the Irish Food Innovation System (IFIS). Synthesizing the literature on intermediary organisations we present an original typology of intermediary organisations and their hypothesised effect on business innovation in a sectoral innovation system. Mapping this against the IFIS we then evaluate the presence and various roles of intermediaries in this sector and identify current strengths and weaknesses in the innovation system.

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### **Agglomeration effects on labour demand: Establishment level evidence from Germany.**

Uwe Blien and Oliver Ludewig  
Institute for Employment Research, Germany

Many studies show that agglomerations increase establishment or firm productivity (e.g. Henderson 2003, Saito/Gopinath 2009, Anderson/Lööf 2009, Baldwin et al. 2010). While productivity increases are also welfare increasing it is unclear how they influence employment. Increased productivity allows producing a given quantity with less labour. This is the *displacement effect of increased productivity*. However, higher productivity decreases costs which lead to a drop in product prices. This in turn increases product demand and therefore labour demand is rising. A *compensation effect* occurs. Thus the agglomeration effect on labour demand via productivity is theoretical undetermined. Additionally there are other channels than productivity through which agglomerations might influence employment, market size for example.

Several studies investigated agglomeration effects on employment on the aggregated level (Glaeser et al. 1992, Henderson et al. 1995, Combes 2000, Blien et al. 2006). However regions do not hire people and they do not lay off employees, but establishments do. These establishments are then embedded in regions. Establishment level evidence on this issue is still sparse. Hence, we want to provide some additional evidence to the questions: What are the agglomeration effects on establishment employment? We take a dynamic labour demand function from labour demand theory and augment it with agglomeration factors. This provides our estimation function. We build an establishment data set by combining a German large scale establishment survey, administrative employee data and regional data from different sources.

The empirical results derived by applying system gmm estimator to our estimation function suggest, that there are indeed agglomeration effects on labour demand.

However these effects are to some extent contrary to our intuition. Labour demand in core cities is below average and it is highest in medium agglomerated areas.

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### **Path Dependence in the Innovation Performance of Previously State Owned Russian Firms**

Gerard Brady and Justin Doran  
University College Cork

This paper provides an empirical analysis of whether path dependence exists in the innovation performance of previously state owned Russian firms. This is accomplished by analysing the innovation performance of previously state owned firms and privately owned firms through the use of innovation production functions and testing for parameter stability across firm ownership to assess if the innovation system of these types of firms differs. The results indicate that previously state owned firms are not only less likely to innovate but also respond less to market pressures and are less efficient in their conversion of R&D effort into innovation output. This difference in innovation activities may result from path dependence, where previously state owned firms may have had their innovation systems engrained in them through previous state ownership.

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### **Cognitive Synergy and Poverty**

William Orlando Prieto Bustos  
Catholic University of Colombia

Social capital is an essential element in any growth and development social policy strategy that faces high exchange costs caused by either or both asymmetric information and moral hazard in transactional situations. Using a methodological design composed by an income-spending comparative analysis of an insular against a continental population a poverty change's probability decomposition is implemented to obtain an estimation of the local development epistemology category know as "cognitive synergy" proposed by Boisier (1999). The research main findings show that cognitive synergy capital produced by a private local development initiative is highly correlated with lower poverty levels when it is measured by housing living conditions. However, the least the income level is the more effective is social capital to reduce poverty levels.

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### **The Geographical Spread and the Economic Impact of the Agri-Food sector in Ireland – Implications for Regional Development**

Mary Carey  
University of Limerick

Recently, the agri-food sector has received increased attention in Ireland. The agri-food sector has been the traditional backbone of Irish exports, and despite the economic downturn Irish exports in this sector grow by an impressive 8% in 2011

(Irish Exports Association, 2011). The agri-food sector is regarded as Ireland's largest indigenous industry, the potential of the sector in terms of exports, and its heavy dependence on domestic inputs are the key reasons for the increased attention. The real economic value of the agri-food sector in Ireland is analysed at national, and most importantly for this paper, at regional level. This paper examines the impact of the agri-food sector in addressing regional disparities in Ireland. The estimation of the true value of the agri-food sector is evaluated at regional level by analysing Gross-Value-Added, employment levels and productivity rates for the sector expressed in percentage of regional values. Gross-Value-Added in absolute terms and as a percentage of regional Gross-Value-Added provides us with a more thorough understanding of the regional importance of certain industries within the sector (i.e. services in Dublin & the South West). In terms of employment, the rural context of the agri-food sector is discussed, including the geographical spread of the sector. A comparison of regional productivity levels is analysed in terms of manufacturing, resources, and services. As a preliminary contour of the agri-food sector in Ireland this research will be useful to all the key players in the sector.

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### **How Important is Innovation for the Productivity Performance of European Firms?**

Frank Crowley,  
University College Cork and University of Groningen

The purpose of this paper is to examine the systematic relationship between the innovation process and the productivity performance of European firms. A production function approach is used to analyse the exploitation stage of the innovation process in European firms. An endogenous switching model is employed on 2005 and 2009 Business Environment and Enterprise Performance Survey (BEEPS) data. The benefits of employing an endogenous switching model are fourfold by allowing the researcher to examine: the factors that have a positive (or negative) effect on the productivity of firms; if factors outside the model were important in explaining innovation and productivity levels; whether the decision to innovate had a positive or negative impact on the firms level of productivity; and, if the productivity levels would have been higher if the firm had taken the alternative strategy (the counterfactual scenario).

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## **A case study of small scale Aquaculture**

Peter Cush

National University of Ireland, Galway

Aquaculture has become an important source of employment for many peripheral rural areas in the West of Ireland. It has developed from a fledging industry in the 1970's to making an important economic impact to many of Ireland's most vulnerable regions. It has an estimated annual value of €130 million and employs over 2000 people. In Ireland, aquaculture has been developed along 2 diverging paths. At one level, a large scale capitalist approach has been followed, particularly in the salmon farming sector. Here an investment of industrial capital and waged labour has been added to the production cycle in order to generate rather substantial profits. In other regions, a small scale low cost approach has surfaced, where local households have taken over the industry. This form of production has developed mainly in the shellfish sector. Despite the emergence of this class of operators, little is known about how they have developed small scale aquaculture into a significant factor of production. The purpose of this paper is to illustrate how this industry has developed through a case study analysis of mussel farming in Killary harbour. It will be shown that this mode of economic organisation has survived mainly due to the resilience of household labour. Furthermore, producers have forged linkages with other households and worked cooperatively in order to share costs, equipment, knowledge and labour. This has allowed the producers to cut out the substantial costs associated with the industry. Cooperative action in this instance has allowed the producers to negotiate their peripherality and develop a solid economic model. The findings presented here are the result of an 18 month ethnographic study, where the researcher resided in the area, interacting and participating with the mussel farmers on a regular basis.

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## **Labour market escalators and remote island communities: creative industries and wage premia**

Mike Danson

University of the West of Scotland

There is a positive link between a vibrant Gaelic cultural and artistic sector within the Gaelic heartlands of the Hebrides of north west Scotland and the sustainability and growth of Gaelic-speaking communities. This is argued by both arts and cultural organisations but also by the economic development agency (HIE): *“Investing in the native language and cultural traditions of the region.... can lead to population retention, inward migration, ...greater entrepreneurial activity and business creation”*.

Although they can lead to increases in the use of the language, attachment of local people to their community, and levels of local confidence, different investments and initiatives can create different outcomes. So, as well as community and private initiatives, significant public investment in the Gaelic media has been a strong provider of quality jobs and careers in the Gaelic heartland, helping to retain and attract families to the islands. However, there is a bias in the 'Gaelic labour market' in generating such public sector employment not in these areas but in the media clusters of the urbanised mainland cities. This generates tensions between demands for such jobs and economic activity to be located in the traditional heartlands and the market drivers which favour concentration and centralisation



in the cities of central Scotland. This conflict between efficiency and economy on the one hand and quality job generation in the periphery on the other has not been resolved satisfactorily. In this paper, we explore the causes and dynamics of these developments and identify challenges for policymakers and supporters of the language and islands.

The research draws on our work on peripheral and marginal regions in Northern Europe as well as on escalator regions, the Gaelic labour market, and the Gaelic creative industries to suggest a reconsideration of the co-location of work and residence with a flexible definition of the 'home'.

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## **Smart Specialization Policies and New Directions for Regional Development: Challenges for Irish Policymakers**

Claire Davis<sup>1</sup> and Eoin O'Leary<sup>2</sup>

1. South West Regional Authority and University College Cork
2. University College Cork

This research is posed within the context of the Commission's new direction for EU Cohesion Policy<sup>1</sup> for 2014-2020. It examines the evolution of national and regional innovation policy in Ireland in the context of the EU since 1970. It documents the recent shift in European policy thinking from the traditional 'one size fits all' innovation policy to a place based smart specialisation policy which focuses on specialised technological diversification. This paper considers the uniqueness of Irish economic development performance and policy and conducts a comparative assessment of multi-level governance in Ireland and the EU over the same period in order to contextualize the challenges of adopting a smart specialisation policy in Ireland. The paper provides the framework within which further exploration will determine if Ireland should adopt a place based innovation policy and will provide a template on how such a policy could be developed.

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## **New firm formation and its effect on employment growth in declining regions.**

Heike Delfmann and Sierdjan Koster  
University of Groningen

Regional decline of population is likely to occur increasingly in developed countries. Entrepreneurship can play an important role in keeping declining regions vital through job creation. But the way new firm formation exerts its influence on employment growth is not yet evident. Although there is a large and growing body of research on new firm formation and employment, there is still a knowledge gap concerning the regional context new firm formation takes place in. Also, the focus tends to be on growth and the spatial variety in the relation is often neglected. This paper therefore examines the economic consequences of new firm formation on regional development in terms of employment growth. We focus particularly on the context of population decline. We also investigate whether the relationship differs depending the intensity and type of population decline, and by

the degree of urbanization. Promoting new firm formation is a policy measure all over the world. Particularly for regions that are declining, new firm formation is often highly prioritized by local governments. We know population decline, when controlling for other aspects, has a negative effect on the formation of firms. But what is the effect of start-ups on regional development in those areas that are facing population decline? New firm formation can contribute direct and indirectly to regional employment. The indirect effects are thought to have a larger impact on the long term, and indirect effects are not per se positively related to employment growth. This study aims to answer the following research questions: 1) What are the economic consequences of new firm formation on regional development in terms of employment growth? 2) Does the relationship differ depending the intensity population decline, and by the degree of urbanization? And 3) Are direct and indirect effects of new firm formation different across declining and growing regions, and in terms of rurality?

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## **The Distribution Dynamics of Industrial Impacts**

John Dewhurst  
University of Dundee

In an input-output context the impact of any particular industrial sector may be measured in a variety of ways. For the purposes of this paper output and income multipliers, back and forward linkages and shutdown effects are all considered. Although such measures are routinely calculated and often used to guide regional industrial policy the behaviour of such measures over time is an area that has attracted little academic study.

In this paper attention is primarily directed to two issues. First, for any given measure (the set of income multipliers, for example), the calculated measure will have a distribution. For some industries the income multiplier will be relatively high, for some it will be relatively low. The behaviour of this distribution over time is not without interest. Does the “average” multiplier follow any trend? Does the dispersion of the multipliers exhibit any signal? The recent publication of consistent input-output tables for the Scottish economy makes it possible to examine these questions over the ten year period 1998 – 2007. The extent to which the various measures tell a consistent story is discussed. Second, the overall distribution may be plotted and the movement in the histogram over time studied. However this does indicate the extent to which, if at all, industrial sectors switch places in the hierarchy. Using a Markov chain modelling approach it is possible to estimate the average time it might take a sector with a relatively large impact to fall back to an average position in the industrial hierarchy. In the process of this modelling strategy it is possible to identify an equilibrium distribution that the figures suggest. Again the extent to which there exists a consistent pattern in the results across the various measures is discussed.

Given that not all industrial policy is designed to be short-term, the implication of the stability or lack of it in the impact of key sectors should be of interest to regional policy makers.

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# **The Impact of Regional Migration on Regional Wage Inequality: A Semiparametric Approach**

Heather Dickey

University of Aberdeen

According to economic theory, regional migration is one of the primary mechanisms through which regional wage convergence is predicted to take place. In particular, regional wage equalisation will occur as regional wage differentials are removed through labour mobility flowing between regions. However, even if regional migration does act to reduce disparities in regional average wage levels, this does not necessarily imply that regional migration has an equalising effect on regional wage inequality. For instance, migration may lead to regional wage convergence, but if it causes increased dispersion within regional wage distributions, then regional migration may not be a desirable mechanism in reducing regional disparities in a wider context.

There exists a considerable literature on both regional migration and regional wage inequality separately; however, there is much less attention focused on the relationship between the two; specifically, how the flow of labour out of regions affects individual region's wage distributions. This paper investigates the impact that regional migration has upon regional wage inequality. It adopts the semi-parametric procedure proposed by DiNardo et al (1996) to examine the way in which regional wage distributions change as a result of regional migration. The empirical analysis applies the methodology of kernel density estimation to BHPS data for the period 1991 to 2007 to derive counterfactual wage densities for six broad regions of Great Britain. These hypothetical wage distributions represent what the regional wage distributions would have looked like if no one had entered or exited the regions over the period. Consequently, they provide a visually clear representation of the effect of regional migration on regional wage distributions.

From a policy perspective, if regional migration leads to greater regional wage inequality, then regional and national policies that promote and assist regional migration may actually have negatively impacted regional, and consequently, national inequality.

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## **National Resilience: An Analysis of the Persistence of Economic Shock in European Countries**

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2. University of Cambridge

This paper analyses whether economic shocks are persistent or transitory at the national level. Hamilton (1989) and Friedman (1993) provide two alternative views of the consequences of output shocks. Hamilton (1989) constructs a model where output shocks are permanent in nature, which is similar to the concept of "ecological resilience". The focus of ecological resilience is the impact of shocks on pushing a system past its breaking point and to a new path. It assumes multiple equilibria and that a shock can push an economy from one equilibrium to another (Simmie and Martin 2010). However, Friedman's (1993) "plucking" model of output has an alternative outcome for economies which experience a recession.

Friedman's model suggests that output progresses along a ceiling level, but occasionally is plucked downward by recession; implying fluctuations are asymmetric and recessions are transitory. This is similar to the definition of "engineering resilience" from the physical sciences. This describes a concept which refers to the resilience of a system to shocks and the speed of recovery to the pre-shock state. This can be viewed as the system being in equilibrium, with shocks temporarily knocking the system out of equilibrium.

The paper utilises data from the IMF International Statistics Database and the OECD's National Accounts Database for 15 EU countries. The 15 countries analysed are the countries which comprised the EU prior to 2002. Quarterly data is available from Q1 1960 to Q1 2011. The five variables considered are GDP, investment, government expenditure, exports and prices. In order to assess the interrelatedness of these five variables, and the extent to which shocks to one variable in the system are transferred to other variables, a vector error correction model which controls for spatial spillovers is estimated. The use of a VECM with spatial variables allows for an analysis of whether a long run relationship exists between the variables while controlling for cross sectional dependence. Impulse response functions are derived from the VECM model to assess whether shocks among the 15 countries are permanent or transitory.

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### **Shocks, Regional Employment and Output: Evidence on policy options for UK Regions**

Bernard Fingleton  
University of Cambridge

The aim of this paper is to explore the best policy options for stimulating employment and output growth among the UK regions. To achieve this, we consider the impact of a single, point in time, positive stimulus to either employment or to output, and attempt to trace whether such a stimulus would have permanent (positive) effects or whether it would be merely transitory.

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### **Is Health Care a Necessity or a Luxury? New Evidence from a Panel of U.S. State-Level Data**

Donald Freeman  
Sam Houston State University

A major concern of many of the world's developed economies is the increase in health expenditures as a share of national income. Health expenditures now account for over 10% of GDP in most western economies, and in the United States will approach 20% within the next decade. Aging populations will increase the demand for health delivery, with consequent pressure on capacity and prices of health services and products.

In previous research<sup>1</sup>, I used a panel of U.S. state-level data to address whether health care is a luxury or a necessity; that is, whether its income elasticity was above or below unity. The answer has implications for the determinants of health care spending, particularly as to whether the increasing share of GDP is driven by

consumers exhibiting greater preference for health spending as income grows, or whether changes in technology and health care supply are driving up the costs of health care. Using panel cointegration techniques, I concluded that health care in the U.S. was in fact a necessity good, with an income elasticity of about 0.8.

Since that paper, there have been several developments that occasion a fresh look at the question of health's income elasticity. First, eleven years of additional data has become available, extending the previous data set through 2009, a period of relatively slow income growth in the U.S. and one marked by two recessions. Second, there have been major changes in the healthcare market, with a significant expansion in government spending on healthcare through Medicare and Medicaid programs, in terms of enrollees and in terms of a new prescription drug benefit, Medicare Part D. Third, refinement of econometric techniques to identify structural breaks in time series has cast doubt on whether health expenditures and income are cointegrated, as my previous paper and much of the earlier research used as the basis for estimation.

My present paper uses recent developments in structural break identification and the updated data set to better estimate the income elasticity of health care using U.S. state-level data. To date, most research in this area has focused on international comparisons. Using intra-national or regional data has the advantage of greater homogeneity in health care systems and delivery, thereby removing a potential source of bias. Preliminary results indicate that health expenditures and state income levels are trend stationary around changing means and slopes, which is different from previous findings, but that health care remains a necessity good, confirming the earlier result. Other results of interest in the regional context still to be determined are the response of health spending to regional business cycles and the effect of the business cycle on the share of public versus private spending on health at the state level.

<sup>1</sup> "Is Health Care a Necessity or a Luxury? Pooled Estimates of Income Elasticity from U.S. State-Level Data," *Applied Economics* 35: 495-502 (2003).

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## **The Escalator Hypothesis Revisited: Is geographic mobility the key to career progression, or just being in the right place or in the right sector?**

Ian Gordon<sup>1</sup>, Tony Champion<sup>2</sup> and Mike Coombes<sup>2</sup>

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The literature on agglomeration suggests that the large labour pools of big cities improve the matching of supply and demand, leading to both higher productivity for cities and improved prospects of career progression for people living there. Some large cities – especially London – have achieved strong growth in knowledge industries, creating more opportunities for high-level professionals and managers. This paper reports the results of a project which addresses a number of unanswered questions concerning the links between social and spatial mobility and the role of place in these aspects of people's lives. Do migrants achieve all/most of their differential career advancement at the time of their move, or do they continue to make faster progress than 'locals' in the years after arrival? If the latter, is this just a function of selectivity, i.e. their overall composition by age,

health, education, ambition, etc? And are the gains concentrated among an identifiable minority of migrants, rather than being equally available to all? Is escalating potential a function of regional/urban primacy, or is it a continuous function of agglomeration, i.e. varying across the full range of areas' size, density, etc? Is regional/urban advantage in these terms simply a matter of job structure, with locational/production factors giving some areas a concentration of the sorts of jobs that tend to fast-track people? Or is it a function of dynamic firms, cultures, etc., facilitating and encouraging the able and ambitious? These questions are tackled using individual-level data from the ONS Longitudinal Study of England and Wales on 1991-2001 change in job-status scores based on imputed hourly income, with cases being coded to their city region of usual residence at each census. Micro-level modelling is used to identify the key determinants of the observed 10-year career progressions. This work is part of a project for the ESRC-funded Spatial Economics Research Centre (SERC).

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### **The Contribution of Local Enterprise Partnerships to British Productivity Growth**

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1. Glasgow University
2. Swansea University

This paper uses plant-level data from the Annual Respondents Database to decompose aggregate total factor productivity (TFP) growth in Great Britain between 1997 and 2008. The decomposition shows the contribution of entering plants, exiting plants, TFP growth in continuing plants and reallocations of output share among continuing plants. Each of these components is then disaggregated both by ownership status and geographically to show the contribution from UK and foreign-owned plants located in different local enterprise partnerships (LEPs). TFP is calculated using parameter estimates of an augmented Cobb-Douglas production function, estimated using system GMM to deal with the endogeneity of the factor inputs. The results show the importance of the treatment of output shares in calculating indices of TFP performance. Amongst UK and foreign-owned plants, the LEP that contributed the most to aggregate TFP growth was the Pan London LEP. However, this is the consequence of the large share of output located in this LEP rather than its TFP growth over the period. After controlling for output shares, the Black Country LEP experienced the fastest TFP growth in the UK-owned sector while Lincolnshire achieved the fastest TFP growth in the foreign-owned sector. The poorest performers in the UK and foreign-owned sectors were Hertfordshire LEP and Tees Valley LEP respectively.

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### **Agriculture, The Smart Economy and Regional Development**

Kevin Heanue and David Meredith  
Teagasc

This paper first outlines the contribution of agriculture to the Irish economy and selectively identifies the key international and national policy, market and societal

drivers that will impact the sector in the medium term. The vision and targets for the sector under the Irish Government Food Harvest 2020 strategy for ‘smart, green growth’ are briefly outlined, and a regional profile of the agricultural sector is presented which highlights the relative importance and regional specialisation of the dairy sector. Next a framework to conceptualise innovation along different parts of the agricultural value chain, consistent with the theme of ‘smart growth’, is presented.

The remainder of the paper focuses on an analysis of the regional variation in innovation at two points in the dairy value chain: farm level and dairy processor level. At farm level, the uptake of technological and management best practice by dairy farmers and their use of Knowledge Transfer activities are analysed econometrically to identify regional variations. At processor level, location quotients applied to local labour markets are used to identify the density of workers with third level qualifications associated with regional groupings of processors. The final part of the paper contains a conclusion.

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### **Beyond Intermediates: The Role of Wages, Consumption and Commuting in Accurately Estimating Metropolitan Level Input-Output Tables**

Kristinn Hermannsson,  
University of Strathclyde

It is a well-established fact in the literature on simulating Input-Output tables that mechanical methods for estimating intermediate trade lead to biased results where cross-hauling is underestimated and Type-I multipliers are overstated. Repeated findings to this effect have led to a primary emphasis on advocating the accurate estimation of intermediate trade flows. Laudable as that methodological prescription is, it is not complete. I qualify the consensus view and argue that, at least in the special case of metropolitan economies, commuting, wage and consumption flows are equally important if accurate Type-II multipliers are to be obtained. I demonstrate this case using an interregional Input-Output table for Scotland. This 3-region IO-table captures interdependencies between the sub-regional economies of Glasgow City, the rest of the Strathclyde region (greater Glasgow) and the rest of Scotland. In addition to identifying interdependencies caused by interregional intermediate purchases I use data on sub-regional household incomes and commuter flows to identify interdependencies from wage payments and household final demand expenditures. The construction of the table is varied around a range of assumptions about intermediate trade and household consumption to capture the sensitivity of multipliers to these underlying factors.

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### **The impact of education on regional growth and productivity: an analysis of the experience of the provinces of China**

John Hicks and Parikshit Basu  
Charles Stuart University

This paper compares and contrasts the economic growth experiences of China's provinces over recent years relative to the outstanding performance of the Chinese economy as a whole. Provincial growth performance, in terms of output per head, is shown to be dominated by changes in labour productivity rather than by changes in either labour force participation or changes in the proportion of the provincial population of working age (which is determined by both demographic and labour movement factors). In turn, an income accounting framework is utilized, in conjunction with recently available data on provincial capital stock, to assess the relative importance of the growth of the capital to labour ratio and the growth of total factor productivity in the determination of labour productivity. Our findings suggest that growth in both have been vital, but that changes in total factor productivity become more important than increases in the ratio of capital to labour as the growth process proceeds. In theory, a range of factors will impact on total factor productivity in each region. A number of studies have identified a lack of growth in education expenditure and a failure to improve educational levels in economically disadvantaged provinces as a major hindrance to achieving economic growth. We undertake an analysis of the relationship between the growth in total factor productivity and changes in provincial education activity in order to estimate the contribution of education to provincial growth rates and, using our results, draw out policy implications for both provincial and national governments seeking to narrow the income discrepancy amongst provinces in China.

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### **Valuing Marine Environmental Characteristics Associated with Changes to the EU Bathing Water Directive in Ireland**

Stephen Hynes<sup>1</sup>, Dugald Tinch<sup>2</sup>, Nick Hanley<sup>2</sup>, Caitriona Scully<sup>1</sup> and Alphonsus Browne<sup>1</sup>

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In 2015, European bathing water quality standards are set to become much stricter. This paper presents a review of the potential impacts on marine recreationists in Ireland of the revised Bathing Water Directive and examines the preferences of individuals for a number of potential changes in terms of the environmental quality of the Irish marine bathing waters. The changes considered are in relation to varying levels of benthic health, risk to respondents' health from poor bathing water quality and debris management. A choice experiment survey was designed to elicit individuals' willingness to pay for these attributes and discrete choice models were then employed to assess the relative importance of each beach characteristic to the respondent and to provide an estimate of benefits to marine users in Ireland from the revisions to the Directive.

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### **A spatially-related note on Entrepreneurship and Economic Growth**

Torben Klarl  
University of Augsburg

A large and still growing body of literature suggests that entrepreneurship is of exceptional importance in explaining knowledge spillovers. Although quantifying



the impact of entrepreneurial activity for economic growth is an interesting issue - particularly at the regional level - a concise formulation within a theoretical growth model is still missing. This paper in general tries to uncover the link between own- and neighbour-related regional entrepreneurial activity in innovation and regional growth within a spatial semi-endogenous growth model in the spirit of Jones (1995) reflecting recent empirical findings on entrepreneurial activity for economic growth. The paper derives an explicit solution for the transitional as well as for the balanced growth path level of ideas.

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## **Does Location Matter for Business Level Product Innovation in Vietnam? Evidence from the Investment Climate Survey**

Declan Jordan  
University College Cork

Using data from the Investment Climate Survey published by the World Bank, this paper estimates the determinants of business level product innovation in Vietnamese enterprises. In particular the paper sheds light on the effect of location on the likelihood of business-level innovation, while also controlling for business-specific factors. The paper finds that businesses in the Red River Delta Region, which includes Hanoi, are significantly more likely to introduce new and upgraded products than businesses in other regions. It is common to find a strong capital city effect on innovation, though it is surprising, given its history as a strong commercial centre, that businesses located in the South-East (Ho Chi Minh City) Region are less likely to innovate than those in the Red River Delta Region.

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## **Measuring the Impact of Regional Business Networks on Firm Performance**

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2. University of Derby

Business networks have been defined as groups of firms who come together to collaborate to overcome common problems, share knowledge, resources, and/or to reach new markets. Business networks which are geographically concentrated in a specific region are classified as regional business networks (InterTradeIreland, 2011). This paper, through the use of a Two-step Heckman model aims to evaluate the impact that regional business networks have on their participant firms' performance. Currently, there exists a distinct lack of research *vis-à-vis* the estimation of the impact of business network membership on firm performance (Parker, 2008; Schoonjans et al 2011). More specifically, we aim here to fill this gap by looking at the impact that membership of formal regional business networks have on participant firms' performance. Empirical evidence suggests that firms reap a number of benefits from being members of formal business networks (e.g. Fuller-Love and Thomas, 2004; Witt, 2004; Chetty and Holm, 2000). In an attempt to cultivate such benefits, business networks have been promoted by policymakers. According to Rosenfeld (1996), for example, the

catalyst for business networking was the Emilia Romagna region in Northern Italy. The success of networks in the Emilia Romagna region sparked an interest in business networking from Danish policymakers and subsequently, countries such as the US, Norway, Australia, Canada, and New Zealand, began to promote network activity (Ffowcs-Williams, 2000). Irish policymakers are no different and have also recognised the benefits to be gained from promoting business networks. This has resulted in a number of Irish network programs being introduced at a regional level. Indeed, 16 percent of business networks in Ireland can be classified as regional business networks (InterTradeIreland, 2011). The paper's core aim is to evaluate the micro-impact (firm level impact) of regional business networks, using the case of Ireland as the laboratory to validate the framework developed. Evaluation plays an important role in policymaking circles because it provides accountability of where, and how, public funds are allocated. Additionally, it provides policy lessons regarding possible future interventions.

The current paper is based on data gathered from a random sample of 117 firms who are members of regional business networks and 100 non-network firms (a control group profiled on the regional network respondents). The rationale for including the control group of firms is to enable the behaviour and performance of firms who are members of regional business networks to be compared to those who are not members of such networks. Only then can we estimate the true impact of regional network membership on firm performance. There is an abundance of literature on the 'positive' aspects associated with a firm being a member of a business network (the same largely holds for regional business networks). Far less is written on the 'negative' aspects of business network membership (Gulati et al, 2000; Witt, 2004). The latter is explored in the current paper and in particular, we focus on the negative 'lock-in' effects of regional business network membership, namely, technological 'lock-in' (Gluckler, 2007) and cognitive 'lock-in' (Asheim et al 2011).

The study contributes to the international business network and regional studies literatures providing empirical evidence on the motivations and impact of regional business network membership on firm performance. Furthermore, the results of the econometric analysis highlight key firm and network characteristics which impact on member firms' performance. Additionally, the paper makes a methodological contribution through the development of multivariate econometric models to estimate the true impact regional business network membership has on participant firms' performance. Finally, the study has the potential to provide interesting insights for policymakers engaged in promoting regional development.

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## **'Commuter fuel poverty': A spatial microsimulation approach**

Robin Lovelace and Dmitris Ballas

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Rising fuel prices and recession have driven interest in 'fuel poverty', a characteristic of households spending more than 10 percent of their disposable income on domestic energy bills. However, relatively little research has been conducted on the proportion of incomes spent on transport energy costs. The daily trip to work is an essential yet increasingly expensive energy using activity which consumes more than 10% of individuals' disposable income in many cases. We

label this phenomenon 'commuter fuel poverty'. This paper reviews existing evidence about the phenomenon and then describes a new method for its investigation based on spatial microsimulation. We then apply the method to simulate the geographical distribution and socio-economic characteristics of individuals living in 'commuter fuel poverty' in Yorkshire and Humber. The political implications of our methods, and opportunities for validation, are outlined in the context of energy security.

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### **Spatial analysis of housing markets: the Portuguese urban housing context**

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Spatial homogeneity is a strong assumption in the hedonic housing price context; if not analysed conveniently it can be a potential source of specification errors. Spatial heterogeneity occurs when a territorial segmentation exists in the housing market and, therefore, either the hedonic prices associated with different attributes or the characteristics of the houses are not constant over space. The evidence of recognition of housing submarkets and the argument that caution should be exercised when interpreting the results of standard hedonic models has been identified early in the literature. Despite the argument that housing submarkets should be adopted as a working framework, some ambiguity remains about how to deal with this issue.

The early empirical works on submarkets tended to be segmented into two major perspectives: those studies that adopt a supply side determinant focusing on the structural characteristics of dwellings and on neighbourhood characteristics; and those that focus on demand side determinants, such as, on household incomes or other demographic and socioeconomic characteristics. In this case the existence of distinct subgroups of demand is reflected on the territorial segmentation of the hedonic price vector.

Thus, the objective of this communication is to a methodology to define housing submarkets applied at an urban area, specifically, the analysis will be applied to the urban area of Aveiro-Ílhavo in Portugal. Demand and supply side views will be adopted and results compared to see how demand and supply interact to shape the segmentation landscape of housing markets.

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### **Opportunism over Strategy: A review of regional policy in Ireland**

Steve McFeely  
University College Cork

Since the late 1950's, the priority given to regional issues in Ireland has ebbed and flowed with the country's economic and political fortunes. This inconsistency in

approach has stemmed from the uncertainty as to whether regional development undermines or supports national development. Arguably, this debate has been allowed to continue unresolved in Ireland as regional statistics, analysis and modeling have not sufficiently developed to address this question in a robust analytical manner. As a consequence, sub-national regional issues remain secondary to national ones and continue to struggle for recognition in Ireland.

Two of the most significant plans regarding regional and spatial planning in Ireland; the Buchanan Report and the National Spatial Strategy were both quickly rejected by the Governments of the day for reasons of political expediency. Thus, over the past fifteen or so years, despite the National Spatial Strategy and two National Development Plans having set balanced regional development as a core objective, there is little evidence to date to suggest this objective is being achieved. Furthermore, changes to the definition of balanced regional development, from equity to competitiveness, have left regional policy struggling to hit a moving target.

This paper charts the evolution of regional policy since the late 1950's, highlighting some of the defining moments, and argues that the inconsistent priority given to regional issues, has led in general, to reactive regional policy, that has been typically been short-term and opportunistic in perspective rather than strategic. Some implications for regional policy in Ireland today are then addressed, such as: the incoherent and artificial nature of the NUTS regions, raising the question as to their sustainability and suitability for policy decisions; what will drive regional policy in the future, now that EU funding has been reduced to 'Phasing Out' status? And; can regional statistics, analysis and modeling really be improved given the dysfunctional data infrastructure and multiple regional structures operating across the wider public service?

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## **Using Regional Input-Output Tables to forecast regional Final Demand**

Steve McFeely

University College Cork

One of the criticisms frequently levelled against Input-Output (I-O) is the static nature of the tables and subsequent models. It is argued that this limitation, arising from the fixed technical coefficients assumption makes I-O unsuitable for forecasting, particularly over the medium and long run.

This paper outlines a series of simple ex-post tests, to establish, the forecasting capability of national and regional I-O tables. A more sophisticated experiment is then conducted where the Leontief production function constraints are relaxed to incorporate labour productivity. These tests are conducted over a stable two-year period (2005 – 2007) and a longer, more unstable period (2005 – 2009).

An ex-ante forecast of regional Final Demand for 2011 is then compiled, in order to assess whether the current economic climate has had a significantly more negative impact on the Border, Midlands & Western (BMW) region relative the Southern & Eastern (SE) region.

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## **The impact of Innovative Human Capital on firm-level innovation: Empirical evidence and implications for policy**

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2. Aston Business School

The Irish government through the National Development Plan 2007-2013, will invest €8.2 billion in initiatives to enhance human capital, physical infrastructure and commercialisation related to science, technology and innovation<sup>1</sup>. The recently published Action Plan for Jobs (2012) emphasises building competitive advantage through research and innovation to drive job creation, aligning skills with needs and sectoral employment initiatives. Having a third-level degree is no longer a sufficient criterion for competitive advantage or firm-level innovation: the proportion of the labour force with such a degree has increased from 25 per cent in 1996 to 36.2 per cent in 2006<sup>2</sup>. Competitive advantage lies in part with the firm's capacity to innovate and ability to identify, evaluate and exploit internal and external knowledge<sup>3</sup>. From a scholarly and policy perspective, this research is motivated by the well-accepted argument that sustained competitiveness depends upon the innovation-based strengths of the economy<sup>4</sup>. In this paper we undertake a holistic evaluation of human capital, its effect on firm-level innovation and implications for policy. We develop a unique Innovative Human Capital Index (IHCI) measure using rich firm-level data with over 5,000 observations of Irish employee's workplace experiences. The far reaching IHCI builds on the traditional measure of human capital (education and training) and adds the tacit characteristics of intrapreneurship, job satisfaction and willingness to change work practices. An augmented innovation production function is used to test the hypothesis: *firms with higher Innovative Human Capital are more likely to innovate*. The analysis finds that IHCI is a significant determinant of firm-level innovation in both private and public sectors and across regions of Ireland. At a time when the opportunity cost of public funds is at an all-time high (in view of the fiscal rectitude) the research explores the value of IHC for policymakers and firms' innovation strategy and practice. The research provides insights on evaluating innovation and human capital related government support programmes *ex-ante* and *ex-post* so as to take account of the 'hidden' competitive advantage held by firms' innovative human capital. The research explores research questions such as: do current innovation programmes support innovative human capital? And how can government support programmes address the research findings in the future? The implication for firms' innovation strategy and practice is in recognising and developing innovative human capital. The methodological approach adopted and the analysis applied has broad-based application beyond the Irish case and will provide transferable insights regardless of country context.

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## **Responsibility v. Attribution for GHG Emissions**

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In the past decade the issue of regional emissions targets has become central to public policy debates in the UK. Scotland, Wales and Northern Ireland have legislative targets or explicit sustainability policies aimed at reducing their territorial and/or consumption emissions. A large part of this debate centres on the idea of 'responsibility' for greenhouse gas (GHG) emissions, yet 'responsibility' is very poorly defined in the literature.

What does it mean to have responsibility for GHG abatement? The current debate ignores, or worse conflates, attribution and responsibility for GHG emissions. The practical considerations underpinning the attribution work in the literature need not say anything in reality about responsibility, despite its claims to the contrary.

The purpose of this paper is twofold. Firstly, to make explicit the hitherto unexplored link between legal/moral/ethical ideas of responsibility and the 'responsibility' for emissions discussed in the literature. Secondly, in expanding the basis for the accounting/attribution analyses currently used in the literature to better align attribution analysis with the definition/concept of responsibility developed above.

It is crucial that in future debates about regional emission reductions, responsibility is properly defined and aligned with the appropriate accounting methodology. This paper attempts to explicitly tackle the issue of who is responsible, or can thought to be responsible, for different components of air emissions within each region, and to outline a decomposition of global emissions that aligns with this idea of responsibility.

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### **Export led growth and territorial emissions targets: a paradox?**

Stuart McIntyre<sup>1</sup>, J. Kim Swales<sup>1</sup> and Karen Turner<sup>2</sup>

1. University of Strathclyde
2. University of Stirling

Like most small regional economies, Scotland has traditionally, and continues, to see exports as a promising means of boosting economic growth. However since the passage of the Climate Change (Scotland) Act 2009, Scotland has had binding emissions targets which seek to reduce Scotland's production based emissions by 80% by 2050. Our research suggests that around half of these emissions are generated in the production of goods and services for export. This suggests that an economic policy that seeks to boost exports would be expected to have important impacts on the national emissions balance. Is it the case, for instance, that Scotland's consumption based national emissions balances (e.g. Carbon footprints) increases less in the face of export growth than a territorial based (e.g. Kyoto) alternative?

It is not necessarily the case that, ex-ante, territorial emissions targets will be incompatible with export led growth strategies. Whether these two policy objectives are incompatible depends on the impact of the proposed economic policy (here export growth) on the territorial emissions balance. To analyse the impacts of a change in activity from a range of export shocks, we introduce a regional CGE modelling framework for the Scottish economy. We then use the model results to inform post-shock IO analysis of emissions under the production and consumption accounting principles, and specifically to answer our principle

question about the effect of an increase in Scottish export demand on its national emissions balance.

Thinking only about a territorial and a consumption based emissions balance, the impact of an economic strategy aimed at boosting exports on each of these two emissions balances, is not obvious. Increases in domestic economic activity, driven by an increase in export demand, would tend to drive up the territorial emissions balance. On the other hand, increases in domestic economic activity will increase employment and household consumption (as more people are employed and incomes rise), which manifests itself in an environmental context through an increase in consumption by households. Household demand in Scotland currently supports a significant volume of emissions.

As household consumption grows, this is expected to support additional emission generation which would be expected to increase both the territorial and the consumption based emissions balance. The extent of the increase in each will differ depending on the extent to which households consume domestically produced versus imported final demand goods, and Scottish businesses switch between domestically produced and imported inputs. The CGE modelling approach taken in this paper is intended to capture and model these economic interactions. This will allow us to assess the impact on different emissions balances of increases in export demand, allowing us to gauge the extent to which export growth increases the territorial and consumption emissions balances.

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### **Market Potential and the Geography of Entrepreneurship in Chile**

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The sharp and persistent differences in entrepreneurial dynamism among regions within countries have captured the attention of both economists and regional scientists. This paper explores the relationship between market potential and the spatial variability of entrepreneurial activity rates in Chile, as measured by the number of businesses relative to the labor force. To do so, we adapt the canonical NEG framework of Krugman-Helpman-Hanson to arrive at a testable equilibrium equation. The econometric specification casts changes in entrepreneurial activity rates as a partial adjustment process. The model is tested against municipal data on the number of firms per adult population during the period 2005-2010. Results support market potential as a plausible explanation for the geography of entrepreneurial activity in Chile, along with the detrimental effect of local fixed costs of running businesses. Simulation experiments indicate interregional demand linkages of a limited spatial and temporal extent. In sum, evidence suggests that distance to markets discourages entrepreneurial activity, although the potential of nationally centralized integration is quite limited as a mean for stimulating entrepreneurship in remote areas. Therefore, and depending on policy

objectives, spatially-sensitive and/or spatially targeted entrepreneurship support programs may be warranted.

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### **A quantitative method of Industry Linkage Analysis: A New Method for Comparable Studies**

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Industrial cluster analysis has become a crucial tool in regional policy. What is clear is that in most of this work there is confusion around the term cluster. While much of the cluster literature stems from the work of Porter (1990), the term cluster has strong similarities to the extensively studied economic principle of agglomeration documented since Marshall (1890). Porter's description of clusters (Benneworth and Henry, 1994) has been criticised for lack of methodological precision. There is increasing concerns concerning cluster methodologies, specifically in the area of quantitative measurement and comparison of industrial linkages.

In light of these concerns this work suggests a new framework to measure and analyse industrial linkages. The framework employs both quantitative and qualitative methods to identify clusters of industries. Included within the framework is a survey instrument based on the *Four i Linkage Scale*. The scale facilitates an enumeration of the nature and business significance of linkages that respondent firms have with other firms, organisations and institutions. Although such linkages are a central element of cluster theory (Porter, 1990, 1998b), the literature does not provide a consistent method of measuring them. Furthermore the paper enhances the analysis by reporting the results of a linkage index. This index measures the degree to which a companies linkages are potential in nature. It is on a scale of 0 to 1 with a value closer to 1 more potential in nature.

The framework described in this paper provides a consistent methodology. As an index it is unit-less and has the advantage that it can be applied to various spatial spaces and dimensions within an industry setting.

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### **Linking acute psychiatric administrative data within a spatial microsimulation model to examine the prevalence of mental illness in Ireland**

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1. University of Liverpool
2. Teagasc
3. University of Leeds

It is well documented that Ireland has traditionally reported high rates of mental illness and admissions to acute psychiatric hospitals for mental illness. However, there are few detailed studies on the geographic prevalence of mental illness in Ireland. Recent research using the National Psychiatric In-patient Reporting System (NPIRS) has examined urban and rural differentials in admissions to acute



psychiatric hospitals in Ireland. However, although a rich dataset with regard to examining the characteristics of psychiatric in-patients, in using the NPIRS dataset one is only using revealed utilisation data. The dataset takes no account of those treated in community-based mental health services or indeed those who may have a mental illness but who may never present to services. Thus, the aim of this paper is to link the NPIRS dataset within a spatial microsimulation model (SMILE – Simulation Model for the Irish Local Economy) to estimate the prevalence of non-revealed psychiatric illnesses at the small area level. Combining the NPIRS dataset with the simulated SMILE data will produce a small area profile of individuals with a potential or untreated mental illness as well as individuals that have a treated mental illness. Such a dataset would allow one to examine the differential characteristics that make individuals seek acute psychiatric care, the relationship between access to acute psychiatric facilities and utilisation rates, and to test whether individuals drift towards areas with higher service capacity.

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### **An investigation of the participation decision in the Rural Environment Protection Scheme (REPS): a conditional logit approach using simulated counterfactual data for farmers**

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In this paper we present a theoretical model of the effect of the choice to participate in the Rural Environment Protection Scheme (REPS) on Irish farms. REPS was a voluntary agri environmental scheme with broad objectives that was available to every farmer in the Republic of Ireland from 1994 to 2009. We describe farmers' hypothetical responses to the possibility of participating in the scheme using an adapted version of the agricultural household model. Data on physical, economic and demographic farm variables is taken from the National Farm Survey (NFS) and is used in a 16-year pooled dataset. We compare farmers' actual decision (to join REPS or not) with the possible alternative decision. In doing so we simulate counterfactual data for variables that are likely to influence the decision for each individual in the sample. A conditional logit framework is then used to test our behavioural hypotheses and to examine the impact of the REPS participation decision on Irish farms over time.

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### **Social Integration and Externalities in the Netherlands**

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University of Groningen

The aim of this paper is to determine to what extent differences in individuals' social integration are the result of a) the characteristics of the individuals, b) the characteristics of the neighbourhood where the individuals live and of the neighbouring neighbourhoods, and c) the characteristics of the municipality where the neighbourhood is located and of the neighbouring municipalities. This paper

also examines whether place-based factors affect social integration of individuals i) of different ethnical groups and ii) of the first and second generation immigrants, in different ways. Data from the SPVA (Sociale Positie en Voorzieningsgebruik Allochtonen) survey and the Netherlands Statistics was analysed, using a multi-level model with spatial externalities at neighbourhood and municipality level. In addition a broad range of proxies for social integration are analysed since social integration is a broad and multidimensional concept.

Results depict that Dutch natives are the most socially integrated, but as for the immigrants, Antilleans are the most socially integrated and Turks are the less integrated. The second generation immigrants are more socially integrated in the Netherlands than the first generation immigrants for all ethnical groups. In the neighbourhood, Turks are the most socially integrated and even more integrated than the native Dutch. Moreover, there is no difference in social integration in the neighbourhood between the first and the second generation immigrants. People who live in neighbourhoods with high percentage of foreigners are less socially integrated. This finding is highly robust to the measurement of social integration and to the inclusion of different control variables at individual, neighbourhood and municipality level.

Other results show that place-based effects do not matter for the most socially integrated people.

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### **Agglomeration Economies in Ireland: Implications for Firm Productivity**

Lisa Noonan and Eoin O’Leary  
University College Cork

This study identifies how internal economies of scale and external economies of localization and urbanization affect labour productivity differences between Irish manufacturing firms. According to O’Leary (2007) Irish policymakers have focused on localization economies as the only source of agglomeration economies. The study first attempts to operationalize Parr’s (2002) classification of six agglomeration economies, three of which are internal to the firm and three of which are external to the firm. Based on secondary data on Irish manufacturing establishments from the Census of Industrial Production (CIP) it then attempts to quantify the relative importance of the different kinds of agglomeration economies on manufacturing labour productivity for firms operating in Irish regions.

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### **Estimating the Value of Marine and Coastal Ecosystem Goods and Services in Irish Marine Waters Using Benefit Transfer**

Daniel Norton and Stephen Hynes  
*National University of Ireland, Galway*

Ireland is an island nation with a long coastline and sovereign rights over a large marine area. As a result, Ireland is host to many marine and coastal ecosystems (MCEs) which provide a variety of goods and services. Some of these goods and

services have a market value but many are not priced by the markets. If these non-market goods and services are not valued, they are in danger of being overlooked in policy making. There are many non-market valuation techniques available that can assist analysts and policymakers to place a value on these ecosystem goods and services. However, these can be time consuming and expensive to undertake. An alternative to such primary valuation techniques is a valuation methodology called benefit transfer (BT). This paper applies this methodology to study MCE services in Ireland. It does so by transferring value estimates of MCE services from other study sites (both national and international) to Irish marine and coastal ecosystems (the policy site). This will give estimates of the value of various MCEs in Irish waters. Additionally, the combination of geographic information systems (GIS) with the BT methodology at a national scale will highlight the differences in the values of MCEs between regions in Ireland.

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### **Exploring complexity in the relationship between entrepreneurial knowledgeexploration and exploitation: Individual assigned patents in Ireland, 1976-2009**

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1. University College Cork, Ireland
2. Queen's University Belfast

Evidence for a positive relationship between investment in knowledge creation and performance is well-documented for nations (Guellec and van Pottlesberg 2004) and for organisations (Damanpour and Evan, 1984). Less well researched is the role of individuals in the innovation process and specifically, the knowledge generation and commercialization process. Studies incorporating individuals, have typically positioned them as a distinct tier in knowledge flows, comprising individuals, groups and organisations (Kamhawi, 2010).

We examine a largely neglected area of knowledge creation, namely patents that are both invented and assigned to individuals. These patents tend to be excluded from studies of knowledge creation as the organisational context is ambiguous and therefore it is virtually impossible to integrate this information with other data sources on business activity and performance. Yet, as is the case in Ireland, patents created by and assigned to individuals account for a significant proportion of total patents (c. 10 per cent). This knowledge represents substantial novel technology with the potential to be exploited commercially.

Based on a survey of individuals being awarded a European and/or US patent between 1976 and 2009 the paper analyses the individual and organisational context of patents that are invented and assigned to individuals as opposed to private or public sector organisations. In addition we explore the extent to which individual patents are commercialised and the various routes to commercialization taken, including intrapreneurship, spin-offs and licensing.

Our findings contribute to the literature on entrepreneurial learning and the relationship between exploration and exploitation both within and across organisational boundaries. Our results are of interest to policy makers in identifying the extent to which novel technology created by and assigned to individuals is, or is not, exploited and the relationship between the environment

for knowledge exploration and subsequent exploitation. Finally, it helps to deepen our understanding of how individuals innovate and the various ways in which they do so.

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### **The Spatial Impact of the Economic Downturn in Ireland 2006-2011**

Cathal O'Donoghue, John Lennon, Jason Loughrey and David Meredith

Teagasc

This paper examines the impact of the economic downturn in Ireland on labour force participation, income distribution, and income inequality at a district spatial scale. This paper provides a methodology that is used to estimate household income changes at the district level in Ireland between the 2nd quarter of 2006 and the 2nd quarter of 2011, a time span that covers the most recently completed inter-censal period and coincides to some extent with the peak and the subsequent downturn in the overall economy. The methodology can however, be used to produce estimates of change over an alternative period of time, provided that the baseline population is drawn from the Census of Population which occurs at five years intervals.

A large amount of data is available in relation to the impact of the economic downturn on households at a national level. There remains however, a gap in the data infrastructure and the economic literature with regard to the spatial impact of these changes. The methodology described in this paper seeks to fill some of this void by updating and calibrating the SMILE model (Simulation Model of the Irish Local Economy) to a number of external data sources on employment and earnings.

The paper builds on existing work by incorporating a national level tax-benefit model thereby allowing for the estimation of disposable income for each household. These estimations can be used to estimate changes in poverty rates at the district level. The future availability of the 2011 SAPS data and the 2011 Survey of Income and Living Conditions (EU-SILC) will allow for validation to be carried out on the estimates produced by this model.

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### **The City and the Region: Is there a Real Difference?**

John B. Parr

University of Glasgow

It is becoming increasingly common for the terms “urban” and “regional” or their associated nouns, “city” and “region”, to be employed jointly. This is to be found in the names of university departments and research institutes, e.g. the Department of City and Regional Planning at Cardiff University, and the Centre for Urban and Regional Studies at the University of Newcastle. In addition, a number of journals use this phrase or a similar one in their titles, e.g. *Urban and Regional Development Studies* and *Regional Science and Urban Economics*. The reasons for this joint usage of the terms urban and regional are not obvious. One explanation is that in both urban analysis and regional analysis, which have

emerged as important specialisations in certain disciplines, many of the theoretical frameworks, methodologies and techniques have a high degree of affinity. Such joint usage of terms prompts a number of questions, the most fundamental of which is the following: to what extent do the city and the region involve different entities?

Clearly, the city represents a material entity (if only in physical terms), whereas the region is in the nature of an intellectual or technical construct, though no less significant for that. Among the numerous ways of distinguishing between the two, the one selected here focuses on the extent to which the city and the region exhibit differing forms of spatial organisation, and this will be approached primarily in economic terms. The issue is not simply a matter of academic interest: the city and the region continue to be important points of reference in numerous interventions by the state, notably in areas such as planning and the delivery of public services. The issue is thus of relevance to the policy analyst as well as the policy maker. In the following discussion the three perspectives are adopted, and in each case the setting is within the broader context of the nation. The first compares the city and the region as individual entities, while the second focuses on a particular city within a given region, i.e. the city and its region. The third perspective examines the city and the region each on a system-wide basis, so that the system of cities is compared with the system of regions.

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### **Analysis of the transnational freight transport in the Southwestern European border**

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Suppression of customs checks between member states of the European Union hinders estimation of the volume of intra-community transit of passengers and goods. Control over freight volume crossing the borders of EU countries is not homogeneous and depends mainly on the modes of transport used. Potentially reliable sources of information in this field are statistics provided by certain carriers and entities: mainly railway companies, airlines, companies engaged in maritime transportation, oil pipelines, harbours and airports. Even more challenging is the estimation of the volume of freight transported and the number of road operations engaged in intra-community trade: there is no control along intra-European borders and the data available for the volume of freight transported by road are provided by general directorates of customs and foreign trade reporting to the central government in the different member states; generally, these data do not exactly match reciprocal data (mirror data) for several reasons, i.e. the volume of goods received does not match the goods shipped. However, in this context, the number of operations or journeys remains the most evasive piece of information concerning freight road transport among EU countries.

On the one hand, measurements are performed close to the borders by means of indirect counters or the use of surveys based on random sampling techniques. The most reliable indirect counters are based on measurements at Hestia-type dynamic weighting stations and data originating from toll stations located on both sides of transnational motorways. There are three types of Hestia stations: type-T

stations meet the needs of counting, speed measurement and vehicle length; Hestia C stations also classify vehicles into 18 different categories according to their silhouette; and Hestias P allow for dynamic weighting of axles and vehicles. Hestias T and C may be portable. Hestias are not reliable for humidity rates above 95%, but feature  $\pm 1.5\%$  accuracy rates in vehicle counting and 10%-20% in weighting. As for random sampling techniques, the most frequently used surveys are the Permanent Surveys of Road Goods Transport carried out by every European country on domestic heavy vehicles traveling along international routes.

The purpose of the present paper is to provide for the specific estimation of freight volume and traffic operations of heavy vehicles crossing the Pyrenean border between Spain and France while analyzing the distribution of such operations and tonnes of freight transported on either side of the French-Spanish border. The main aim of the present paper is, hence, to demonstrate, based exclusively on statistical data, that load per vehicle in freight transport across the Pyrenees is not homogeneous, as assumed by several *Transit* surveys, and depends not only on the nationality of vehicles but above all on the kilometres travelled and the specific itinerary chosen. Unfortunately, *Transit*-type surveys and the like do not shed much light on the percentage of Spanish vehicles for each itinerary nor on vehicle load, as data is obtained from measuring stations on both sides of the Pyrenees which weight lorries and record registration plates separately, thus preventing any biunivocal correspondence between both magnitudes. *Transit*-type surveys are possibly the best method to ascertain the percentage of lorries going from one place to another, but data processing associated with this type of surveys by French and Spanish agencies, particularly the *Bilan 2001* published by the *Observatoire des trafics au travers des Pyrénées*, assumes an average load which is then multiplied times the percentage of vehicles. Such data processing results in an excessive ratio for road trade between Spain and France at the expense of trade between Spain and the rest of Europe. The present paper seeks an alternative approach strictly based on the analysis of freight tonnage transported by heavy vehicles along international routes.

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### **Modelling the Location and Consequences of Aircraft Accidents.**

D.E. Pitfield

Loughborough University,

Following the completion of two projects funded by the UK EPSRC, this paper aims to summarise the work on the location and consequence models. The projects focused on the development of an improved airport risk assessment methodology aimed at assessing risks related to aircraft accidents at and in the vicinity of airports and managing Airport Safety Areas (ASAs) as a risk mitigation measure. The improved methodology is more quantitative, risk-sensitive, flexible and transparent than traditional risk assessment approaches. As such, it contributes to the implementation of Safety Management Systems at airports, as stipulated by the International Civil Aviation Organisation. The innovative elements of this research are two-fold. First, an accident database covering undershoots, overruns, and take-off and approach crashes close to airports has been compiled. Each element has then been 'normalised' to allow comparisons between all accident cases. This allows statistically significant conclusions to be drawn. Second, accident frequency models have been developed, for example, identifying the

contribution of influencing factors such as variations in meteorological conditions. To allow airport risk to then be calculated entails comparing these cases with those contained in a 'normal operations database' where no accidents have been recorded but where the influencing factors are also known. Subsequent models have examined the location of the accidents and their consequences. It is this work that is the focus of this paper. Future work will focus on improving these aspects of the modelling and extending the modelling to cover both lateral deviation (veer-offs) and the consequences of crashes more than 600 metres but less than 10 kilometres from a runway end.

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### **An Analysis of Firm Deaths in Ireland**

Bernadette Power, Geraldine Ryan and Justin Doran  
University College Cork.

This paper investigates the death of firms in four separate birth cohorts, or generations, of nearly 195,371 Irish firms over the period 2000 to 2009. These firms were founded between 1910 and 2009 and operate in NACE codes 1 (C to K). Its aim is to explore and to link the likelihood of death to firm, industry and regional variables. We rely on secondary data obtained from the Central Statistics Office (C.S.O.) in Ireland. The latter enables us to match business demography micro data on firms in Ireland collated by the C.S.O. with data from other surveys of these businesses (also collected by the C.S.O.) such as the Annual Services Inquiry, Census of Industrial Production, the E-Commerce Enterprise Survey and the Community Innovation Survey to build up a profile of firm exits in Ireland across four separate birth cohorts firms founded before 1980, between 1980 and 1989, 1990 and 1999 and 2000 and 2009. We add to this profile by examining the characteristics of the regions in which these firms are located such as GVA per head in the region and level of entrepreneurial talent (as measured by stock of businesses per resident). We examine how mature business exits differs from firms which exit earlier in their life using contemporary loglog models where firm exit is explained by a wealth of firm, industry and regional variables. Our preliminary results suggest that few firms in Ireland survive over one generation. Older firms operating over 30 years face a greater hazard rate. Firms in manufacturing are more likely to survive than firms operating in the services sector. Larger firms are more likely to survive and face a lower hazard rate. While mature firms (30+ years) represent a small fraction of the population of firms in the data (about 3%) mature firm deaths represent a relatively large proportion of job losses and loss of added value (particularly non family businesses). Firms which are more technologically advanced and reinvest in the capital asset base of the business are more likely to survive. Mature family businesses (30+ years) are less likely to survive.

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### **Process innovation in small businesses: Investigating the innovative behaviour of the self-employed**

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This paper explores the determinants of innovation in small businesses from a survey of self-employed workers in Andalusia (Spain). The paper investigates the differences in the influential factors for the different types of process innovations and how these factors vary substantially across sectors.

Self-employed people running businesses without employees or with less than 50 employees were included in the study. We distinguish between five different types of process innovation: the introduction of completely new process in production or marketing, the introduction of new specialized machinery, the introduction of new computer and electronic equipment, the introduction of new information and communications technology and the introduction of other small incremental process innovations.

The theoretical framework adopted distinguishes between two types of factors affecting the innovative activities of the self-employed: (1) Personal characteristics of the self-employed –such as their motivations and their educational and professional background; (2) Business characteristics –such as the sector, the number of employees, the dependence from suppliers or clients and the management styles. Assuming that the data comes from a population with grouped structure, we use a random effects model of innovation type choice with parameters varying at more than one level.

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### **Specialisation, Adaptation and Connectivity in Staving Off Technology Cluster Extinction**

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Technological clusters have their genesis in university science (Braunerhjelm and Helgesson 2006, Charles and Benneworth, 2001; Rosenberg, 2002), entrepreneurship (Feldman and Braunerhjelm 2006) or pioneering multinationals (Manning, 2008). Capabilities are created and developed in such clusters. Technological capabilities are the mainstream of cluster well-being (Best, 2001; 2005) and are manifest in a firm's ability to shape and integrate core competencies with external resources and complementary assets (Teece et al, 2000). Micro-level firm capabilities aggregate into a regional cluster's capabilities that are locally distinctive and have evolved across its enterprises, both foreign and indigenous, over time. The cluster's internalised capabilities are embedded in the products, processes and skills of the local milieu. Technological clusters have life cycles (Malmberg and Maskell, 2002; Feldman et al, 2005; Jenkins and Tallman, 2010). They form, grow, mature and can become extinct (Saxenian, 1994; Brenner, 2004; Bathelt et al, 2004; Martin and Sunley, 2006 ). The specialised technology becomes intensified but increasingly vulnerable to a disruptive technology (Bower and Christensen, 1995) from the phenomenon of technological lock in (Narula, 2002; Martin and Sunley, 2003; 2006). This could mean the downgrading of the cluster in the global value chain, potential loss of hard-earned reputational capital, and the consequent exhaustion or hollowing-out of the cluster.



Even more disastrous would be cluster extinction through technological wipe-out. To stave off extinction, technological clusters must continuously upgrade their knowledge-intensive capabilities (*Porter 1999; Cantwell and Santagelo, 1999; Narula and Zanfei, 2005; Best, 2005*). How a technological cluster can maintain its growth phase, extend its maturity phase and battle against possible extinction is under-researched in a literature preoccupied with cluster genesis and growth. We address this knowledge gap in this paper which reports on a longitudinal revelatory case study of a technological cluster as it expands, specialises, matures and endeavours to ward off exhaustion and extinction. We focus particularly on the role of the MNE subsidiary and ancillary cluster members in the process. The primary objective of this paper, therefore, is to explore the process by which a cluster overcomes the vulnerabilities of over-dependence on a technological specialisation and potential obsolescence. It reports on how a mature cluster extends its life span through adaptation and variation, initially in related technology and product categories, then, over time, in less related arenas of more original technologies and products. This study is a longitudinal examination of an ongoing story of birth, growth and extended maturity of a technological cluster. The study reveals the significance of ‘host’ and ‘home’ cluster interplays in the development of varied technological activity. As subsidiaries ‘tap into’ the local cluster to source knowledge, local technological entrepreneurs reverse the flow to ‘tap into’ the home cluster of the MNC parent.

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### **Counterfactual impact evaluation of EU cohesion policy: the case of Slovenia**

Sonja Šlander and Črt Kostevc  
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While EU cohesion policy is said to be one of the most widely evaluated methods in Europe (Barca, Bachtler, 2008), the strength of results of the empirical investigations into its effectiveness has been marked as »very unsatisfactory« (Barca, 2009, str. XV). One of the main reasons is the lack of data which would allow the researcher to establish a counterfactual and determine the real, net effects of cohesion policy with the proper methodology, and the need for »quasi-experimental« methods has been pointed out several times. To our knowledge, this is the first paper to use the appropriate counterfactual methods to evaluate the efficiency of cohesion policy – matching, combined with difference-in-difference analysis. The analysis is based on data for the population of Slovenian firms and focuses on the R&D aid to firms as part of the cohesion policy expenditures in Slovenia.

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### **Valuing Changes to the EU Bathing Water Directive in the UK using a Choice Experiment approach**

Dugald Tinch  
University of Stirling

In 2015, European bathing water quality standards are set to become much stricter. This paper presents a review of the potential impacts on beach users in Scotland, Northern Ireland and Northern England of the revised Bathing Water

Directive and examines the preferences of individuals for a number of potential changes in terms of the environmental quality of marine bathing waters.

The changes considered are in relation to varying levels of benthic health, risk to respondents' health from poor bathing water quality and debris management. A choice experiment survey was designed to elicit individuals' willingness to pay for these attributes and discrete choice models were then employed to assess the relative importance of each beach characteristic to the respondent and to provide an estimate of benefits to marine users in the UK from the revisions to the Directive.

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### **Energy and Emissions Conflicts in Asia (2006-2010)**

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The main aim of this paper is to observe the environmental behaviour in 22 Asian economies during the period 2006-2010, by analyzing for each country the trends of several energy and emissions indicators that appear as explanatory variables in both energy and labour average productivity equations. At the same time we also consider the life expectancy at birth as an endogenous variable which be partially explained by these indicators to for observing the CO<sub>2</sub> effects on the Asian population health. The paper also examines some conflicts coming from competition for energy resources, energy dependence and the spillover effects of the emissions on neighbouring countries. For the purposes above mentioned, we assuming that the growth process of each Asian economy is managed by means of a neoclassical production function, which includes energy consumption and emissions as intermediate goods, and labour as a production factor. By simplicity we avoiding the physical capital as argument being it substituted by energy consumption. In the same sense we assume that the production of energy in each country is carried out by means of a Cobb-Douglas production function, which includes the energy consumption and emissions as inputs. To quantify how affect changes in CO<sub>2</sub> emissions, energy production and consumption on the Asian life expectancy, climate change, and labour and energy productivities, we used panel data techniques across 22 countries during the period 2006-2010 with IEA annual data.

Following the results concerning to the proposed indicators, the energy consumption per inhabitant and CO<sub>2</sub> emissions by Km<sup>2</sup> are highest around the oil producer countries (Qatar, Emirates and Kuwait). CO<sub>2</sub> emissions by Km<sup>2</sup> are also very high among the High-Tech user countries (Japan, China, South Korea and Singapore). The more high energy productivity is in Japan, Singapore and Turkey. Only CO<sub>2</sub> emissions are addressed in this paper, but it does not address other emissions such as NO<sub>x</sub> or SO<sub>x</sub>. In other hand, we assume by simplicity perfect competition in the good markets to can calculate an energy price indicator for the renewable and non-renewable energies in each country. Besides that, we cannot consider all Asian countries because there are not energy or emissions data in some countries. The paper relates issues to central questions of international politics and theoretical debates concerning to the levels of consumption per head, CO<sub>2</sub> emissions/surface and the role of the renewable energies on the climate change and the wellbeing of the consumers. The differing interests of ruling elites, the political opposition, and minority ethnic and religious groups region-wide are

also addressed. By classifying the Asian countries in Oil producers, High Tech users, and Poor countries, if we assume perfect rationality in the energy producers we calculate the costs for change the use of fossil energies by renewable energies in each Asian country.

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### **Science parks in The Netherlands: stimulating innovation or just iconic for firms?**

Jacques van Dinteren

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As a concept, science parks are still relatively young. In the Netherlands their development only began in the eighties. Governments consider science parks as important engines in regional economic development, above all because of the power for innovation that they are supposed to generate. Based on an exploratory study of businesses at six Dutch science parks, this paper outlines the way these parks work. The necessary R&D is carried out, and services and facilities are an important part of the concept, but for a large number of the companies the image of a science park seems to be more important than the knowledge environment and the facilities provided. To analyse that in more detail the population is split up in four categories, based on their opinion about the importance for their firm for the image of their firm and how they that the science park has had an impact on the productivity of the firm. The four groups can be described as follows:

- knowledge seekers (positive about knowledge productivity; attach no importance to image);
- image builders (the opposite view);
- the mixed group (find image important, but also experience a higher knowledge productivity);
- the indifferent group (at least where these two aspects are concerned).

It will be shown that there exist quite a lot of differences between these groups in the way they function and operate.

The general conclusion appears to be that science parks in the Netherlands are set up in such a way that they can fulfil the concept of a 'science park', but the admission strategy evidently lacks cohesion. There is no critical consideration of the companies that put themselves forward. Given that most science parks are limited in size, the danger exists that the power of the concept is undermined through this.

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### **Exploring micro-macro perspectives on the socio-economic future of the Scottish Western Isles.**

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The WISDEM model is a hybrid micro-macro model built recently to explore the regional and local social and economic impacts of job growth in the West Isles of

Scotland. It primarily focuses on the energy sector, but includes all other economic sectors as well. The aim of this paper is to use WISDEM to explore a variety of what-if scenarios relating to future socio-economic change in the region. These scenarios include demand and supply side changes, such as population change, migration, changing incomes and job opportunities. The power of this micro-macro framework will be illustrated through key-performance indicators related to households and firms, which can be aggregated to any local or regional spatial resolution.

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## **The Impact of New Motorway Construction on Regional Airport Accessibility: An Analysis of the Implications for Irish Air Transport Policy**

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This paper examines the impacts of the Irish Exchequer and European Union investments in the road network over the period 1980-2010 in terms of the changing degree of accessibility for communities across the Island of Ireland. The Irish Government, with the support of the EU Structural Funds, invested in the provision of six regional airports during the 1980s to provide faster access to the southeast, southwest, west and northwest regions. These regions had relatively poor road access and were disadvantaged in promoting tourism products and attracting new industries. The Government put in place an *essential air transport services programme* in 1994 to guarantee a minimum level of air access to the regions, once the airports were constructed. This programme was significantly reduced in the 2008-2011 period, with only two of the regional airport continuing to have any form of subsidised public service obligation for the period 2011-2014.

The Government engaged in an extensive motorway construction programme throughout the 1990s and 2000s, greatly increasing the overall length of the inter-urban motorway network from 103km in 2000 to 776km in 2010. We use small area datasets to measure the impact of these changes on accessibility within Ireland by road, and between the small areas and the network of regional airports. We link this more local analysis with measurements of European and global air transport accessibility, using databases on global air transport activity over the period. We discuss the policy implications of the improved local access and reduced international air transport access for regional economic growth and development.

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## **Continuous-Time Estimation of a Spatial Endogenous Growth Model with Spatial Panel Data**

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A common objective of many regional policies—e.g., allocation of structural funds or cohesion funds in the EU—has been to reduce inequalities among regions. Whatever the causes of inequalities may have been, what has been widely observed is that since these policies have been implemented, *greater* regional inequality has ensued. Much empirical work on regional policies has focused on the extent to which there is convergence in performance—e.g., in *per capita* measures—while controlling for spatial association between explanatory variables or spillover effects in space. Perhaps a more pressing challenge is to *explain what actually underlies processes of convergence and divergence* in terms of spatial relationships between structural factors. There are in the theoretical literature of endogenous growth theory, models which explicitly take spillovers into account—i.e., not just control for their presence—in explaining long-term growth. (See e.g., Romer, P.M. 1986. “Increasing Returns and Long-Run Growth.” *Journal of Political Economy* 94:1002-1037, or Romer, P.M. 1989. “Capital Accumulation in the Theory of Long-Run Growth,” in *Modern Business Cycle Theory*, R.J. Barro, (ed.), Cambridge, MA: Harvard University Press.) These endogenous growth models are based on micro-behavioral assumptions of intertemporally optimizing agents and not on reduced-form production functions. While we have been able to estimate such *nonlinear continuous-time* models for more than a decade now, we are *not* aware of any efforts to estimate *continuous-time models of spatial endogenous growth* that might be employed to examine explanations of convergence and divergence of regional economic performance. A problem one quickly runs up against in undertaking such work is that spatial time series are not of sufficient length to estimate models that are theoretically and structurally well-elaborated. But if some regions are structurally similar—as much of the work on so-called ‘convergence clubs’ would seem to suggest—it may be possible to pool data for panel estimation. Clifford Wymer has developed what can be most generally termed a ‘constrained-variance’ estimator to permit estimation of such models and post-estimation testing of enabling assumptions about variance restrictions. The work underway and reported in this paper goes further in attempting to estimate what may be viewed as a *non-cooperative differential game in space* ‘played’ between many regional representative agents. We present a generalization of Romer’s model, discuss Wymer’s novel approach taken to the estimation of the model with spatial panel data on Spanish regions, discuss the data, the estimation results and post-estimation tests, and conclude with indications of how this line of research might be further extended.

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#### **Whether Gold Price as a Hedge against Inflation Risk in Gold Producing Countries**

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Gold as a commodity is widely used and transacted in the open market freely. It is durable, divisible, and can be accepted by a large part of the world. Moreover, gold is also the standard of value, for instance, it was the basis of monetary system from the ninetieth century. Gold is always in demand, both for use and as an investment product asset. For many years, it has formed a key part of long term investment portfolios. In recent years, an increasing number of short and medium term

investors are also paying attention to the gold market and its value as a hedge to inflationary risks.

The policies with respect to gold and gold mining industry, wars and other uncertainties in gold producing countries can influence the supply of gold, and hence the price of gold will be affected (Rockoff,H. 1984). In addition, the inflation in gold producing countries has an impact on the price of gold in domestic currency. This research tests the relationship between gold prices and inflation in gold producing countries. In doing so, this research examines whether gold is an inflation hedge for gold producing countries in a long horizon. We also explore the stability and elasticity of the relationship between gold price and inflation rate.

In this research, we focus on Australia and Canada. These countries are both in the Top 10 Gold-Producing countries 2011 (Kolesnikova, M., 2012). In addition there is an abundance of readily assessable data available for both countries. Our preliminary results indicate that gold price can be an inflation hedge for gold producing countries, but its hedging ability is very weak.

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### **The impact of human capital composition on Chinese regional growth: 2002-2010**

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This paper examines the effect of the composition of human capital on Chinese regional economic growth from 2002 to 2010. The paper introduces several measures of human capital based on years schooling and level of education attainment. The results show a positive effect of human capital investment on provincial growth rates and demonstrate a lagged effect of tertiary education on growth.