STRATHCLYDE

DISCUSSION PAPERS IN ECONOMICS

# THE IMPACT OF ENHANCED REGIONAL FISCAL AUTONOMY: TOWARDS A SCANDINAVIAN MODEL FOR SCOTLAND

BY

TOBIAS EMONTS-HOLLEY, ALASTAIR GREIG, PATRIZIO LECCA, KATERINA LISENKOVA, PETER G MCGREGOR AND J KIM SWALES

NO 17-07

DEPARTMENT OF ECONOMICS
UNIVERSITY OF STRATHCLYDE
GLASGOW

**The Impact of Enhanced Regional Fiscal Autonomy:**

**Towards a Scandinavian Model for Scotland?***

by

Tobias Emonts-Holley[1]

Alastair Greig[1]

Patrizio Lecca[2]

Katerina Lisenkova[1]

Peter G McGregor[1]

J Kim Swales[1]

1. Fraser of Allander Institute, Department of Economics, University of Strathclyde
2. European Commission, DG Research Centre

Keywords: CGE; Scotland; income tax.

JEL: R13, C68, H24

July 2017

*This work was supported by the ESRC under *The Constitutional Future of Scotland and the United Kingdom pre and post Referendum* Initiative (grant ES/L003325/1). Tobias Emonts-Holley acknowledges joint Scottish Government and ESRC funding of his PhD. The authors are grateful to Grant Allan for detailed comments on an earlier draft.

## 1. Introduction

The fiscal powers of the Scottish Government have recently been significantly enhanced as a consequence of the implementation of the Scotland Act 2012, which required the Scottish Parliament to set a Scottish Rate of Income Tax (SRIT) from April 2016. Initially, the SRIT could vary from that in the rest of the UK by up to 10p in the pound.[1] More extensive powers over income tax came into effect in 2017 as a consequence of the Scotland Act 2016, which sought to implement the proposals of the Smith Commission (2014). The Scottish Government now has the power to set income tax bands, rates and thresholds (but not personal allowances). All income tax receipts on wage income collected in Scotland are now received by the Scottish Government, with a corresponding adjustment in the block grant, as detailed in the new Fiscal Framework. These changes make Scotland one of the most powerful devolved governments in the world in terms of the proportion of public spending and tax revenues under their control (Bell and Eiser, 2014).

While there has been considerable debate about which tax powers should be devolved, there has been much less discussion concerning what should be done with the powers once they are devolved. Differences in income tax policy among Scottish political parties did emerge during the 2016 Scottish Parliament elections, but the current SNP government has no plans for radical change in income tax. However, the Scottish Government has decided not to match the UK Government's recent decision to increase the threshold for higher rate tax payers, which will create the first income tax differential between Scotland and the rest of the UK (RUK).[2]

The substantial increase in the degree of fiscal autonomy is of a scale that would allow radical change in the structure of the Scottish economy and the nature of Scottish society, but the current Scottish Government seems unlikely to pursue this (although it did advocate, during the recent UK general election, raising the highest rate of income tax across the UK as a whole). However, a number of prominent SNP members have recently suggested that tackling inequalities, ensuring a quality health service and maintaining distinctive benefits such as the absence of tuition fees and free prescriptions will prove to be unsustainable with current levels of taxation, against the background of what is expected to be continuing austerity at the UK level (given the outcome of the 2017 general election), exacerbated by the anticipated impacts of Brexit. It seems likely that there will be growing pressure on the Scottish Government to

[1] Tax rates for all income bands has to be changed equi-proportionately.
[2] See Lecca et al (2017) for a discussion of the parties' income tax policies.

reconsider its position on pursuing a distinctive income tax policy, although it clearly remains nervous about the possible reaction of Scottish taxpayers.

The "Scandinavian model" has often been held up as one that Scotland, if it had the necessary fiscal powers, might wish to emulate, although the emphasis has typically been on the high level (and quality) of public services rather than the associated high level of taxation that characterises the Scandinavian economies. Its current tax powers would allow the Scottish Government to raise average income tax rates to Scandinavian levels and use the revenues to implement a substantial increase in public spending.[3] This paper explores the likely consequences of such a shift as a contribution to our understanding of the likely impact of Scotland pursuing a differentiated income tax policy from that in RUK. It will be critical for any future Scottish Government that may be contemplating the use of significant differential income taxes carefully to assess the likely implications for the Scottish economy and society.

Section 2 begins by identifying some key characteristics of the Scandinavian economies, prior to providing a brief analysis of the likely economic impact of the substantial balanced budget fiscal expansion that a move towards the Scandinavian model would require.[4] The wage bargaining process proves to be a crucial determinant of the outcome. Section 3 outlines a Computable General Equilibrium (CGE) model for Scotland, which is used to explore the likely impact of raising average tax rates to Scandinavian levels, with the increment to revenues being recycled to finance increased public expenditure. Section 4 presents the results and Section 5 concludes.

## 2. The Scandinavian Model

Some key aspects of the Scandinavian economies are summarised first. Then the likely consequences of Scotland seeking to emulate these economies by imposing a significant balanced budget rise in income tax rates are discussed.

*The Scandinavian Economies*

Keating and Harvey (2014) identify two ideal-type contrasting strategies for dealing with globalization and other changes: market liberalism, associated inter alia with the Baltic States, and the "social investment state, in which public expenditure is seen as a contribution to the productive economy rather than a drain on it" (op. cit, p12), associated with the Scandinavian

[3] In fact, even the income tax powers devolved in April 2016, as a consequence of the Scotland Act 2012 allowed this.
[4] Borrowing powers remain limited and so we focus here on a balanced budget adjustment.

economies. In this model, the role of the state is much more predominant than in other Western economies.

Table 1 gives the average personal taxation level as a share of labour costs for the UK and Scandinavian economies (Denmark, Finland, Norway and Sweden here). Total tax revenue as a percentage of average wage levels was 7.4 percentage points higher in the Scandinavian economies (at 38.8%) than in the UK (31.4%) in 2013. Social security contributions as a percentage of GDP were also significantly larger in Scandinavia (10.9% compared to 6.4%) as, generally, are both direct and indirect taxes. Similarly, the VAT rate was higher at 24.8% as compared to 20% for the same year. These figures suggest that, as Keating and Harvey (2014) write, the state plays a larger role in the Scandinavian economy than is the case in the UK.

**Table 1. Average personal income taxes as a percentage of labour costs, 2013**

| | % of average labour costs |
|---|---|
| Denmark | 36.4% |
| Finland | 43.1% |
| Iceland | 34.1% |
| Norway | 37.3% |
| Sweden | 43.0% |
| United Kingdom | 31.4% |
| Scandinavian Average | 38.8% |

Source: OECD (2016)

Apart from the higher tax and spending levels of the Scandinavian economies, they also exhibit important institutional differences from the UK, which are crucial to the way in which these states operate. For example, the "tripartite bargaining" system in the Scandinavian economies is characterised by national wage negotiations which include workers' unions, employers' associations and the government. Further, this system is subject to an annual bargaining cycle, which is believed to reduce tensions in these negotiations that are commonly observed in other European economies, such as Germany (Keating & Harvey, 2014). A second institutional difference is represented by the principle of "universalism". This concept implies that even the middle-class is included in the benefit system. Most of society is included in the social system, ensuring the maintenance of social solidarity, which allows the system to thrive (Keating & Harvey, 2014).[5]

[5] The principle was also upheld in economic crises, including the recent financial crisis of 2008. During those periods, the Scandinavian economies continued to pursue their 'social investment state', instead of the austerity measures observed in other Western economies. However, prolonged downturns put a strain on the system, which relies on near full-employment levels to allow for its inclusive social solidarity system (Keating & Harvey, 2014).

Acemoglu *et al* (2012) maintains that the success of the Scandinavian model is attributable to "cuddly capitalism", which free rides on "cutthroat capitalism" (such as that in the US) pushing out the World's technology frontier. Barth *et al* (2014) argues that the success of the Scandinavian economies in terms of economic growth, high productivity, low wage dispersion and a big welfare state reflects what is, in effect, a two-level bargaining system. A local system supplements the national system described above and strong unions both suppress wage dispersion and enhance local productivity. The latter is generated through inducing greater worker effort and higher capitalist investment. Furthermore, the wage compression and productivity enhancement encourage political support for welfare spending.

It is clear that there is more to emulating the "Scandinavian model" than simply raising income taxes to Scandinavian levels and using the resultant revenues to increase current government spending; institutional differences are also central. The analysis that follows focusses particularly on the valuation of government expenditures and the nature of the wage bargaining process.

*Towards a Scandinavian Model: the importance of wage bargaining*

What would be the likely consequences of a Scottish Government moving towards the Scandinavian model by significantly raising the average tax rate and recycling the revenues to expand current government expenditure? The answer proves to depend crucially on the value placed on the enhanced public services and the reaction of wage bargainers. For simplicity, we assume that the increase in government expenditure per se has no immediate supply-side impact beyond the creation of a local amenity.[6]

We adopt the long-run, open-economy model of the region of Lecca et al (2014), which is based on the disaggregated analysis of Layard *et al.* (1991, Ch. 6), with imperfect competition in the regional labour market. Here we focus on a comparative-static long-run analysis where equilibrium implies that both the regional capital stock and population are optimally adjusted. Long-run equilibria are therefore characterised by zero net investment and zero net migration.

In this framework the long-run equilibrium of the regional economy is determined by the interaction of two relationships between the regional employment (unemployment) rate and the real consumption wage: the zero net migration condition and the bargaining function (wage

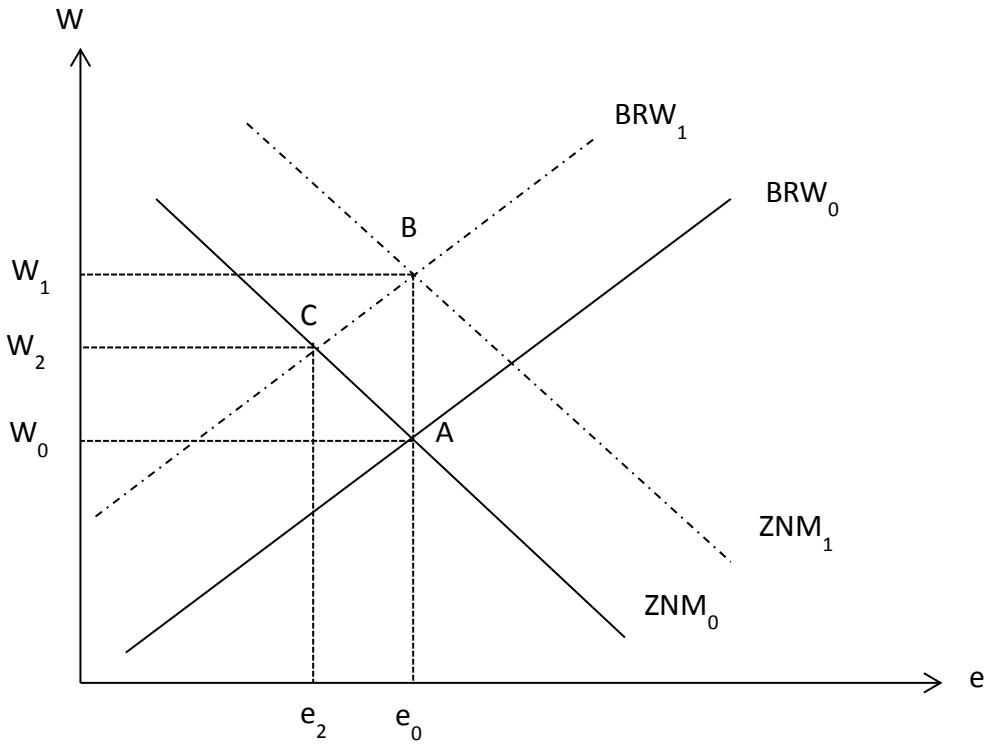
[6] This assumption rules out the potential productivity-enhancing effects of such spending (e.g. through education and health) that e.g. Barth et al (2014) would emphasise, a point we return to below.

curve). Following Layard et al (1991), and many other authors, net migration is a positive function of the inter-regional relative real wage and employment rates.[7] This yields a condition for zero net migration, given in equation (1). This identifies the set of values of the post-tax real consumption wage, w, and the employment rate, e, for which net migration is zero:

$$w = (1-\tau)^{\beta} z(e) \qquad \beta \geq 0; 1 > \tau \geq 0;\ z_e < 1; w_{\beta}, w_{\tau} \leq 0 \qquad (1)$$

where $\tau$ is the proportionate rate of income tax and $\beta$ is a parameter indicating the degree to which households value public, as against private, consumption. Equation (1), $ZNM_0$ in Figure 1, indicates that there is a negative relationship between the post-tax real wage and the employment rate: across zero net migration (long-run) equilibria, a low local wage is compensated for by a high local employment rate. However, following Lecca et al (2014) the equation includes the term $(1-\tau)^{\beta}$ in an attempt to capture the effect on the migration decision of the locally financed amenity.

**Figure 1. The long-run impact of a balanced-budget fiscal expansion.**




[7] This function has its roots in Harris and Todaro (1970) and has been widely employed elsewhere. See for example Greenwood *et al* (1991).

Where individuals attach no value to this amenity $\beta = 0$ and the standard formulation of the net migration condition applies, with the post-tax real consumption wage governing migration decisions. However if, as is emphasised in the literature on fiscal federalism, there is a positive amenity effect, then $\beta > 0$, and the value of this parameter measures the potential migrant's relative marginal valuation of public expenditure versus private consumption. For a given employment rate, this implies that the larger the value of $\beta$, the lower the post-tax real consumption wage required to preclude net outmigration. When $\beta = 1$, the potential migrant is indifferent between marginal changes in local public expenditure and private consumption so that in this case the pre-tax real consumption wage drives migration.[8]

Through the regional real wage curve or bargained real wage function, $BRW_0$ in Figure 1, the real (post tax) consumption wage is positively related to the regional employment rate (Layard *et al*, 1991):

$$w = (1-\tau)^{\alpha\beta} b(e) \qquad b_e > 0,\ \ w_\alpha, w_\beta, w_\tau \leq 0, 0 \leq \alpha \leq 1 \qquad (2)$$

In this formulation of the regional bargaining function, the local amenity generated by the expenditure is allowed to influence wage bargaining behaviour directly. The parameter $\alpha$, which takes a value between 0 and 1, reflects the extent to which the value of the amenity is taken into account in the wage bargaining process (Lecca et al, 2014).

Where labour markets are competitive, since the amenity provision is exogenous to the individual worker, it is ignored in the individual's work/leisure choice, so that only the post-tax real consumption wage matters.[9] This corresponds to a situation where the value of $\alpha$ is zero. However, in the bargaining context the public good externality will be internalised in so far as local unions cover a significant section of the labour force and act co-operatively. Given that the scale of the amenity is tied directly to income and therefore to the bargained wage, the value of $\alpha$ will rise above zero. If $\alpha$ is unity the marginal valuation of the amenity is fully reflected in workers' bargaining behaviour.

We now consider the likely impact of a balanced budget fiscal expansion. In general, the impact of a balanced budget fiscal expansion generates two countervailing forces (Lecca et al, 2014).

[8] That is to say, the individual is indifferent between £1 marginal private consumption and the public good implications of paying £1 more in tax.

[9] The labour supply decision could, of course, be influenced by the amenity if, for example, the amenity were complementary to leisure.

One is that there is a net stimulus to demand: a balanced budget expansion essentially shifts spending from private to public consumption. However, the fall in private consumption due to the rise in income taxation, is more than offset by an expansion in government expenditure, since the latter is less import-intensive. The second is a negative competitiveness effect: if taxes go up workers feel worse off and attempt to restore their real consumption wages through increased wage claims. The nature and scale of the competitiveness effect depends critically on migration and wage bargaining behaviour.

Figure 1 illustrates the initial long-run equilibrium of the regional economy, which is established at point A in employment rate - nominal wage space, where the initial bargained real wage curve, $BRW_0$, and zero net migration curve, $ZNM_0$, intersect (Lecca et al, 2014).[10] We next consider the impact of a balanced budget fiscal expansion under three alternative visions of regional labour markets that imply different values of the parameters α and $\beta$.

In the **Conventional Macro** model neither local residents nor potential migrants place any value on the increase in public consumption following the balanced budget expansion so that $\alpha=\beta=0$, and the standard (neoclassical) specifications of the net migration and bargained real wage curves apply, with after tax real consumption wages governing both migration and bargaining decisions. This approach is embedded in many studies of net regional migration and of regional wage curves. In this case the ZNM function in Figure 1 shifts vertically upwards by the amount required to restore the real post tax wage. At any given employment rate the nominal wage has to rise by the amount required to offset the rise in the tax rate and the increase in the CPI to ensure zero net migration. The BRW function is shifted up vertically by exactly the same amount (since $\beta = 0$ in (2)), to maintain a given post tax real wage at any given employment rate. In the new long-run equilibrium, at point B in Figure 1, the real post-tax wage is restored to its original level, as is the employment (and unemployment) rate.

In this case workers bargain for a net of tax real wage, and there is upward pressure on wages and prices, which creates an adverse competitiveness effect, as workers seek to restore their real take home pay. The more open the economy, in terms of share of imports and responsiveness to relative price changes, the greater the adverse demand effects associated with the loss of competitiveness. Migration responds only to net of tax real wage and unemployment differentials in this case. Given a predominant adverse competitiveness effect,

[10] In fact both relationships are formulated in terms of the real consumption wage. They are here transformed in nominal wage relationships so that we can clarify competitiveness effects.

real post tax wages initially fall, unemployment rises and net out-migration occurs until real wage and unemployment rates are restored (at lower levels of population and employment).

In microeconomic models of fiscal federalism (e.g. Tiebout, 1956), potential migrants value the increase in public services provided by the relevant authority and factor that into their migration decisions. The is the basis of the ***Conventional Micro*** model, in which we assume that migrants are motivated by their 'social wage', which we take to be unaffected by the balanced-budget fiscal expansion: migrants value the increased public spending equally to the foregone private wage as a result of the income tax increase so that $\beta = 1$. However, this valuation is not reflected in regional wage bargaining so that $\alpha = 0$. In Figure 1, the BRW curve shifts vertically upwards by the same amount as under the Conventional Macro model, but in this case, since $\beta = 1$, the ZNM curve does not shift in response to the hike in taxes because migrants value the increased public spending as much as they do the loss of consumption, and so feel no worse off after the fiscal expansion. Long-run equilibrium occurs at point C where the nominal wage increases (but not sufficiently to restore the real wage), and the employment (unemployment) rate falls (rises). While the unemployment rate rises in this case, the extent of the adverse supply shock is less than under the Conventional Macroeconomic case, with nominal wages rising less, so that employment and GDP effects are improved and any induced net out-migration reduced.

In the ***Social Wage*** case the increase in public consumption is valued equally to the loss in private consumption, and that valuation is fully reflected in the regional wage bargaining process so $\alpha=\beta=1$. In terms of the long-run equilibrium in Figure 1, neither the ZNM nor the BRW curves are affected by the hike in taxes: both depend only on the pre-tax wage, and the long-run equilibrium of the nominal wage and employment rate is unaffected. This reflects the fact that workers value the increase in government consumption as much as their foregone private consumption, so that they feel as well-off after the change as they did before. Accordingly, workers do not push to restore their take-home wage following the policy change, and the adverse competitiveness effect is eliminated completely. In this case, therefore, the beneficial net demand stimulus associated with the fiscal expansion predominates, and output and employment expand, in a manner similar to that envisaged in the simple Keynesian balanced budget multiplier. However, the whole of the increase in tax (and induced effects on the cpi) is reflected in a significant reduction in the post-tax wage.

What public evidence do we have that relates to the likely values of α and $\beta$? In fact, there is a dearth of relevant evidence. While there is a longstanding presumption that Scotland is "more

left wing" than the rest of the UK (RUK) with a preference for higher public spending and taxation, this does not appear to be borne out by survey evidence. For example, Bell and Eiser (2015) find no statistically significant difference, for various indicators of political attitudes, between Scottish and RUK respondents to the British Social Attitudes survey. Furthermore, while the majority of respondents to ESRC-commissioned surveys in 2014 (after the Referendum) wanted to see greater devolution of fiscal powers to Scotland, only a minority wanted to see rates that differed from those in the RUK. This apparent contradiction may reduce to an issue over which Government – at Holyrood or Westminster - commands greater trust (Bell and Eisner, 2015). On average, respondents wanted to see lower taxes and higher welfare benefits, which would very probably violate the balanced budget constraint of the present analysis.

However, there are at least two further points that should be noted here. First, while individual survey data do not appear to support the notion of distinctive Scottish political attitudes, the results of successive elections can be interpreted as suggesting otherwise. The Scottish results of the 2015 UK general election saw the elimination of all but a single Labour and Lib-Dem MP, joining the single MP that the Conservatives had had for some years. That result was widely regarded as a reaction against a Labour Party that had shared a platform with the other Unionist parties in the independence Referendum and which had been perceived to be "light" in its opposition to the "austerity" programme of the previous UK Government (in contrast to the perception of the SNP's positioning). The significant advance of the Scottish Conservatives, in the 2017 UK general election (in contrast to the experience of the national party) is seen, in large part, as a reaction to the SNP's proposed second independence referendum (although they also committed to retain parity with UK income tax rates). IndeRef2 is itself a response to the outcome of the Brexit Referendum in which the majority of Scots voted to remain in the EU. The relative success of the Scottish (and UK) Labour Parties in the recent UK election is seen, in part, as reflecting enthusiasm for the Party's clear anti-austerity platform.

Second, as we have already noted, Scotland is in the process of a radical change of historic importance that renders it one of the most powerful devolved authorities in Europe: an irreversible sea change in terms of the fiscal powers of the Scottish Parliament is now well underway. In this new context political parties may seek to alter public attitudes towards changes in taxes and public spending, perhaps through some degree of incremental hypothecation.

The Social Wage case comes closest to reflecting the outcome of the centralized tripartite bargaining of the Scandinavian model. One key issue, however, is whether the Scottish bargaining system is likely to deliver such an outcome. Of course, there is no "tripartite bargaining" system in Scotland presently, and the shift would require the Government to take a much bigger role in the bargaining system than it currently has. Furthermore, in the UK (Scotland) only 26.1% (31.6%) of the workforce is unionized (Department of Business, Innovation and Skills, 2015), compared to 64% in Scandinavia in 2012 (Table 1).

Nevertheless, the current wage bargaining system in Scotland may appear to offer some support for the Social Wage outcome, since many workers are covered by UK-wide bargaining agreements. From a Scottish perspective, this effectively means that their nominal wage is fixed, which would preclude any adverse competitiveness effect from this group of workers.[11] The ***Traditional Keynesian*** model implied by a fixed nominal wage would closely emulate the social wage model, exhibiting the traditional demand-driven character of Keynesian models of the regional macro-economy. However, if workers do not in fact value the enhanced public services sufficiently to feel as well off as they did prior to the rise in tax and spending, there would remain pressure in the long-run to establish a supplementary regional bargaining system, and the system would ultimately behave as the Conventional Macro model.

For those not covered by nation-wide bargaining, there is a lot of international evidence supporting the notion that wage bargaining essentially operates around real take home pay, exactly as in the Conventional Macro model. However, the recent very prolonged recession has depressed wages, but in the longer-term bargaining seems likely to focus again on net of tax real wages. So the current wage bargaining systems in Scotland seems unlikely to deliver Social Wage outcomes, at least over the longer term, without some fairly radical reform of the bargaining system.

## 3. The computable general equilibrium (CGE) model

This section provides a brief, non-technical overview of AMOS (A Macro-micro model Of Scotland), a regional CGE model, which we use to simulate the impact of a balanced budget fiscal expansion that raises the average Scottish income tax rate to Scandinavian levels. The version employed here is the forward-looking model (Lecca et al, 2013) calibrated on the 2009 Scottish SAM (Emonts-Holley et al, 2014).

[11] However, the exogeneity of the nominal wage is guaranteed by our single-region analysis of the present paper. That restriction would not hold in an explicitly interregional context where the UK nominal wage would be endogenous, although relatively stable in this particular case of a Scottish-specific change.

AMOS is essentially a regional, multi-sectoral, forward looking variant of the Layard, Nickell, and Jackman (1991) model. In the long-run equilibrium of this economy all stocks are optimally adjusted and so it is characterised by both zero net migration and zero net investment. In the short-run, all sectoral capital stocks and population are fixed. AMOS has three domestic transactor groups, namely, households, firms and government; and four major components of final demand: consumption, investment, government expenditure and exports. In the version used here there are eighteen commodities/activities.

Here we use the intertemporal variant of the model with perfect foresight, the full specification of which can be found in Lecca *et al.* (2013, 2014). Government expenditure is equal to its base year level plus the increment to revenues attributable to the rise in the average income tax rate, so that revenues become dependent on the entire general equilibrium of the system. In fact, under the new Fiscal Framework government expenditure is still partly funded through the Barnett formula, subject to block grant adjustments. However, here we want to focus on a balanced budget fiscal expansion, in which all income tax revenues from the increase in income tax are recycled increased current spending. The demand for Scottish exports is determined by export demand functions with a price elasticity of demand of 2.0. Imports are modelled by an Armington link (Armington, 1969) with trade substitution elasticities of 2.0 (Gibson, 1990).

In all the simulations there is a single representative household and a unified Scottish labour market with perfect sectoral mobility. All sectors are taken to be perfectly competitive and produce using multi-level CES production functions. The elasticity of substitution in the production of gross output and value added is 0.3 and is Leontief for intermediate demands (Harris, 1989). We do not explicitly model financial flows: Scotland is a price-taker in competitive UK financial markets.

The size of the labour force only varies due to net migration flows, modelled in accordance with Layard *et al* (1991), but incorporating the amenity effects discussed in Section 2. Net migration is positively related to real after tax wage differential, and negatively related to the difference between regional and national unemployment rates:

$$m = \varsigma - 0.08\left[\ln(u^S) - \ln(u^R)\right] + 0.06\left[\ln\left(\frac{w^S}{cpi^S}\right) - \beta\ln(1-\tau) - \ln\left(\frac{w^R}{cpi^R}\right)\right] \quad (3)$$

Where: *m* is net in-migration as a proportion of the Scottish population; u is the regional unemployment rate; the S and R superscripts stand for Scotland and the Rest of the UK, respectively; and ς is a parameter calibrated to generate zero net migration in the base period. As before, *β* is the parameter indicating the extent to which households value public, as against private, consumption. It represents the subjective net valuation by households of the benefits of the increased public expenditures weighed against the corresponding increase in their income tax.

As we have seen, in the Conventional Macro model households attach no value to the amenity created by the increased expenditures so that *β* = 0 and the standard specification of the net migration function applies, with after tax real consumption wages governing migration decisions. However, if public expenditure generates a positive amenity, so that households attach any value at all to the services produced by the additional expenditure, then *β* > 0. For a given unemployment rate, the larger the value of *β*, the lower the post-tax real consumption wage required to preclude net outmigration. In the Conventional Micro and Social Wage models *β* = 1, and the potential migrant is indifferent between marginal changes in public expenditure and private consumption, so that in this case the *pre-tax* real consumption wage governs migration.[12]

Wage setting reflects the bargained real wage curve estimated by Layard *et al* (1991), again augmented by amenity effects:

$$\ln\left(\frac{w^S}{cpi^S}\right) = c - 0.113\ln\left(u^S\right) + \alpha\beta\ln\left(1-\tau\right) \qquad (4)$$

Where: α, as before, represents the extent to which the amenity effect is reflected in the wage bargain and *c* is a calibrated parameter.[13] In the Conventional Macro model both *α* and *β* equal zero and the last term on the RHS of (2) is zero. In this case (2) implies that bargaining is over the real net of tax consumption wage. In the Conventional Micro model *β* equals unity, but *α*=0, so that again (2) simplifies to the conventional wage curve specification. However, in the Social Wage case *β*=*α*=1. In this case (2) implies that workers bargain over the pre-tax real wage: the tax hike has no impact on the bargained wage.

[12] That is to say, the representative worker is indifferent between £1 marginal private consumption and the public good implications of a local fiscal arrangement where he or she pays £1 more in tax.

[13] A wage curve elasticity of around -0.1 has been found over a large number of empirical studies across different countries and time periods (Blanchflower and Oswald, 2005).

## 4. Results

This Section simulates a rise in the average rate of income tax in Scotland of 7.4 percentage points, the change required to match average tax rates in Scandinavia (Table 1). The resultant tax revenues are used to fund a rise in current government consumption.[14] The permanent rise in the income tax rate is applied in period 1 and the model is run for 50 periods.

*Aggregate results*

Table 2 shows the long-run impacts, in terms of percentage changes from the initial steady state, generated by the balanced-budget fiscal expansion. The increase in the average rate of income tax of 7.4 percentage points. The resultant stimulus to government consumption is positive in the long run in each case, but is noticeably greater in the Social Wage model. The overall impacts on the other broad macroeconomic indicators shown in Table 2 are fairly similar for the Conventional Macro and Micro cases, but the Social Wage results differ markedly.

The first column of Table 2 reports results for the Conventional Macro model. In this case, neither potential migrants nor workers value public consumption. Accordingly, migrants respond to the net of tax real wage, as do workers who seek to restore the initial value of their real take home pay (and, in the long-run succeed in doing so). Therefore there is no change in the post-tax real wage or in the unemployment rate in the long run, corresponding to the shift in long-run equilibrium from A to B in Figure 1. While public expenditure rises by 7.1%, the long run impact of the fiscal expansion is contractionary, with a fall of 8.5% in Gross Value Added (GVA) and 9.0% in employment. It is clear that, for Scotland, the adverse competitiveness effect of the balanced budget fiscal stimulus dominates the net stimulus to demand, reflecting the degree of openness of the Scottish economy, with exports to both RUK and ROW falling by 6.9% and 7.2% respectively.

The adverse competitiveness effect is apparent in the substantial rise in the nominal gross wage (of 17.1%) and the CPI (of nearly 5%), as workers successfully restore the initial value of their real take home pay. Due to the zero net migration condition, which is binding in long-run equilibrium, the unemployment and real wage rates are ultimately restored to their initial values through a process of net outmigration, confirming the analysis of Figure 1. The rise in the average rate of income tax naturally lowers household consumption, in this case by 5.4% in the long run.

[14] This balanced budget change is equivalent to revenue recycling in this case because income tax is here assumed to be the only devolved tax.

**Table 2. The long run impact of a balanced-budget 7.4 percentage point rise in the average income tax rate**

| | Conventional Macro | Conventional Micro | Social Wage |
|---|---|---|---|
| | 7.4 pp | 7.4 pp | 7.4 pp |
| Gross Value Added | -8.52% | -7.77% | 1.92% |
| Consumer Price Index | 4.96% | 4.57% | 0.00% |
| Unemployment Rate | 0.00% | 7.87% | 0.00% |
| Employment | -9.02% | -8.17% | 2.95% |
| Gross Nominal Wage | 17.11% | 15.69% | 0.00% |
| Nominal Wage after Tax | 4.96% | 3.68% | -10.38% |
| Gross Real Wage | 11.58% | 10.63% | 0.00% |
| Real Wage after Tax | 0.00% | -0.85% | -10.38% |
| Labour Income | 6.55% | 6.24% | 2.95% |
| Capital Income | -4.00% | -3.68% | 0.52% |
| Labour supply | -9.02% | -7.70% | 2.95% |
| Household Consumption | -5.39% | -5.30% | -3.94% |
| Government Consumption | 7.14% | 7.83% | 16.76% |
| Export RUK | -6.92% | -6.41% | 0.00% |
| Export ROW | -7.21% | -6.69% | 0.00% |

The second column in Table 2 reports the long-run results for the Conventional Micro model. Here potential migrants value the increase in public consumption, but workers do not moderate their wage claims accordingly. Typically, Conventional Micro models abstract from the presence of imperfect competition in labour markets, so that the improved amenity is an externality from the individual worker's perspective and, in effect, $\alpha = 0$. The fiscal expansion results in a rise in public consumption of 7.8% in the long run, but GVA falls by 7.8%, and employment by 8.2%. Given the predominant adverse competitiveness effect observed in the Conventional Macro model, the scale of the resultant contraction in this case is less. As before, in the short-run real wages fall and unemployment rate rises, inducing net outmigration. However, the scale of the response is now less than before since migrants are, in effect, motivated by the Social Wage in Scotland, not by the net of tax wage. Accordingly, migration does not continue until real net of tax wages and unemployment rates return to their initial levels. While workers continue to attempt to restore their real wage this increases the unemployment rate and lowers their bargaining power. A lower real take home wage rate is now compatible with the zero net migration equilibrium, given that potential migrants in Scotland and RUK value their higher Social Wage, as reflected in the move from long-run equilibrium A to C in Figure 1.

Workers are in this case unable to restore their net take home pay, although the pressure on wages remains significant, with the nominal gross wage rising by 10.6%. Essentially, labour supply remains greater in this scenario than in the Conventional Macro case because migrants are less willing to move out of Scotland at any given net of tax real wage, and so the upward pressure on the real wage due to outmigration is less in this case. Consequently, unemployment rate increases even over the long run, (by 7.9%).

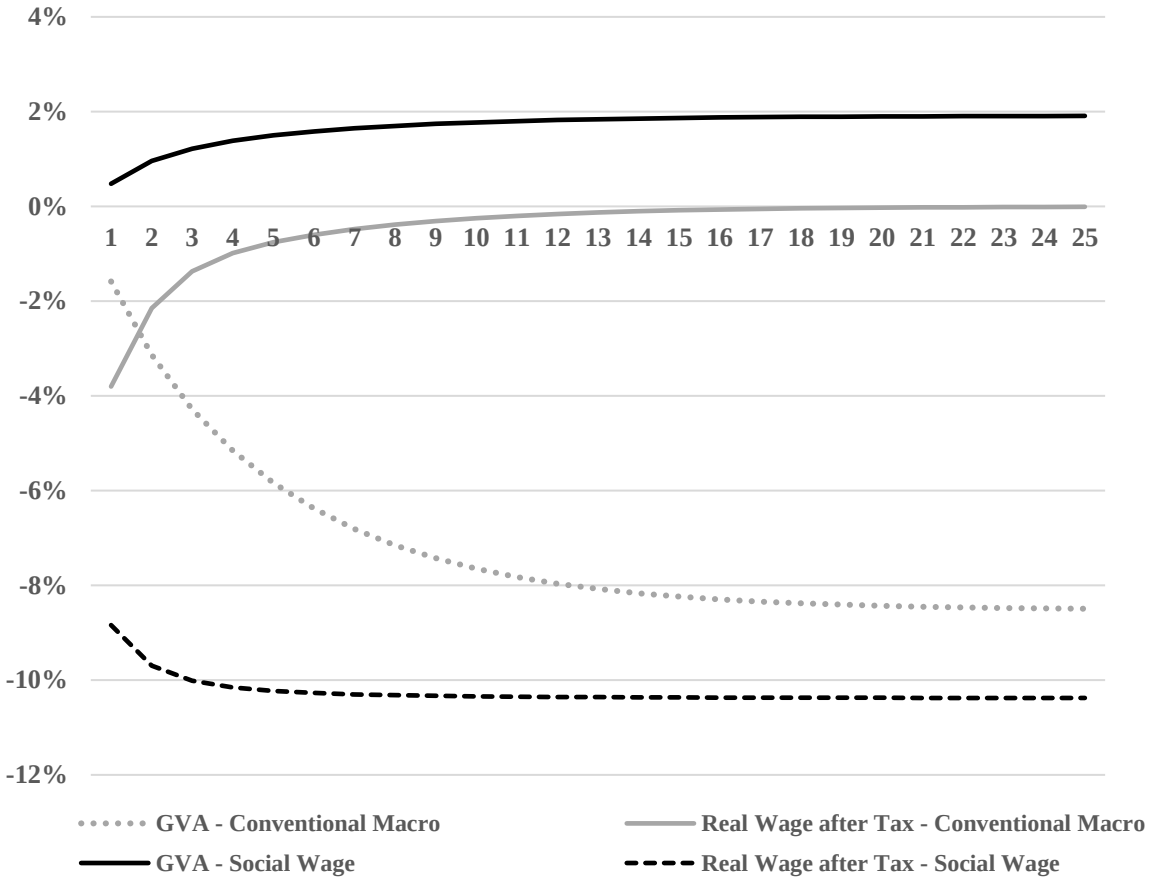
Overall, the aggregate results of the Conventional Macro and Micro models are very similar, reflecting the predominance of adverse competitiveness effects in both cases, although the behaviour of the real wage and unemployment rates differs, reflecting the different models of migration embedded within them. However, the results of the Social Wage model, summarized in the last column of Table 2, are very different from both Conventional models. In this case workers do not bargain to restore their take-home wage, since the increase in government expenditure compensates them for the reduction in their take home pay and nor do migrants require compensation for lower take home pay. The economy remains in a long-run equilibrium like A in Figure 1, where neither the nominal wage nor the employment (or unemployment rate) change. However, we know that in this case there is no adverse supply effect, and so the (net) stimulus to demand predominates. Here the balanced budget fiscal expansion produces a rise of 16.8% in government consumption in the long run and generates a rise in GVA of 1.9% and in employment of nearly 3.0%.

Since workers do not seek to restore their net take home pay there is no upward pressure on the nominal wage or the CPI in the long run. The real wage after tax therefore experiences a substantial fall of approximately 10.4% in the long run (which accounts for the rise in employment exceeding that in GVA). Due to this fall and the tax hike, household consumption declines by over 3.9% in this case. Exports are unchanged in the long run as the competitiveness of the region is ultimately unaffected.

The social wage model effectively eliminates any adverse supply shock associated with the fiscal stimulus, by preventing any upward pressure on the nominal wage. However, this implies a willingness by workers to accept a substantial cut, of 10.4%, in their real take home pay. In the long-run this model operates “as if” it is an input-output system, in which the supply side is entirely passive and wages and prices are unaffected. We obtain results very similar to simple Keynesian balanced-budget multipliers, which are positive, although here both population and capital stocks are endogenous.

It is clear that the overall impact of a balanced budget fiscal expansion is crucially dependent on the public's valuation of the amenity associated with the greater public expenditure, and especially to the extent to which this is reflected in workers' wage bargaining behaviour.

**Figure 2. Adjustment Paths: Macro Case versus Social Wage**




The adjustment paths for GVA and employment for the Conventional Macro and Social Wage models are presented in Figure 2.[15] Adjustment to the new long-run equilibrium values (which are shown in Table 2) takes somewhat longer in the Conventional Macro case, in part reflecting the scale of the changes, particularly in wages and prices. The period-by-period results show that the contraction induced by the predominant adverse competitiveness effect in the Conventional Macro model leads to a fall in GVA and, given the upward pressure on the real wages following the tax hike (Figure 2), the greater fall in employment observed in Table 2. In contrast GVA and employment both rise in the Social Wage model, with the impact on employment greater given the fall in the real post-tax wage. Initially, the social wage increases which, together with the fall

[15] The dynamics of the Conventional Micro and Macro models are very similar, except that unemployment and real wage rates do not return to their initial levels in the former case.

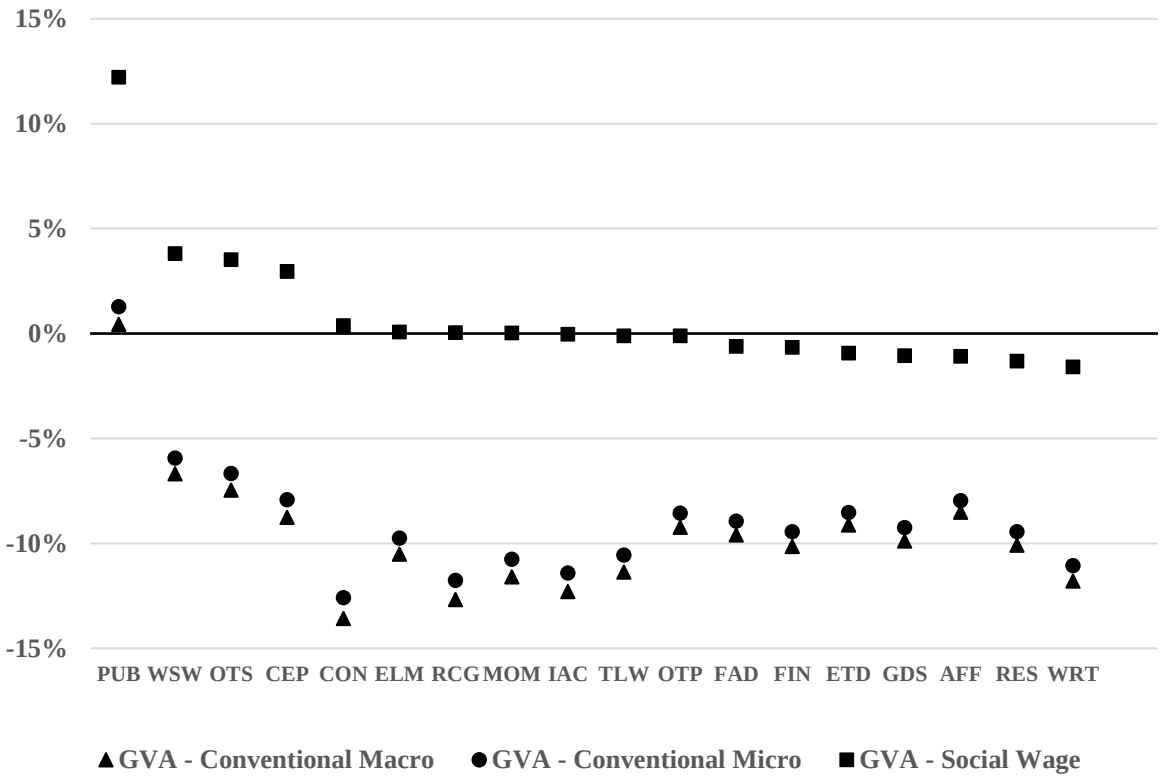
in unemployment rate, induces in-migration. This process pushes down the private element of the social wage until the nominal gross wage is restored to its original level. The very different movements in nominal wages in the two models reflect the contrasting motivations for wage bargaining: with significant upward pressure in the Conventional Macro model, and a return to base year levels in the Social Wage case (following an initial rise). These largely account for the contrast in competitiveness changes in the two models. While real wage and unemployment rates ultimately return to their base year levels in the Conventional Macro model, the levels of employment and population are much lower (by over 9%) than in the base year.

*Sectorally disaggregated Results*

Figure 3 reports the long run results for sectoral value added changes for all three models. In both Conventional Models, the rise in the average rate of income tax results in a contraction in seventeen of the eighteen sectors, the only exception being public administration, education and health, in which government current expenditure is concentrated. This reflects the relative sensitivities to the loss of competitiveness as well as the contraction in consumption and the initial distribution of the rise in government expenditure. The extent of the contraction increases over time in each case as a consequence of net out-migration and disinvestment.

Overall, the contractionary impacts on the private sectors are significantly less under the social wage case. Ultimately prices are unaffected in this case, and there is a substitution of government spending for consumption, against the background of an expanding economy. Here the public administration sectors are not alone in being stimulated by the balanced budget expansion, with Water Sewage and Waste, Other Services, Chemicals and Pharmaceuticals, and Construction all expanding, reflecting a combination of sensitivity to consumption contractions, demand-side linkages to Public Administration, Education and Health, and sensitivity to improving competitiveness. Of course, commodity prices rise only in the short run so that exports are crowded out only over that interval and return to their initial level in the long run for all three sectors. The input-output character of the long-run results in the Social Wage model is apparent from the sectorally disaggregated results: within each sector output, employment and valued added all change equi-proportionately.

**Figure 3. Sectorally disaggregated results – Change in GVA**




*Note on Sectors: Agriculture, forestry and fishing (AFF), Other primary (OTP), Food and drink (FAD), Textile, Leather, Wood, Paper, Printing (TLW), Chemicals and Pharmaceutical (CEP), Rubber, Cement, Glass, Metals (RCG), Electrical Manufacturing (ELM), Mechanical and Other Manufacturing (incl. Repair) (MOM), Electricity, transmission and distribution (ETD), Gas; distribution of gaseous fuels through mains; steam and air conditioning supply (GDS), Water, sewerage and Waste (WSW), Construction – Buildings (CON), Wholesale and Retail Trade, Transportation and Storage, accommodation, food and services (WRT), Information and Communication (IAC), Financial services, insurance and services (FIN), Real Estate, professional act., R&D (RES), Pub. Admin, Education and Health (PUB), Other services (OTS).*

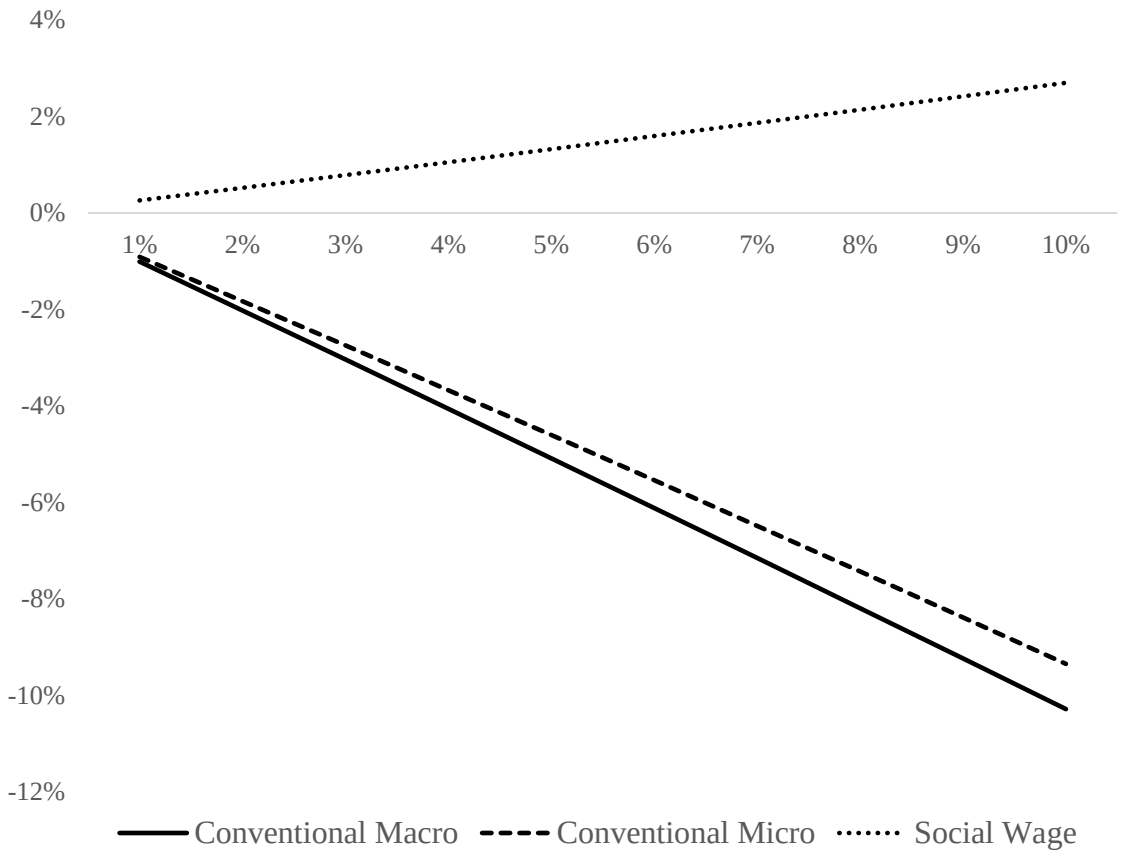
*Sensitivity analysis*

Recall that the simulation analysed so far relates to a 7.4 percentage point increase in the average income tax rate in Scotland, with income tax revenues being recycled to allow an expansion in current government expenditure. Figure 4 shows the long run percentage change in GRP resulting from a range of balanced budget 1 to 10 percentage point rises in the average rate of income tax under the three models.

The results indicate that only in the Social Wage model are higher average rates of income tax associated with increases in GRP. In contrast, in the Conventional Macro and Micro models higher average rates of income tax are associated with falling GRP, although the extent of the contraction is always greater in the former model for the reasons discussed above. The greater sensitivity of GRP to balanced budget fiscal expansions in the Conventional Macro and Micro models reflects the degree of openness of the Scottish economy, which is crucial in determining

the relative strength of the adverse competitiveness effect associated with any increase in taxation.

**Figure 4. Change in the income tax rate, percentage points**




## 5. Conclusions

Scotland has recently acquired very substantial powers over income tax. Currently, the Scottish Government has to set a Scottish Rate of Income Tax (SRIT)[16], and its powers were further significantly enhanced when the provisions of the Scotland Act 2016 are implemented from 2017. Of course, it would always be possible to set a SRIT to ensure that, overall, income tax rates are equal to those in RUK so as to maintain the status quo, and this was indeed what happened when the rate was first set in 2016. However, differences in tax policies among the political parties began to emerge in the 2015 Scottish Parliamentary elections; now only the Conservatives remain committed to the maintenance of income tax parity with the rest of the UK. Furthermore, a number of commentators, including prominent supporters, believe that the SNP will have to further alter its position on income tax if it is to sustain its current and planned

[16] Indeed a Scottish Rate Resolution had been expected by the autumn, but this has been delayed.

future commitment to the maintenance of its distinctive policies on, for example, student fees and some service charges, while defending health and education services, in the face of Westminster's austerity policy.

This paper explores the likely impact of a radical shift in the direction of the Scandinavian model, characterized by high taxes and high public spending, a shift made feasible by the enhanced fiscal autonomy that Scotland now enjoys. The main message from our analysis is that the nature of the wage bargaining system seems crucial to the likely macroeconomic outcome of a significant rise in income taxes and public spending. If the public amenity created by higher public spending is not valued by migrants or workers, and bargaining is not restricted by weak labour market conditions, the openness of the Scottish economy is likely to result in a balanced budget fiscal expansion having contractionary aggregate effects. If, on the other hand, the higher public spending is valued as much as the forgone private consumption, and this is reflected in workers effectively bargaining over the Social Wage, there is no adverse competitiveness effect, and the result is (a more modest) expansion in economic activity.

The Social Wage outcome is, however, necessarily associated with a significant fall in real take home pay, and the key question is how likely it is that Scottish workers would be willing to accept that in return for the maintenance or enhancement of public services. The current wage bargaining system in Scotland seems unlikely to deliver Social Wage outcomes, at least over the longer term. Accordingly, our results suggest that, if a move towards Scandinavian levels of public services and taxes was judged to be appropriate, it would be essential to seek reform of the bargaining system if adverse macroeconomic consequences were to be avoided. Alternatively, some form of incomes policy linked to the provision of public services might be pursued.

Of course, the case we consider here – of an immediate hike in taxes to Scandinavian levels - is unrealistic in that any move in that direction would likely be much more cautious and gradual. But it seems doubtful that *ad hoc* agreements linking moderated wage responses to incremental increases in public spending for particular purposes would be feasible within the current bargaining system. However, it seems likely that workers' attitudes to increased public spending, and therefore to either reform of the bargaining system or some form of incomes policy, will depend on the composition of that spending. For example, US evidence suggests that spending on health and education has a positive effect, but spending on welfare has a negative impact on working migrants.

While the Scandinavian model has often been held up as an example that a Scotland with sufficient fiscal autonomy might like to emulate, few have advocated the kind of radical change considered in this paper. Indeed until the recent Scottish Parliamentary elections there had been surprisingly little debate about what the government should actually do with its new powers. Furthermore, while there has been a longstanding presumption that Scotland is "more left wing" than the rest of the UK (RUK) with a preference for higher public spending and taxation, this does not appear to be borne out by survey evidence. However, public attitudes may change with increasing pressure on the budgets available for public spending as a consequence of UK austerity policies, which seem set to continue in the light of the outcome of the recent UK general election. In any event it is important for Scottish governments of whatever hue to understand the likely effects of any deviation from income tax parity with RUK. Without such an understanding there can be no appreciation of the potential costs and benefits of maintaining the status quo, as against alternative policies. While we have begun to address this issue here, there are a number of aspects that need to be more thoroughly explored in future research.

First, we have considered only one of the options facing the Scottish Government. It would be useful to investigate the use of the new tax powers to move towards the low tax/ low public spending associated with the Baltic economies, although this is a shift that few in Scotland have advocated. Here competitiveness effects may act to stimulate the economy, although outcomes will again depend on the valuation of any change in public spending, and the extent to which that is reflected in the wage bargaining system.

Second, there is a need to explore the valuation of public spending more systematically, in particular its dependence on the composition of government spending, and on the source of that spending, in terms of the level of government.[17] Third, there is requirement for a better understanding of any immediate supply-side consequences of changes in government spending. This is perhaps most obviously relevant when we consider government capital expenditure, but would also apply to those aspects of current government spending, which in fact represent investment in human capital and so would also be expected to have important supply-side impacts (e.g. Hermannsson et al, 2014). The presence of such a stimulus introduces a beneficial supply side impact that tends to counter the competitiveness effects, but the former takes time to emerge, and so such changes may continue to have adverse macroeconomic consequences,

[17] There is also scope for examining a range of alternative models, reflecting different valuations of government expenditure (by category), and different wage bargaining responses.

even in the medium run, in the absence of Social Wage bargaining (Lecca et al, 2017) or sources of nominal wage inflexibility. This timing of effects could lead policy makers to lay undue emphasis on the short-to-medium term outcomes and this may act to inhibit investments in physical and human capital that are worthwhile from a longer term perspective.

Fourth, identifying the impact of fiscal changes on the distribution of income across households of different income groups is clearly of policy interest given the current emphasis on inclusive growth. Fifth, it would be instructive to move away from the strictly balanced-budget changes considered here to explore the impact of fiscal policy within the new Fiscal Framework. Finally, extension to an interregional setting to explore the direction and scale of spillovers and their implications for the "no detriment" principle of the Smith Commission would provide valuable insights for the impact of differential tax regimes between Scotland and RUK (Lecca et al, 2015).

**References**


Acemoglu, D., Robinson, J. A. and Verdier, T. (2012). "Can't we all be more like Scandinavians? Asymmetric growth and institutions in an interdependent world", NBER Working Paper Series, no. 18441.

Armington, P. S. (1969). *A theory of demand for products distinguished by place of production*. Staff Papers, 16(1), 159-178.

Barth, E., Moene, K., & Willumsen, F. (2014). "The Scandinavian model - An Interpretation". *Journal of Public Economics*, vol. 117, pp 60-72.

Bell, D. N. F. and Eiser, D. (2014). "Scotland's Fiscal Future in the UK", University of Stirling.

Bell, D. N. F. and Eiser, D. (2015). "The economic case for further fiscal decentralization to Scotland: theoretical and empirical perspectives", *National Institute Economic Review*, vol. 233, pp R27-R36.

Blanchflower, G. D. and Oswald, A. J. (1984). "Estimating a Wage Curve for Britain". *The Economic Journal*, vol.104, pp. 1025-43.

Department for Business, Innovation and Skills (2015). *Trade union membership.*

Emonts-Holley, T., Ross, A. and Swales, K. (2014). "A Social Accounting Matrix for Scotland." *Fraser of Allander Institute Economic Commentary*, 38(1), pp. 84-93.

Gibson, H. (1990). *Export Competitiveness and UK Sales of Scottish Manufacturers*. Working Paper, Scottish Enterprise, Glasgow.

Greenwood, M. J., Hunt, G. L., Rickman, D. S. and Treyz, G.I. (1991). "Migration, regional equilibrium and the estimation of compensating differentials". *American Economic Review*, vol.81, pp 1382-1390.

Harris, R. (1989). *The Growth and Structure of the UK Regional Economy. 1963-1985*. Aldershot.

Harris, J.R. and Todaro, M. P. (1970). "Migration Unemployment and Development: A Two Sector Analysis", *American Economic Review*, vol. 60, pp. 126-142.

Hermannsson, K., Lecca, P., Lisenkova, K., McGregor, P. G. and Swales, J. K. (2014). "The Regional Economic Impact of more Graduates in the Labour Market: A "Micro-to-Macro" Analysis for Scotland" *Environment and Planning A*, Vol. 42, no. 2, pp471-487.

Keating, M. J. and Harvey, M. (2014). *Small Nations in a Big World: What Scotland Can Learn*. Luath Press.

Layard, R., Nickell, S. and Jackman, R. (1991). *Unemployment: Macroeconomic Performance and the Labour Market*. Oxford University Press.

Lecca, P., McGregor, P. G. and Swales, J. K. (2013). Forward-looking and myopic regional Computable General Equilibrium models: How significant is the distinction? *Economic Modelling* vol. 31, 160-176.

Lecca, P., McGregor, P. G., Swales, J. K., & Yin, Y. P. (2014). “Balanced budget multipliers for small open regions within a federal system: evidence from the Scottish variable rate of income tax”, *Journal of Regional Science*, vol. 54, pp. 402-421.

Lecca, P., McGregor, P. G., and Swales, J. K. (2015). *Scotland -no detriment, no danger; the interregional impact of a balanced budget regional fiscal expansion.* IPPI Discussion Paper.

Lecca, P., McGregor, P. G., and Swales, J. K. (2017). Taxes and Spending, chapter 2 in Keating, M. (ed) *A Wealthier, Fairer Scotland.* Edinburgh University Press; Edinburgh.

The Smith Commission. (2014). Report of the Smith Commission for further devolution of powers to the Scottish Parliament.

Tiebout, C. (1956). "A Pure Theory of Local Expenditure", *Journal of Political Economy*, vol. 64, pp. 416-214