The Scottish Parliament
Pàrlamaid na h-Alba

FINANCE COMMITTEE

AGENDA

31st Meeting, 2013 (Session 4)

Wednesday 4 December 2013

The Committee will meet at 9.30 am in Committee Room 1.

1. **Decision on taking business in private:** The Committee will decide whether to take items 6 and 7 in private.

2. **Inquiry into proposals for an independent fiscal body:** The Committee will take evidence by video conference from—

   Sebastian Barnes, Counsellor to the Chief Economist, and Lisa von Trapp, Policy Analyst, Organisation for Economic Co-operation and Development.

3. **Inquiry into proposals for an independent fiscal body:** The Committee will take evidence from—

   Professor David Bell, University of Stirling;

   Dr Angus Armstrong, Head of Macroeconomics and finance Group, and Dr Katerina Lisenkova, Senior Research Fellow, The National Institute of Economic and Social Research;

   Professor Peter McGregor, University of Strathclyde.

4. **Draft Budget Scrutiny 2014-15 (in private):** The Committee will consider a draft report on the Scottish Government's Draft Budget 2014-15.

5. **Appointment of an adviser (in private):** The Committee will consider a list of candidates for the post of adviser.

6. **Procurement Reform (Scotland) Bill:** The Committee will consider its submission to the lead committee on the Financial Memorandum.

7. **Work programme:** The Committee will consider a paper by the clerk.

FI/S4/13/31/A

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The papers for this meeting are as follows—

Agenda item 2

Note by the Clerk	FI/S4/13/31/1

Agenda item 4

PRIVATE PAPER	FI/S4/13/31/2 (P)

Agenda item 5

PRIVATE PAPER	FI/S4/13/31/3 (P)

Agenda item 6

PRIVATE PAPER	FI/S4/13/31/4 (P)

Agenda item 7

PRIVATE PAPER	FI/S4/13/31/5 (P)

Finance Committee

31st Meeting, 2013 (Session 4), Wednesday, 4 December 2013

Inquiry into proposals for an independent fiscal body

Introduction

1. The purpose of this paper is to provide a summary of the written submissions received in connection with the Committee's inquiry into proposals for an independent fiscal body. The Cabinet Secretary for Finance, Employment and Sustainable Growth has stated that it is his intention to establish such a body prior to the implementation of the newly devolved taxes in April 2015.

2. The Committee's call for evidence sought responses on six questions relating to—

- the role and remit of the new body
- whether the new body should be established on a statutory basis
- the powers of the new body
- the accountability of the new body, including how it is appointed
- the objectives of the new body and
- the principles of the new body.

3. The written submissions received, including those from the witnesses who will provide evidence to the Committee at this meeting, can be accessed online at: http://www.scottish.parliament.uk/parliamentarybusiness/CurrentCommittees/67138.aspx.

Role and remit of the new body

4. The OECD notes that in the experiences of OECD members countries "independent fiscal institutions role in forecasting takes several forms" including—

- Producing the official forecasts
- Producing alternative forecasts to those of the government
- Providing an opinion on government forecasts.

5. Annexe 1 of the submission from the OECD includes a breakdown of the roles of fiscal bodies in 17 member countries. Members may wish to note that—

- 8 of the 17 bodies have a role in assessing government forecasts
- 2 of the 17 bodies have a role in preparing official forecasts (the OBR and the Netherlands Bureau for Economic Policy Analysis)
- Of the 8 fiscal bodies established post-2008, only the OBR has a role in preparing official forecasts while 5 have a role in assessing government forecasts[1].

[1] The remaining 2 bodies do not have a role in relation to forecasting

6. Professor Hughes Hallett looks at the range of roles that fiscal bodies have, identifying the Swedish Fiscal Policy Council at one end of a scale and the OBR at another—

> "Swedish Fiscal Policy Council has an explicit mandate to comment on, and where necessary recommend improvements to current fiscal policies and the extent to which they will reach the goals and priorities the Government has set for itself."
>
> … OBR is required to provide independent forecasts of the future fiscal revenues and budget position…But it is forbidden from examining or commenting on the other targets of economic policy."

7. On the need for a new body, Audit Scotland states—

> "as Scotland currently has limited devolved fiscal powers it will be important to ensure that the proposed body has a critical mass of work to enable it to attract suitably talented and experienced people. This may influence the structure for the new body, for example using part time experts from a wide range of backgrounds rather than only a small full time expert cadre in order to achieve the range of skills required at a proportionate cost."

8. The submission from Professor David Bell (and others) cautions that "We need to guard against seeing a forecasting body as a panacea for the uncertainties surrounding public finances".

9. Considering a future Scottish body within the context of the existing OBR, Professor Bell goes on to say that—

> "Given the difficulty in producing accurate economic forecasts, and given an OBR which produces forecasts that are accepted as independent forecasts of the UK economy, a low cost solution for the Parliament may be simply to adjust the OBR forecasts as required for the Scottish Government's budget process."

10. The Austrian Parliamentary Budget Office also comments on the context of the existence of other bodies, saying that—

> "The role and remit of a new body highly depend on the local needs and especially the tasks of already existing or planned independent institutions and overlaps should be avoided."

11. A number of submissions set out views as to what the role and remit of a Scottish IFI could be. For example, Audit Scotland sees the role as being to—

> "provide independent, comprehensive, timely, high quality professional information and advice to both the Parliament and the Executive to enable them to fulfil their functions in setting tax levels and budgets. This will involve producing forward looking reports on the sustainability of public finances… The IFB should have the ability to produce reports at its own initiative and also to respond to requests from parliamentary committees and the Executive."

12. The Canadian Parliamentary Budget Office states that “the body should have the authority to prepare independent economic and tax analysis proactively as well as in response to specific requests from the Committee or individual members of parliament”.

13. The Slovakian Council for Budget Responsibility its role in producing “long-term sustainability reports” which “allows the public to see whether and to what extent various government policies contribute to the long-term sustainability of public finances”. The CBR comments that “The emphasis on long-term sustainability is crucial given that Slovakia faces a rather severe ageing problem over the next few decades”.

14. Commenting again on its own role and as a recently established body, the Slovakian Council for Budget Responsibility also notes that—

> “Its role is limited to providing a positive assessment of the state of public finances in Slovakia. Giving such an institution a normative role would have inevitably drawn it into the sphere of political battles, which could have harmed its independence from the outset.”

15. Professor Hughes Hallett sets out a framework in which—

> “The Fiscal Policy Council would be created by and report to the Scottish Parliament, which would also provide its resources. Its members should be experts on public finance and public financial management of high professional standing.”

Establishment of the body on a statutory basis

16. Regarding the establishment of a new body on a statutory basis, the OECD submission states that “international experience would point to this being highly desirable”. Referring to the OECD principles, the submission also comments on the inclusion in legislation of—

- Term lengths, number of terms and the criteria and process for dismissal
- A clear definition of the mandate of the institution
- A guarantee of access to information and a definition of restrictions on the access to information.

17. The view of the Canadian Parliamentary Budget Office is that—

> “To provide independent and credible analysis the new body should be protected from any political or bureaucratic interference… The statute would give the new body protection against interference and the authority to discharge its mandate. The statute would also give a permanent status to the organisation that would facilitate hiring competent staff and preparing a work plan.”

18. From its own perspective as a body established by statute, Audit Scotland comments that—

> "…it is essential in allowing us to be objective and to generate public confidence in our reports. We therefore consider that the OECD principle that the mandate of an IFB should be defined in higher level legislation is applicable to a Scottish body and that it should be established on a statutory basis."

Powers of the new body

19. OECD stress the power to—

- Access relevant data and information
- Hire and dismiss staff in accordance with local labour laws
- Produce reports and analysis at their own initiative (within the mandate of the body) and determine their own work programme.

20. The Canadian Parliamentary Budget Office highlights the most important "ingredients" for a parliamentary budget office as being "expert staff and access to information" and that the head of the body should have the authority to design the structure of the organisation and hire people with the necessary technical knowledge and experience.

21. The Canadian Parliamentary Budget Office goes on to highlight the need to ensure that any legislative provisions enshrining the access to information are properly drawn to enable the body to fulfil its mandate. In relation to difficulties with the legislation relating to it—

> "Firstly, it refers only to *economic and financial data*. The Executive has argued that the law entitles the PBO to numerical information only and has denied us access to other relevant information, analysis and models. Second, the legislation does not provide any remedy in case the Executive does not provide the requested information."

22. The Portuguese Public Finance Council's presentation to the OECD High-Level Parliamentary Seminar in Sweden[2] notes that in terms of its statutory functions—

> "The statutes also grant the CFP access to all the economic and financial information necessary for the accomplishment of its mission, all public entities being duty bound to supply this information in good time, as well as additional clarification in response to requests. All the Council's analyses and reports must be made available to the general public."

[2] Available online at http://www.oecd.org/about/membersandpartners/publicaffairs/oecdhigh-levelparliamentaryseminarsweden.htm

Appointment and accountability of the new body

23. OECD Principles note that—

> "Regardless whether an independent fiscal institution is under the statutory authority of the legislative or the executive branch, mechanisms should be put in place to encourage appropriate accountability to the legislature."

24. Commenting on accountability, the OECD submission acknowledges that typically the reports of fiscal institutions are sent to parliament and the leaders of the institutions participate in hearings before the relevant parliamentary committees. Placing this within the wider context of budget scrutiny, the OECD notes that—

> "Legislatures are constitutionally mandated with approving the budget and holding governments to account. Legislative discussions on the budget (which should include fiscal policy objectives, the macroeconomic framework and the policy basis for the budget, and major fiscal risks) provide a unique opportunity to consider independent fiscal institutions' analysis."

25. The view of the Canadian Parliamentary Budget Office is that—

> "To maintain independence and objectivity, the head of the new body should be appointed and dismissed by and be accountable to the Parliament. In Canada, the head of the PBO is appointed by the Prime Minister but is accountable to the Parliament. This has the potential of creating conflict of interest and reducing the independence and effectiveness of the PBO."

26. On this topic, Audit Scotland comments that—

> "The key principle in considering appointment and accountability is that independence and non-partisanship are achieved. The OECD principles make the point that if appointment terms are independent of the electoral cycle this will help reinforce the public perception of independence."

Objectives of the new body

27. The Canadian Parliamentary Budget Office comments that "it appears that the focus of the proposed new body is tax analysis" and suggests that "the mandate of the new body be broadened to include economic and fiscal analysis and forecasting".

28. Audit Scotland—

> "Key objectives should include preparing economic and taxation forecasts including fiscal sustainability reports in sufficient time for them to be used by the Parliament and Executive in annual tax and budget setting exercises. Possible additional objectives could include providing economic reports for Scotland where existing UK information is not disaggregated or where there is good reason, in the view of the IFB, to use different assumptions."

Principles of the new body

29. A recurring theme throughout submissions was the identification of two of the OECD principles as being of particular importance, the principle of independence and non-partisanship and the principle of transparency.

30. In relation to the first of these, the OECD states that “Independence and non-partisanship – real and perceived – is critical to an independent fiscal institutions’ success”.

31. The submission from Professor David Bell (and others)—

> “Perhaps the most significant aspect of its remit is its independence, meaning that although its forecast may be wrong, it will not be wrong because it is constructed to please the government of the day. It is important that such independence is endorsed through Parliamentary scrutiny.”

32. Referring to the principle of transparency, the Canadian Parliamentary Budget Office notes—

> “…making the analyses and the forecasts of the new body public as opposed to privately submitting them to parliamentarians will engender greater non-partisan public debate around policy issues, enhance the overall credibility of the new body, and encourage greater transparency on the part of other stakeholders.”

33. Slovakian Council for Budget Responsibility—

> “Perhaps the most important guiding principle of all is that an independent fiscal institution should be set up so that it reflects the pre-existing institutional and legal framework, political economy as well as the main fiscal challenges lying ahead in a particular economy.”

34. The submission from Professor Hughes Hallett comments that the new body “would have to enjoy full political and physical independence” from the government and identifies five statutory rules which could determine that independence—

- That the council does not and may not take directions from government or a government controlled institution
- That the council has the right to develop its own framework of analysis methodology and data sources
- That the resources available to the council should be fixed by a rule determined by the Scottish Parliament and the budget should be for a “rolling medium-term horizon”
- Council members should be personally independent from political pressures which could be achieved through fixed-term, non-renewable appointment
- That the freedom from political pressure is balanced by an appropriate mechanism of accountability.

35. The Netherlands Bureau for Economic Policy Analysis' submission sets out that it is a branch of the civil service and its director is appointed by the Minister. Commenting on what this means for its independence, the submission notes—

> "However, tradition and practice developed in Dutch policy formation for 65 years are more important than formal legislation. This tradition is engrained in procedures and rules of conduct, which all parties involved observe in great detail. This practice allows CPB independence in hiring and other human resource management policies, in the conclusions it draws from its research, in its press releases, and in the timing of publication."

Conclusion

36. The Committee is invited to consider the above in relation to this evidence session.

Catherine Fergusson
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FINANCE COMMITTEE

INQUIRY INTO PROPOSALS FOR AN INDEPENDENT FISCAL BODY

SUBMISSION FROM THE SCOTTISH CENTRE ON CONSTITUTIONAL CHANGE

1. The ESRC *UK and Scotland* programme is funding a number of projects in Scotland through the Scottish Centre on Constitutional Change. These projects will add significantly to the existing capability to analyse and forecast Scotland's economy and its fiscal outcomes. They comprise the construction and development of the following models:

a. Microsimulation model (David Bell, David Comerford and David Eiser)
b. Computable General Equilibrium (CGE) model (Patrizio Lecca, Peter McGregor and Kim Swales)
c. Macro-econometric model – NiESRC (Angus Armstrong, Ian Hurst and Katerina Lisenkova)
d. Overlapping Generations (OLG) model NiAGE(Katerina Lisenkova and Marcel Merette)

These models use different mixes of data and knowledge of the workings of an economy to produce different types of output. They also focus on different time horizons. A microsimulation model primarily focuses on the effects of changes in taxes and benefits on households with different levels of income. This type of analysis is most commonly associated with the analysis of government spending plans undertaken by the Institute for Fiscal Studies. A CGE model takes a much wider view of the economy, looking not only at how quantities – consumption, investment, trade etc might change in response to policy shifts, but also how prices and wages might evolve. It also can focus how such variables might change across different industries – investment in the construction sector, prices of the energy sector etc. A macro-econometric model is based on estimated relationships between macroeconomic aggregates such as exports, imports, the exchange rate, wages. These tend to be used for short and medium-term forecasting. The Office for Budget Responsibility (OBR) uses a variant of the UK Treasury model as the basis for its analysis of UK fiscal policy, typically over the period of a Spending Review. An OLG model incorporates much of the methodology used in a CGE model, but also includes information on the economic behaviour of different generations. It utilises the age-related information to look forward and, in particular, to produce internally consistent projections of the effects of demographic change. CGE and OLG models are more suited for long-term analysis. They depart from currently observed relationships and incorporate behavioural responses to changing circumstances.

2. Each of these models could play an important role in a future Scottish fiscal body as discussed in the rest of the paper. Further detail is provided in appendices to this paper.

3. Because Scotland has had few tax-raising powers, the development of a capability to analyse Scotland's fiscal position is in its infancy. In the first instance, the Committee will wish to address the issue of forecasting of tax receipts from the Scottish Rate of Income Tax, Stamp Duty Land Tax and Landfill Tax. Powers to levy these taxes were made available to the Scottish Parliament under the

Scotland Act 2012. Under the Act the OBR was given a duty to forecast these taxes (Office for Budget Responsibility, 2012). The forecasts are published as part of the bi-annual Economic and Fiscal Outlook (EFO). One set is published as part of the UK budget process and the second during the autumn.

OBR forecasts have several roles in relation to the new powers under the Scotland act 2012, which are:

- Determining the size of the Block Grant Adjustment (BGA).
- Providing estimates to ensure that the Scottish budget suffers “no detriment” from changes in the UK income tax structure and allowances.
- Ensuring that Scottish income tax receipts are managed within each fiscal year.

4. The forecasts for Scotland will be produced by analysts at HMRC. The OBR staff and the OBR’s Independent Budget Responsibility committee will scrutinise and challenge the forecasts and will have the final say on its composition.

5. The OBR argues that reliance on HMRC is necessary because it is not possible to produce a macroeconomic model for Scotland due to availability of data and long lag times associated with the data that is available. The NiESRC model being produced at the National Institute of Economic and Social Research will show that it is possible to produce a Scottish model. However, the initial model will be mostly for simulations to illustrate different policy frameworks. A more detailed forecasting model will require a more complete dataset, such as external and fiscal accounts, than is currently available to the public.

The forecasting method being proposed by the OBR may be subject to error due to differences between Scotland and rUK in:

- economic trends
- the income distribution
- impacts of policies
- absence of key economic data

What should be the role and remit of the new body?

6. The principal motivation for establishing a fiscal agency is the inappropriate use of (political) discretion in fiscal policy making. Discretion is useful to offset unexpected economic events or to introduce redistributive measures. But it is inappropriate if political pressures and short time horizons result in fiscal policies that are not consistent with long-run fiscal sustainability. Moreover, because the political influence is widely understood, government policies without an independent reviewer can lack credibility. Institutional change such as the delegation of some part of the policy role to an external body may be necessary to prevent politically-driven short-termism and shore-up the credibility of government policy. An obvious mechanism is to delegate some part of fiscal authority to an external body – a fiscal agency.

7. The fact that fiscal bodies are becoming more common worldwide[1] is an acknowledgement that politicians accept the need for an external brake on politically-driven fiscal expansion to prevent subsequent austerity or crisis interventions to restore faith in public finances. They are also required for the much needed support for introducing policies which may be unpopular but necessary, and as a commitment device by making it harder for governments to renege on earlier commitments.

8. As the OECD acknowledges in its evidence to the Committee, there is no single model for independent fiscal bodies. They reflect the history, institutional and political context from which they emerge. For example, the OBR largely reflects the culture and methods of HM Treasury. Since there is no Finance Ministry in Scotland, a Scottish fiscal authority will less reflect an established culture.

9. The wider the remit of the fiscal authority, the more constrained will be the choices of politicians. However, the remit should not be so wide that there is any suspicion that the body has a direct role in policy formation, which must be the role of politicians and for which they should be solely accountable.

What would be the key objectives for the new body; what should be its key reports/areas of analysis?

10. Production of independent budget forecasts should clearly fall within the remit of the fiscal body. Governments wishing to pursue expansionary fiscal policies have an incentive to produce over-optimistic forecasts. Such forecasts have the same implications as an over-expansionary policy and can have a measurable negative effect on budget outcomes. Jonung and Lurch (2006) analysed budgetary forecasts from France, Germany and Italy and revealed that they were systematically over-optimistic, while the UK Treasury produced unbiased forecasts[2].

11. Processes underlying forecasts should be as transparent as possible and the body responsible for the forecasts should be required to present their work publicly. At least one forecast should be synchronised with the budget cycle. The body should also be publicly accountable for its forecasting record. We would argue that the fiscal authority's forecast would be strengthened by including other independent forecasts for comparison.

12. There is a strong argument that the fiscal body should be tasked with analysing the distributional and environmental impact of budgetary decisions. These require specialist knowledge that is not commonly available within government. HM Treasury produces a distributional impact of the UK budget on households. This receives virtually no attention because the Institute for Fiscal Studies has a much stronger reputation in carrying out distributional analysis and is clearly seen as independent. In Scotland, the government carries out an environmental budget assessment, which also receives relatively little attention. Impact assessments fall outside the forecasting role but are of great significance: an independent fiscal body is likely to be able to draw together more expertise and to generate more robust analysis of these issues. Further, there are potentially useful

[1] See the submissions from Austria, the Netherlands, Portugal and Canada to this inquiry.
[2] This outcome preceded the recession of 2008.

interactions between different modelling approaches that might not be realised if they are organisationally separate.

13. The fiscal body should also produce long-term fiscal sustainability reports, just as the OBR carries out for the UK. These are projections rather than forecasts, and tend to represent outcomes that might occur if past trends continue and if policy fails to respond to their evolution. They can nevertheless produce useful warnings of the need to change direction: it is almost always true that early policy intervention is less damaging than late intervention.

14. The body should be overseen by a Budget Responsibility Committee along similar lines to the OBR. However, there is an argument for including the social partners on this board so that debates between social partners on the budgetary implications of policy choices can be set in an evidence-based context.

Should the new body be established on a statutory basis?

15. The body should be established on a statutory basis to protect it from short-term political pressures and to enhance its public profile.

What powers should the new body have?

16. The body should have powers to require public bodies to supply it with information that might assist it in its various functions. This might include administrative data that would require secure data clearance.

Should such a body be appointed by and accountable to the Executive or the Parliament (or both)?

17. There is a strong case for the body to be accountable to the Parliament. First, this would assist Parliament with its budgetary scrutiny role, where it is at an informational disadvantage relative to the Executive. This would strengthen the Parliament’s role in the somewhat imbalanced relationship between it and the Executive. Second, accountability to Parliament would be a strong public demonstration that the fiscal body is independent of the Executive in the same way the SPICE is independent of the Scottish Government. The Finance Committee might put in place procedures to regulate its interactions with the fiscal body based on a joint commitment to maintain fiscal sustainability. The Chair of the Finance Committee could automatically be a member of the board of the fiscal body.

18. The possibility of the fiscal body being independent of both Parliament and the Executive should not be dismissed without question. However, most fiscal bodies that are independent of government have long-established reputations for academic excellence and independence. At present there is no obvious candidate organisation in Scotland that has the full range of requisite skills and capacity..

In the light of the OECD’s suggested principles for independent fiscal institutions what should be the core principles for the new body?

19. The ultimate consumers of the outputs of the fiscal body will be the Scottish public. Its core principles should therefore be independence, transparency and accountability, which are essential to establish public trust.

20. Staff should be hired on the basis only of their professional competence.

21. The governing board should be selected for its experience and expertise with the Chair being appointed by the Executive for a period of no less than four years, thus extending beyond the length of a Parliament.

22. For practical purposes, it is necessary for links to exist between the Government of the day and the fiscal body. However, these should take place in the offices of the Fiscal body. The event of all meetings between the Government and the fiscal body should be recorded and similarly between the fiscal body and other outside forecasters.

APPENDIX A A Scottish Microsimulation Model

A microsimulation model produces estimates of key variables both at a Scottish level and at an individual or household level. For example, suppose that the Scottish Government decided to remove the freeze on council tax. The model can calculate the overall increase in council tax receipts for Scottish local authorities and also show how the tax increase affects the net income of different types of Scottish household.

The model is based on data from a representative sample of real Scottish families. For Scotland, we have used the Family Resources Survey for data on incomes, taxes and benefits and the Living Costs and Food Survey for information on how households spend their income. Our latest model uses data for 2011-12. We also include data on public spending patterns by age and gender, so that we can take a more rounded view of how public resources (benefits, tax credits **and** public spending) are targeted on different groups within the Scottish population.

The model starts with the gross income of each household and calculates net income, taxes, tax credits, benefits and state pensions for individuals and households. These are based on the individual circumstances of each family and on current tax rates, benefits and pension rules to complete the calculations. If these rates or rules change, the model can calculate the effects of these changes on incomes, benefits etc. on different types of household (e.g. pensioner households).

These models can show how the effects of policy changes affect different parts of the income distribution. For example, how far does an increase in income tax allowances increase net incomes among poor households compared with rich households? What effect would a change in the Scottish Rate of Income Tax have on pensioner households?

The model calibrates well with known aggregates – such as aggregate council tax, aggregate income tax so that we can be reasonably confident about short-run impacts of policy changes.

The Institute for Fiscal Studies uses a very similar model and the same datasets to analyse the UK Budget.

We are developing the model in a number of ways:

- Expanding it to the constituent nations of the UK to compare tax and benefit outcomes.
- Allowing it to respond to changes in behaviour brought on by policy changes – e.g. withdrawal from the labour market if personal tax rates increase
- Using it to project the impacts of demographic change on revenues and spending. This is similar to the fiscal sustainability analysis published by IFS on November 18 2013.

APPENDIX B: NiESRC - A Scottish Macroeconomic Model

NiESRC model is based on the NIESR global econometric model, NiGEM. The National Institute has been developing NiGEM, since 1987. NiGEM is used internally for forecasting and policy analysis, and is also used by an external group of model subscribers, mainly in the policy community, including the ECB, the IMF, the OECD, the FSA, the Bank of England, and the central banks of France, Germany, Italy, Netherlands, Spain, Portugal and the Czech Republic.

NiESRC has two additional countries/regions and one extra-regio sector – Scotland, the rest of the UK (RUK) and North Sea oil and gas production (NS) – which are used alongside/substitute (depending on scenario) current UK model. NiESRC will be available from the Institute in Q1 2014 with a user-friendly 'front-end' specifically designed to facilitate simulation analysis. The simulation options are limited to those affecting Scotland, RUK or NS.

NIGEM OVERVIEW

- It is used to produce economic *forecasts* for the world economy. At the Institute we prepare quarterly forecasts that are published in the *National Institute Economic Review*, along with a discussion of alternative scenarios around the central forecast and short notes based on recent model-based research. This work is also presented at several conferences each year, is widely reported in the press and is made available for model users on NIESR's web-based product, NiGEMWEB (http://nimodel.niesr.ac.uk). Model users can produce their own forecasts over an extended forecast horizon. Our central forecast baseline currently extends to 2039, but can be extended to 2059 in order to consider longer-term issues.
- It is also extensively used as a *simulation* tool. Typical simulations involve analysing the effects of changes in monetary or fiscal policy or changes in commodity prices such as an oil price shock. The model has a considerable degree of built-in flexibility, so that users can define key assumptions, such as the form of expectation formation in different markets and the policy rules followed by monetary and fiscal authorities. Our recent work on fiscal consolidation plans has received wide coverage in national and international newspapers, trade and more general publications as well as on national and international TV and radio.
- NiGEM has also been used for more complex *policy analysis* exercises, such as modelling the sovereign debt crisis in Europe (see Holland, Kirby and Orazgani, 2011), the macro-economic impact of migration following the EU enlargements of 2004 and 2007 (see Holland, Fic, Paluchowski, Rincon-Aznar and Stokes, 2011), and a cost-benefit analysis of banking regulation (see Barrell, Davis, Fic, Holland, Kirby and Liadze, 2010).
- The *stochastic* mode of NiGEM is used to construct error bounds around the central forecast baseline. The fan charts are based on the historical errors on all the key model equations.

NiGEM is a large-scale structural model of the world economy. It is essentially New-Keynesian in its approach, in that agents are presumed to be forward-looking, at least in some markets, but nominal rigidities slow the process of adjustment to external events. It has complete demand and supply sides, and there is an extensive monetary and financial sector. Rational or model-consistent expectations are used throughout the model, although users may also opt to use adaptive expectations for consumers, firms, wage setters and financial markets. As far as possible the same theoretical structure has been adopted for each of the major industrial countries, except where clear institutional or other factors prevent this. As a result, variations in the properties of each country model reflect genuine differences emerging from estimation, rather than different theoretical approaches.

Linkages between countries take place through trade, through interacting financial markets and through international stocks of assets. Hence a change in, say, US equity prices affects Europe through its effects on US imports, through its effects on interest rates and exchange rates, and also through its effects on the wealth of the European personal sector. It is a ‘closed’ global model, in that all income and asset inflows into one country are matched by outflows from another country.

NiGEM is a global model. Most countries in the OECD are modelled separately, and there are also separate models of China, India, Russia, Brazil, Hong Kong, Taiwan, Indonesia, Singapore, Vietnam, South Africa, Turkey, Estonia, Latvia, Lithuania, Slovenia, Romania and Bulgaria. The rest of the world grouped into 6 regional aggregates that cover the remaining countries in Sub-Saharan Africa, Europe, the Commonwealth of Independent States, the Middle East and North Africa, Asia and the Americas. All country and regional models contain the determinants of domestic demand, export and import volumes, prices, current accounts and net external assets. Output is tied down in the long run by factor inputs and technical progress interacting through production functions. Economies are linked through trade, competitiveness and financial markets and are fully simultaneous.

For a macro-econometric model to be useful for policy analyses, particular attention must be paid to its long-term equilibrium properties. At the same time, we need to ensure that short-term dynamic properties and underlying estimated properties are consistent with data and well-determined. Output is tied down in the long run by factor inputs and technical progress interacting through production functions, but is driven by demand in the short- to medium-term. As far as possible, the same long run theoretical structure of NiGEM has been adopted for each of the major industrial countries, except where clear institutional, or other factors, prevent this. As a result, variations in the properties of each country model reflect genuine differences in data and estimated parameters, rather than different theoretical approaches.

NiESRC OVERVIEW

NiESRC is only a simulation model. This means that you cannot produce forecast for Scotland and RUK using it, but can look at various scenarios and individual shocks: fiscal, monetary shocks and oil price change. Scotland and RUK models are based on the same principles and theoretical approaches as every other country/region model in NiGEM.

Scotland model

Scotland model within NiESRC has the same structure as other “small” models within NiGEM. The difference between a “small” model and a “large” model is in the level of disaggregation and detail and not in theoretical approaches.

Key model equations in NiESRC are estimated based on the publically available data for Scotland (mainly SNAP, GERS and Global connections survey). Some equations are taken from the complete UK model. These are mainly in financial sector. The third group of equations are calibrated to produce theoretically predictable response in standard model simulations.

RUK model

RUK model also has a “small” model structure. Most of the equations in it are taken from the complete UK model. The only differences are due to the fact that some variable of the UK model are not present in RUK model.

NS model

North Sea extra-regio sector is specific to NiESRC. The UK model does not differentiate between on-shore and off-shore activities. Since in Scotland off-shore activity constitutes significantly larger part of the economic output compared with the UK as a whole, the decision was taken to model it separately. This also allows tracking oil price shocks in more detail.

NS sector modelled in a very simple. It only has supply side which is determined by exogenous assumption of the price of oil and North Sea oil production.

Available scenarios and simulations:

There are three available scenarios of relationship between Scotland and RUK:

- UK intact – status quo scenario when Scotland remains part of the UK
- Independence with currency union – Scotland becomes independent but forms a currency union with RUK, which means it does not have independent monetary policy
- Independence without currency union – Scotland becomes independent and introduces its own currency

In all three scenarios NiESRC allows to run standard shock: monetary expansion/contraction, fiscal expansion/contraction and change in the price of oil.

APPENDIX C – A Scottish Computable General Equilibrium Model

The Fraser of Allander Institute (FAI) has been involved in the development and application of multi-sectoral economic data bases and models for Scotland since it was established in 1976. Together with the then Scottish Executive, FAI helped to develop the first input-output table and model for Scotland.

The FAI modelling team has been involved in the development of computable general equilibrium models and their application to Scotland and other regions/ countries for over twenty years. An important feature of these models is that they allow for a detailed specification of the supply-side of the economy. (Earlier multi-sectoral models – input-output models, in particular – are unable to do this.) Since most policy levers available to Scotland relate to the supply-side this is essential if the models are to be useful for policy analysis.

CGE models are typically used within FAI to explore the likely impact of various policy changes. The models are not used for forecasting because of their extensive information requirements. (Although they have been used to inform or elaborate upon the FAI's multi-sectoral forecasts that are reported regularly in the *Fraser Economic Commentary*.) A variant of our CGE model has been adopted and developed by OCEA, and an energy-economy-environment variant is used for policy simulation within ClimateXChange, the Scottish Government-funded Centre of Expertise in Climate Change.

Recent policy-relevant applications have included analyses of the impact of a Scottish-specific rate of corporation tax and a study of the likely economic development consequences of new marine technology deployment in the Pentland Firth (Allan *et al*, 2013a).

CGE model overview

We have a number of CGE models of Scotland that are used for different purposes. However, they share a number of common features:

- They are multi-sectoral in nature, so that levels of industries' output, value-added and employment are tracked, as well as aggregates such as GDP, total employment and the unemployment rate
- They simultaneously determine quantities and prices in all the markets identified in the model
- They incorporate elements of imperfect competition in the labour market
- They have a flexible structure that allows for alternative treatments of key markets, notably the labour market, to reflect alternative perspectives on the way that wages may be determined
- The model structure also allows for extensive sensitivity analysis around key parameter values
- Firms and households are forward-looking

AMOS, A micro- macro Model Of Scotland, is a 25 sector model of the Scottish economy. In this model the rest of the UK (RUK) is, like the rest of the World (ROW), treated as exogenous. That is to say that economic activity in the rest-of-the UK (and ROW) is not modelled explicitly. AMOS-RUK does model Scottish-RUK interaction explicitly, although continues to treat ROW as exogenous. (This model often has fewer sectors, since the interregional data on which it is based are typically less reliable.) AMOS-ENVI extends AMOS to include energy-economy-ENVIronment interactions, and has an aggregative structure that separately identifies key energy sectors.

Model extensions and applications as part of the current ESRC project

Initial policy applications include an analysis of the impact of a balanced-budget fiscal expansion of the type that is feasible under current constitutional arrangements (Lecca *et al*, 2014). This illustrates the importance of public attitudes towards government expenditure and taxation, which we find can influence even the direction of the effects of a fiscal stimulus. We have also begun to explore the economic and environmental consequences of a Scottish-specific carbon tax (Allan *et al*, 2013b). We find that such a tax could generate a "double dividend" of improved economic activity with lower carbon emissions, but only if the revenues are recycled to reduce income tax. This illustrates the use of a model to assess the likely impacts of fiscal powers that could be available if the Scottish Government had a greater degree of fiscal autonomy, as under "devo-max" or independence. The project will use our models systematically to explore the consequences of alternative degrees of fiscal autonomy.

The present research project involves a number of important extensions to the AMOS model, all of which can be used to simulate policy changes under alternative assumptions about constitutional arrangements, in particular, the degree of fiscal autonomy:

- Greater disaggregation of the public sector expenditure and taxation in the database and model, to improve our ability to provide more policy-relevant detail (including separate modelling of government capital and current expenditures, which we would expect to have distinctive impacts).
- Improved representation of household behaviour, reflecting both the importance of public attitudes to government expenditure and taxation, and inclusion of some specifications reflecting developments in behavioural economics (for example, allowing for imperfect foresight). This allows systematic comparison of a "behavioural" variant of our CGE with its more conventional counterpart.
- The incorporation of a separate North Sea Oil sector (using a database being developed by Scottish Government economists).
- The development of New Economic Geography variant of our AMOS-RUK, to allow systematic comparison of policy simulations in models that emphasise increasing returns and agglomeration, with those that have a more traditional specification.

APPENDIX D –An Overlapping Generations Model for Scotland and rUK - NiAGE

NiAGE model belong to a class of dynamic multiregional computable general equilibrium (CGE) models with overlapping generations (OLG). A CGE model attempts to provide a comprehensive description of an economy using a system of equations. The general equilibrium framework requires that all the markets, sectors and industries are modelled together with corresponding inter-linkages, as opposed to partial equilibrium, which takes into account only a part of the system and neglects potential feed-backs between system components (general equilibrium effects). A dynamic CGE model can provide the response of the economy to a wide range of shocks and policy changes over time, i.e. a trajectory of adjustment with clear identification of short, medium and long-run effects.

The main distinction of an OLG-CGE model is its age-disaggregated structure of the household sector. This allows modelling of age-specific preferences and behaviour, such as age-specific labour supply, productivity, consumption, saving/dissaving and retirement decisions. An OLG-CGE model allows for the direct evaluation of the aggregate effects of various policies and shocks as well as their impacts on different generations, both those presently living and those as yet unborn. The overlapping generations structure is required to study the issues of intergenerational equity and redistribution.

Key feature of the model:

- Completely modelled supply and demand sides of the economy
- Forward looking behaviour of households and producers
- Household sector disaggregated into 21 separate age groups. This comprises of twenty 5-year groups, starting from "0-4" and a final "100+" age group. Each cohort's behaviour can be modelled separately. If the shock response is age-dependent then this structure is important for the correct simulation of aggregate effects. It also allows for the determination of specific effects for each age group
- Detailed labour markets with age specific productivity and labour force participation, both disaggregated by qualification level. Development of endogenous labour supply response is planned in the future
- Age-specific government expenditures on health and education. Health expenditures profiles incorporate projected improvements in longevity
- Separately modelled four regions of the UK which are linked via trade and capital movement. A separate Scotland-rUK version of the model has also been developed. The multiregional dimension is important because of regional variations, both in the characteristics of demographic change and in policy. The multiregional dimension becomes more important in the light of the current devolution debate. The implications of policy heterogeneity across regions is likely to generate complex and unanticipated interactions between regional economies.

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