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**A Review of the Empirical Evidence on the Effects of Fiscal Decentralization on Economic Efficiency: With Comments on Tax Devolution to Scotland**

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## **Abstract**

This paper reviews the existing empirical evidence on tax decentralization ("tax devolution") from central government to sub-central government. Sub-central government is taken to be levels above the local level: such as within the UK at the level of Scottish government/executive in Edinburgh, and at the provincial government level in Canada or Spain. Our interpretation of the literature is that there is increasing empirical support for the proposition that tax decentralization helps in promoting economic efficiency and economic growth. It is noted that a distinction must be drawn between tax decentralization and spending decentralization. Where tax decentralization follows spending decentralization - as would be the Scottish case, any adverse economic effects emanating from spending decentralization cannot be blamed on tax decentralization. Indeed, as we argue elsewhere, tax decentralization has the potential of correcting any negative economic effects caused by spending decentralization.

**Journal of Economic Literature Classification:** H21, H21

**Keywords:** tax decentralization, tax devolution, taxes and economic efficiency, taxes and economic growth

In this paper we consider the empirical evidence on the effect of fiscal decentralization – of spending and taxation - on economic growth and on the size of government. Public and private aspects have to be considered. The public aspect relates to the effect of fiscal decentralization on allocative efficiency (both within the public sector and between it and the private sector), income redistribution and macroeconomic stability, and the consequent impact of changes in these components on economic growth. For example, fiscal decentralization could improve allocative efficiency by releasing resources which are then more efficiently employed in the private sector, or the existing employment of resources in the public sector could be made more efficient thereby increasing economic growth. The private aspect relates to the effect that the decentralization of tax levers – such as corporation tax – can have on private sector incentives and hence on economic growth. In this paper we also look at the empirical evidence on the role of fiscal decentralization in affecting the size of the public sector.

The context of this survey of the empirical evidence on the effects of public spending and taxation decentralization is our work on fiscal devolution in the UK, in particular, from Westminster to the Scottish government/executive in Edinburgh (Hallwood and MacDonald 2004, 2005, 2006a, 2006b, and MacDonald and Hallwood, 2004 and 2006). In that work we emphasise the economic benefits of tax devolution – both static and dynamic. In this paper we give a more extensive review the existing empirical support (or, otherwise) for our theoretical and institutional arguments.

Since the debate on fiscal decentralisation only really took off in the 1970s – beginning with Oates (1972), and actual decentralisation only became a trend in the last two decades, it is perhaps not surprising that the empirical literature on the fiscal decentralization-economic growth relationship is relatively recent, itself being kicked-off by Oates (1995). Since then there have been approximately 15 studies on the link between fiscal decentralization and economic growth. These studies rely on cross sectional, panel and purely time series data sets applied to groups of countries, or single country analyses. The latter studies use either time series data or cross sectional data on regions within a country.

As will be shortly shown, the empirical evidence on the efficacy of fiscal decentralization is somewhat mixed. We will argue that the reasons for this lie not in the idea that incentives are irrelevant to economic progress (increased economic efficiency, higher living standards due to faster economic growth, and a ‘correct’ balance between the relative sizes of the public and private sectors), but to two other things: problems with econometric methodology, especially problems with two-way causation (fiscal decentralization causes growth and growth causes fiscal decentralization); and with the quality of the data sets employed in empirical studies. These issues create very real technical problems that cannot be ignored by a serious researcher.

Moreover, there is another factor that complicates the relevance of the extant empirical evidence on the effect of fiscal decentralization on economic growth for the Scottish case. It is true that fiscal decentralization on the side of government spending has already gone

very far in Scotland - it is the financing of this spending that by-and-large has not been decentralized. It can be argued that the decentralization of spending, irrespective of whether financing is decentralized or not, might reduce economic efficiency and/or the rate of economic growth of a region of a country. For example, a well known argument is that economies of scale in the production of public goods might be lost when production is broken down into several sub-central production units – so raising costs of production; but, to repeat, this is due to an expenditure-decentralization decision, not a tax decentralization decision.

Furthermore, a decade ago it was decided that the Scottish Parliament and government/executive would have power over these spending decisions. So if it was subsequently found that economic efficiency or the rate of economic growth had declined this would have to be laid at the door of the decision to decentralize spending. Thus, a problem with many of the econometric studies cited below on the fiscal decentralisation–economic growth relationship is that they do not necessarily distinguish between the devolution of spending and the devolution of financing (taxing) decisions. Indeed, they usually use devolved expenditure as the key explanatory variable in their equations; with few exceptions they do not separate out, as is necessary to understand the case of devolving more financing to Scotland, the independent effects of spending devolution and financing devolution. Thus, extant econometric results have to be taken with a pinch of salt as far as Scotland is concerned.

Also, which expenditure policies a sub-central government chooses may themselves contribute to lower economic efficiency. For example, it has been argued in some quarters that competition between hospitals or between schools will create higher benefit-cost ratios. Or, that requiring students to pay some of the pecuniary costs of their higher education (rather than almost none) may well create a better incentive alignment between taxpayers that, presumably, want hardworking well-educated students and the students themselves who, realizing that they have to repay some of the costs of their higher education, may be motivated to compete through educational achievement for higher paying jobs.

### **Fiscal decentralization and economic growth – the public sector perspective**

#### *The empirical framework and some data issues*

The theoretical workhorse used to analyze empirically the effect of fiscal decentralization on economic growth is the endogenous growth model of Barro (1990), in which the production process has multiple inputs, including private and public spending. Such an approach is helpful since it facilitates a relatively rich menu of control variables, thereby minimizing the effect of omitted variable bias. The dependent variable in the growth regressions is usually the average growth rate of real GDP per capita, although a number of variants have been used, such as the log first differences of real GDP and total factor productivity growth. A variety of explanatory fiscal decentralisation variables have been used, focusing mainly on the expenditure side of the decentralization equation. Most authors use the budget data approach and approximate the degree of fiscal devolution

using the share of sub-central government expenditure (or revenues) in general government expenditure (or revenues), net of intergovernmental transfers, sourcing the data from the Government Finance Statistics of the IMF. More specifically, and from the expenditure side in equation (1), fiscal decentralization (FD) may be measured as the share of sub-central government (SCG) expenditure in total government expenditure net of financial transfers:

$$FD = (E_{SCG} - Tr)/E_{CG} \quad (1)$$

where  $E_{SCG}$  is expenditure by SCG,  $Tr$  is financial transfers to SCG from central government (CG) and  $E_{CG}$  is expenditure by CG. Thus, a decrease in transfers relative to  $E_{SCG}$  would raise the degree of FD (so increasing vertical balance) as, presumably, taxes at the level of SCG would have to increase. Thus, to be clear about the questionable relevance of the empirical studies referred to above, what we are discussing in this book is raising fiscal decentralization by reducing transfers ( $Tr$ ) in equation (1); which may have quite different economic effects compared to raising fiscal decentralization by allowing a sub-central government to take command of greater public spending *and* its own taxes more-or-less simultaneously. The Scottish case is not at all a simultaneous transfer of spending and taxing powers to sub-central government because the transfer of spending has already occurred; and any negative effects of this spending transfer on efficiency and economic growth are already built in. Unless the econometric studies distinguish between a) tax-only devolution – what this book is about; and b) simultaneous

spending and tax devolution, any negative effects from the spending devolution will confound conclusions drawn about the desirability of tax-only devolution.

Alternatively, fiscal devolution can be measured from the revenue (R) side as:

$$FD = (R_{SCG} - Tr)/R_{CG} \quad (2)$$

So a rise in SCG revenues relative to transfers raises the degree of FD (vertical balance). The same caution must be stated about the relevance of estimation results derived from this equation as were mentioned with respect to equation (1). What we are discussing and recommending in this book is an increase in fiscal decentralization caused by a reduction in transfers (Tr) from central government. However, fiscal decentralization can also rise if sub-central government revenues,  $R_{SCG}$ , (mainly taxes), rise relative to transfers (Tr) – which would occur if sub-central government spending is also increasing along with the taxes it is raising. When fiscal decentralization is rising for this latter reason, again, any negative effects of increased sub-central government spending should not be ‘blamed’ on the increased taxing element. And, to repeat, in the Scottish case our interest is in tax-only devolution not spending and tax devolution because the spending part has already occurred.

Moreover, it ought to be emphasized that we and others are of the opinion that spending devolution to Scotland has not been accompanied by any notable efficiency properties. Indeed, we think that in the absence of much tax devolution, spending devolution has led

to inefficiency in government spending in Scotland – especially, as MacKay and Bell (2006) indicate in its bloated level and in the allocation of resources between the Scottish public and private sectors.

As discussed in Hallwood and MacDonald (2009, chapter 8), the UK has one of the lowest degrees of fiscal decentralization of any of the countries in our data set. Thus, even though expenditure is high so are transfers, or, Scottish revenues are small relative to transfers.

The most popular data sets used in fiscal decentralization/growth regressions are either pure cross section or panel data sets, which adds a time series dimension to the cross sectional dimension thereby increasing the statistical power of the test and it also has the advantage that country specific and time invariant characteristics can be controlled for using fixed and time effects. Data of an annual frequency are normally used in panel data sets. In addition to regressions based on panel and cross sectional data sets, Ordinary Least Squares and variants thereof are used to implement the growth accounting procedure (see, for example, Thießen, 2000).

#### *Cross sectional/ Panel results on groups of countries*

The cross sectional data set of Oates (1995) consisted of a mix of 43 industrialised and developing countries, and he found that the average share of central government spending in total government spending in this data set was 65 per cent for the industrialised countries and 89 per cent for the developing countries: industrialised countries therefore

seem to have much more fiscal decentralisation than developing countries. Oates reports a statistically significant and positive relationship between FD and economic growth: therefore countries with high per capita income, which have enjoyed sustained periods of economic growth to reach their current income levels, have greater levels of fiscal decentralisation than low growth/ low per capita income countries. But this raises the central issue in this kind of study, namely: is fiscal decentralisation a cause or consequence of growth? The evidence on causality is inconclusive.<sup>1</sup> As we shall see, more recent studies, based on regression analyses,<sup>2</sup> report that there is a statistically significant relationship between fiscal decentralisation and growth but, intriguingly the relationship is sometimes negative: increased fiscal decentralisation is associated with slower growth. However, in general, these studies are unsophisticated in the way they treat causality and it is possible that the negative result is spurious. We return to this point at the end of this section

Davoodi and Zou (1998) report a negative, although statistically insignificant effect of fiscal devolution on economic growth for developing countries and no clear relationship for developed countries. Woller and Phillips (1998) find no significant and robust relationship between fiscal devolution and economic growth for less developed countries and they therefore essentially confirm the results of Davoodi and Zou. Yilmaz (1999) partitions his data base into unitary countries and those with a federal structure. He finds for unitary countries a significant positive impact of fiscal decentralization on per capita growth but no clear relationship for federal countries. Thießen (2000) tests for a ‘hump-

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<sup>1</sup> See, for example, Oates, 1999, and Bahl and Linn, 1992.

shaped' relationship between fiscal decentralization and economic growth which simply put is: both low and high levels of decentralization are not optimal but some mid way point is likely optimal. The theoretical rationale for such a humped relationship is that with low levels of decentralization unconsidered, or, at least, uncatered for, preferences produce inefficiencies in the provision of public goods, which inhibits, in turn, economic growth. With too high a level of decentralization inter-jurisdictional externalities cannot be internalized and economies of scale are not realized, with negative growth effects the outcome. Thießen finds that the hump-shaped relationship is particularly pronounced in countries with the highest per capita income, while there is evidence that low per capita income countries grow linearly with higher decentralization degrees.

Thießen (2003) follows up on his earlier study of the hump-backed nature of the FD-economic growth relationship using a panel data base for the high income OECD countries. For such countries the degree of fiscal decentralisation has converged over the last 30 years towards an intermediate level. The theoretical arguments for and against fiscal decentralisation point to explanations for this tendency, because both extreme decentralisation and extreme centralisation are associated with disadvantages for economic growth. Hence, the observed trend of convergence in the high income OECD countries should be growth-promoting. Thießen (2003) analyses the long-run empirical relationship between per capita economic growth, capital formation and total factor productivity growth, and fiscal decentralisation for these high-income countries.

Thießen's results supports the view that the relationship is positive when fiscal

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<sup>2</sup> See, for example, Davoodi and Zou, 1998, Xie, Zou and Davoodi, 1999, Zhang and Zou, 1998, and Thießen, 2003.

decentralisation is increasing from low levels, but then reaches a peak and turns negative. A policy implication of this is that policy-makers in several countries with relatively low degrees of fiscal decentralisation could possibly mobilise growth reserves by increasing it.

Feld and Dede (2005) empirically study the impact of fiscal federalism on economic growth for high income countries using a panel data for 19 OECD countries over the period 1973 to 1998. They use new data on the decentralization of tax revenue in which sub-central fiscal autonomy is captured to different degrees. According to their results, tax autonomy does not have a robust impact on economic growth while an extensive participation in joint taxation systems seems to impede economic growth.

### *Single Country studies*

#### *(1) China*

Lin and Liu (2000) demonstrate that China's overall (national) growth rate is positively related to fiscal decentralization and they attribute this to efficiency improvements of resource allocation rather than fiscal decentralization inducing more investment. However in contrast Zhang and Zou (1998, 2001), using provincial data, find that there is a negative association between China's provincial growth and fiscal decentralization and they argue that key infrastructure projects which have nationwide externalities, which are too decentralized in China compared to other countries are the

key reason for this result. So for China the conclusion is that fiscal devolution has differential effects at the local and national levels.

## *(2) United States*

Xie, Zhou and Davoodi (1999) report an insignificant relationship between local and state spending shares and economic growth, although in terms of their theoretical model they argue that insignificant fiscal devolution shares are actually consistent with growth maximization.

Akai and Sakata (2002) use state-level data for the United States to estimate the effect of fiscal decentralization on economic growth more objectively than in previous (cross section studies), because the data set exhibits little cultural, historical, and institutional variation. They also provide the finding that the definition of fiscal decentralization is important in relation to the effect of fiscal decentralization on economic growth.

Akai, Nishimura and Sakata (2004) also use state-level data for the US, their novelty being the classification of the states set into high, medium and low degrees of fiscal devolution. They find a statistically positive relationship between fiscal devolution and economic growth regardless of the classification, thereby indicating that fiscal devolution is conducive to growth regardless of the degree of decentralization (note their categorization into high medium and low is from the expenditure side of the decentralization equation).

Stansel (2005) uses a new cross sectional data set for the United States, comprising 314 US metropolitan areas to show that there is a positive and highly significant relationship between fiscal decentralisation and economic growth: specifically, a one standard deviation increase in decentralization produces a 2.5 per cent increase in per capita income growth.

### *(3) Germany*

Rather than use a fiscal devolution measure, Behnisch, Buettner and Stegarescu (2003) use a measure of fiscal centralization to assess the impact of public sector centralization in Germany on total factor productivity growth and they are able to identify a statistically positive effect of overall centralization on total factor productivity growth.

### *(5) India*

Using Indian regional data, Zhang and Zou (2001) find a positive effect of the per capita fiscal devolution shares on Indian regional economic growth, although the effect is only statistically significant when the FD measure used is the per capita revenue share.

### *(6) Russia*

Using data on the Russian regions post break-up of the Soviet Union, Desai, Freinkman and Goldberg (2003) show that tax retention, as a proxy for fiscal autonomy, has shown a significant positive effect on industrial recovery of the Russian regions.

## (7) Spain

Carrion-i-Silvestre, Espasa and Mora (2008), examine the Spanish fiscal decentralization - economic growth relationship at both the aggregate and regional levels. Their main conclusion is that at the aggregate level, the process of decentralization of responsibilities to autonomous communities (ACs) has not had significant effects on Spanish economic growth when fiscal decentralization is measured in terms of revenue and investment shares, while a statistically significant negative effect is found when decentralization is measured through expenditure shares. When they use the regional data they find that fiscal decentralization at the AC level has a positive effect on economic growth for those ACs with the highest levels of fiscal and institutional decentralization, but the opposite effect is found for those ACs with the lowest levels of competencies. Decentralization at the local level has a significant positive effect for ACs with complete fiscal autonomy.

The Spanish case is also examined by Gil-Serrate and Lopez-Laborda (2006). They define revenue decentralization as actual sub-central government control (free of central government manipulation) and divide it into high, medium and low categories. The dependent variable is GDP growth or per capital GDP growth, and control variables are included to pick up the effects of non-fiscal variables on regional economic growth. They find the hypothesized positive relationships between revenue decentralization and economic growth, but only one is statistically significant – that for low fiscal decentralization. However, what they are able to include in the ‘high’ revenue category had to be rather narrowly defined as administrative fees, user charges, income from

business operations and property (but not corporation taxes as control was not devolved), and divestment of property investments. Thus, devolution of income taxes is not found in the high income category, nor VAT revenues.

Gil-Serrate and Lopez-Laborda (2006) do in fact come up with some other very interesting and robust econometric findings concerning the relationship between revenue decentralization and the *rate of investment* in the Spanish autonomous communities. Thus, when the dependent variable is the rate of investment at the regional level, they find a positive and highly significant relationship with their measures of revenue decentralization. This finding would seem to support the ‘crowding out’ hypothesis of MacKay and Bell (2006) who argue that high public sector spending in Scotland is squashing the private sector as it absorbs so much labour.

#### *Some econometric issues*

The foregoing overview of the relationships between fiscal devolution and economic growth confirms the earlier surveys of Martinez-Vazquez and McNab (2003) and Breuss and Eller (2004) and we follow the latter authors in our summary of some of the remaining econometric issues in these empirical studies.

In estimating the growth – fiscal devolution relationship, most authors apply the sensitivity analyses proposed by Levine and Renelt (1992), which distinguishes between three groups of explanatory variables: base or control regressors (which are always included in the regression); the variable(s) of interest (fiscal decentralization); and a

subset of regressors identified by past studies as potentially important explanatory variables for economic growth. Under the Levine-Renelt test a variable is deemed to have a ‘robust’ effect on economic growth if ‘it remains statistically significant and of theoretically predicted sign when the conditioning set of variables in the regression changes’ But as Sala-i-Martin (1997) has stressed misspecification, biases may still be present in regressions which have followed the Levine-Renelt approach because they it may miss some important control variable - which is likely to be a bigger problem than introducing irrelevant variables. Also the Levine-Renelt test is in fact ‘too strong for any variable to pass it’ Sala-i-Martin (1997, 179).

A second important issue with existing empirical studies concerns the measurement of the fiscal devolution variable. The World Bank, for example, has criticized the IMF’s *Government Financial Statistics* (GFS) database, in terms of its lack of details on expenditure-autonomy and own-source revenue. In other words, it is by no means clear that GFS data measures the variables of interest – actual sub-central government spending or financing autonomy from central government. There are also deficiencies regarding reported data for the sub-national levels and the paucity of information for determining the dispersion among sub-national regions and it is therefore important that more precise measures of FD are calculated (Ebel and Yilmaz, 2002, and Gil-Serrate and Lopez-Laborda, 2006). Both the World Bank and the OECD are making important advances in this regard.

We noted above that there are potential simultaneities, or bi-directional causality, between fiscal decentralization and economic growth and this has not been sufficiently considered within theoretical models or in the extant empirical literature discussed above. For example, as Breuss and Eller (2004) note, if fiscal decentralization is seen as a superior good (due perhaps to quality gains in the supply of public goods) and has a higher income elasticity, then higher levels of income per capita can produce the basis for additional expenditure use for the creation of a new level of decentralization. So in this example, increased per capita income would be expected to have a positive effect on fiscal decentralization and therefore this kind of effect would mean fiscal decentralization is an endogenous variable and any failure to control for such endogeneity would result in a spurious correlation.<sup>3</sup> Since few if any studies do indeed control for such endogeneity the existence of spurious correlation must be a very real one in the kind of studies discussed above.

### **Fiscal Devolution and the size of government.**

Grossman, (1989) analyzes one way in which [governments can circumvent the discipline of a competitive system of fiscal federalism, by using intergovernmental collusion in the form of intergovernmental grants. Grants, it is argued, serve to encourage the expansion of the public sector by concentrating taxing powers in the hands of the central government and by weakening the fiscal discipline imposed on governments forced to self-finance their expenditures. The results reported suggest that intergovernmental grants](#)

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<sup>3</sup> Several studies have indeed demonstrated that fiscal devolution does depend on the level of economic development (see, for example, Oates (1985) and Bahl and Nath (1986).

do encourage growth in the public sector. The results offer further support for the use of monopoly government assumptions in public sector modelling.

The most recent empirical investigation of fiscal decentralization and public sector efficiency that we are aware of is that of Adam, Delis and Kammass (2008). They note that efficiency levels in public sector spending are widely dispersed across developed countries. To ascertain why this is the case they use data envelopment analysis techniques to construct two public sector efficiency indexes for 21 OECD countries for the period 1970-2000. With these indices in hand they then use regression analysis techniques to find causality. Using several control variables, such as demographic characteristics, their “main finding is that government efficiency increases with the degree of fiscal decentralization” (page 3).

Fiva (2006) conducts an econometric analysis of a panel data set from 18 OECD countries on the relationship between fiscal decentralization and the size of government.

The main novelty in the paper is that the author uses improved data on tax revenue decentralization and he shows that fiscal decentralization matters for both the size and composition of government spending. Specifically, tax revenue decentralization is associated with a smaller public sector, while expenditure decentralization is associated with a larger public sector. The results indicate that the former effect is driven by a reduction in social security transfers, while the latter effect is driven by increased government consumption.

Shadbegian (1999) uses a state-level panel data set (1979-1992), encompassing all levels of government, to test the applicability of three theories concerning government size: the Wallis and Brennan/Buchanan versions of the decentralization hypothesis and the Brennan/Buchanan collusion hypothesis and to determine which one, or ones, should be used when modelling the public sector in the United States. The results indicate that as fiscal decentralization increases, state and local public expenditures increase and federal government expenditures decrease, as theorized by Wallis, whereas total government spending decreases, as predicted by Brennan and Buchanan. It is also shown that collusion among the different levels of government leads to an increase in overall government spending and an increase in spending at each individual level of government evidence supporting the Brennan/Buchanan collusion hypothesis. Thus, this study shows that collusion among the different levels of government weakens the disciplining power of fiscal federalism. Therefore, fiscal decentralization alone may not act as a binding constraint on Leviathan type governments. Accordingly, it is concluded that each theory contributes to the explanation of public sector size, implying that each should be taken into consideration when modelling the public sector in the United States.

In his survey of the literature of fiscal federalism and the size of government Kirchgaessner (2001) concludes that there is some evidence that fiscal federalism leads "ceteris paribus" to a smaller size of the government and he also notes that there are also political institutions which have an impact on the public budgets, and there are some interactions between the different institutions.

Rodden (2004) revisits the influential “Leviathan” hypothesis, which posits that tax competition limits the growth of government spending in decentralized countries. Rodden uses a panel data set to examine the effect of fiscal decentralization over time and within countries, and to distinguish between decentralization that is funded by inter-governmental transfers and local taxation. Rodden first explores the logic whereby decentralization should restrict government spending if state and local governments have wide-ranging authority to set the tax base and rate, especially on mobile assets. He finds that in countries where this is most clearly the case, decentralization is associated with smaller government. Second, consistent with theoretical arguments drawn from welfare economics and positive political economy, Rodden shows that governments grow faster as they fund a greater portion of public expenditures through intergovernmental transfers.

### **Allocative efficiency and the private sector**

As we noted in Hallwood and MacDonald (2009), a key element of our fiscal autonomy proposal concerns the ability of the Scottish Government to alter economic incentives to the private sector once it has the means so to do. One key area in which this could occur is by lowering corporation tax. Although there is much anecdotal evidence suggesting a link between lower corporation tax and economic growth (take for example the Irish experience) such evidence is often criticized as being country specific and therefore not directly applicable to Scotland. This point has though been addressed in an interesting and influential econometric study by Lee and Gordon (2005) who use a panel data set of 70 countries, over the period 1970 to 1997, and demonstrate that lower rates of corporation tax contribute to faster rates of economic growth. In particular, after

controlling for other growth inducing factors, lowering corporate tax rates by ten-percent can increase the growth rate of real GDP by between one- and two-percent per year. Lee and Gordon (2005) also address the well-known lack of systematic relationship between tax burdens and rates of economic growth. They suggest that high rates of economic growth can lead to higher tax burdens due to the need to build infrastructure, and that this can confound a null hypothesis of an inverse relationship between tax burdens and economic growth rates.

An argument against cutting corporation taxes, at least in the short run, is that with other things equal (i.e. other spending and taxes staying the same) the Scottish Government's fiscal position would worsen relative to the pre tax cut situation. If, say, Scotland ran a fiscal deficit as a result of cutting corporation tax, it could always borrow on capital markets to finance the deficit until the increased tax revenues from the improved economic growth kicked in (in Ireland, for example, there has been an approximate six fold increase in corporation tax revenues as a result of the tax cuts).

An alternative way in which any potential fiscal shortfall could be met would be through a 'headquarters effect'. Clearly the longer term objective of cutting corporation tax would be attract new corporate investment – increasing the capital stock with the latest technology built in - in Scotland thereby increase total factor productivity and improving the underlying growth rate. However, the cut in corporation taxes would also make it attractive to companies to relocate their headquarters to Scotland to take advantage of the lower tax rates.

Recently there is quite a lot of evidence that the low corporation tax regime offered in Switzerland, combined with the highly educated workforce and other factors available there, have led companies to relocate their European headquarters to Switzerland (for example, the European headquarters of Apple relocated from London to Geneva as a direct result of the more advantageous corporation tax regime available in Switzerland). There are two potential sources of revenue from such a relocation. One is the increased corporation tax revenues that the Scottish Government would obtain from any profits that were channeled through the relocated company's headquarters and the other would be any increased income tax revenues associated with the new employment created by the relocation.

A potential third source of tax revenue would arise for companies who face being taxed on their worldwide income (which is the case in the UK and the US). For example a multinational company with its headquarters in the UK will in all likelihood be repatriating profits from foreign countries with relatively low corporation tax regimes and these profits will be taxed again once they are transferred back to the UK. This additional tax creates an incentive for a multinational company to relocate its headquarters to a country which does not tax foreign profits (or taxes at a lower rate) earned in a low corporation tax country again. Voget (2008) considers a sample of 213 multinational companies that relocated their headquarters over the last decade and compares them to a control group of 3395 multinationals that have not done so. He finds that the additional tax due in the home country has a significant effect on the relocation decision. The

empirical results indicate that if this additional tax increased by 10 percentage points, an additional 2 per cent of multinationals would be induced to relocate to an exemption country.

Some added (indirect) insights on the effect of tax burden on growth may be gleaned from the ZEW IBC taxation index, which determines and analyses the effective tax burden of companies and on highly skilled manpower in twenty European countries and the United States of America. The 2005 study clearly shows that international tax competition has reduced the company tax burden across countries (relative to the 2003 study). The Nordic countries are shown to tax capital at relatively low rates, relative to the European average, but tax labour at relatively higher rates. Ireland has adopted a similar policy but with a much lower tax burden on capital. The tax burden on both capital and labour is relatively low in the Eastern European Countries. One interesting aspect of this study is that it shows the tax burdens on capital and labour for each of the Swiss Cantons and these are extremely low compared to other continental countries and comparable to the tax burden in the new accession countries.

## **Conclusions**

The empirical evidence on the fiscal devolution–economic growth link produces a rather mixed outcome: some studies find a positive association – more fiscal decentralisation stimulates economic growth – while others in fact find a negative relationship. However, and as we have made clear, such a mixed outcome is perhaps to be expected given the rather rudimentary statistical and econometric techniques used (i.e. important econometric issues of simultaneous equation and omitted variable biases are not

addressed) and also the relevance of such tests for the Scottish case is likely to be limited given that most focus on the expenditure side of the balance sheet rather than the revenue side which is where our fiscal autonomy proposal bites (see Hallwood and MacDonald, 2009). Until the econometric and measurement issues are appropriately addressed, we are unlikely to be able to pin down the true relationship between fiscal decentralization and economic growth, especially concerning the decentralization of tax powers. In future attempts at sharpening the point estimates of the effect of fiscal devolution on economic growth, Breuss and Eller (2004) have argued that effort should be made to formalise the primary impact of fiscal devolution on the allocative efficiency, equity and macrostabilisation functions of fiscal policy and then the linkages between these three functions and economic growth can be constructed. In order to properly address the issue of bi-directional relationships between fiscal devolution and economic growth, research should be devoted to examining the various channels that interfere with the relationship. Simultaneity issues also need to be addressed by locating variables which exogenously determine fiscal decentralization and economic growth and population may be a candidate here. We believe that once these theoretical and empirical issues have been addressed a clear positive association between fiscal devolution and economic growth will emerge, particularly when the totality of decentralisation – both spending and revenue - is taken into account.

We read the relatively small literature on the effect of fiscal devolution on the size of government as indicating that decentralization of tax revenue is associated with a smaller public sector, while expenditure decentralization is associated with a larger public sector and that any potential efficiency gains of

fiscal devolution on the size of government may be thwarted by collusion amongst different levels of government.

The empirical literature on the effect of tax devolution on private sector incentives, supports the view that a cut in corporation tax can have a positive effect on economic growth and any short run shortfall in government revenues a result of such a tax cut can be offset by government borrowing or by the so-called headquarters effect. We believe this an important and significant result and one which further supports our preferred system of fiscal devolution, namely fiscal autonomy.

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