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Starting from Scratch? A New Approach to Subnational Public Finance

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Abstract

The arrangements for lower-level governments to finance public goods are complex. Combinations of grant mechanisms and local taxes are often regarded as unfair, opaque or ineffective and therefore, tend to lack legitimacy. This paper explores the design of a new fiscal framework for regional public finance, building from principles rather than an *ad hoc* political process. It also considers the possibility that a region may choose to leave the federation or union. To offset this possibility, and within certain bounds, our framework allows subnational jurisdictions to unilaterally decide how much tax autonomy and fiscal responsibility they wish to adopt.

JEL Classification: H71, H72, H77

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Introduction

In most federations, or countries with other forms of multi-level governance, lower-level (subnational) governments only partially finance their expenditures from their own taxes or user fees. The resulting 'vertical fiscal gap' between subnational expenditures and revenues is bridged by central government grants and/or by subnational borrowing. [i] Convincing arguments in favour of such arrangements exist, yet they also come with significant drawbacks. [ii] Because of their complexity and implicit or explicit redistribution, central government grants are often regarded as unfair, opaque or ineffective, and tend to lack legitimacy as a result. Furthermore, existing attempts to promote local accountability through the transfer of tax-raising powers are frequently seen as insufficient.

In the UK, for example, the main element of the financing scheme has been the 'Barnett Formula', introduced in 1978 as a short-term, 'stopgap' measure based on actual spending in England, but continues to determine funding allocations to Scotland, Wales and Northern Ireland. Following the independence referendum of 2014, the Scottish Parliament acquired significantly more tax and welfare powers than the other nations of the UK, so that different versions of the formula now apply to allocate grants to the devolved institutions. [iii] Many other countries operate with similar levels of complexity embedded in their fiscal frameworks, which are often perceived as ineffective or lacking legitimacy.[iv] In Spain, Belgium and Canada, for example, subnational governments have often demanded increased tax autonomy for this reason, triggering far-reaching state reform and even threats to secede. Even in Germany and Italy, the current fiscal framework is increasingly under pressure. It seems that these systems have mainly solved short-term political concerns, but have been less successful in forming stable, long-term solutions to the question of how to distribute fiscal powers and organise equalisation payments. In this paper, we explore a set of equitable, transparent and intuitive guidelines for establishing such a stable framework for subnational finances.

Figure One shows why an outdated framework for subnational finance may be unstable. Using aggregate data from 24 OECD countries, it shows that the revenue streams needed to finance devolved spending are large: on average, subnational governments account for around 35-40% of total public spending. Only around half of these expenditures are covered by their own revenues, so that they are highly dependent on transfers from central government. The form of fiscal framework in each country is therefore fundamental to determining both taxation and the provision of public services at subnational level. Flaws in these frameworks, such as ill-conceived choices regarding the degree and nature of tax autonomy or grant design, can have negative economic and political implications. In their most extreme form, fiscal frameworks that are widely perceived as unfair can be a threat to the continuation of the Union in its current form.

<<Figure One around here>>

To resolve the common difficulties faced by existing fiscal frameworks, we propose an entirely new design, built on transparent principles of efficiency, accountability and equality of opportunity, rather than on some *ad hoc* process dictated by political expediency. Crucially, we also recognise that any fiscal arrangement will give rise to a 'participation constraint', which we define as the cost of participating in the federation (or union) which can vary across subnational jurisdictions. Hence, our arguments have a political economy element that accounts for the willingness of subnational jurisdictions to leave the Union. In short, we consider the possibility that real or perceived unfairness in the distribution of public resources across jurisdictions could undermine confidence in the Union.

Our proposed framework therefore allows subnational jurisdictions to determine how much tax autonomy and fiscal responsibility they wish to adopt, which, as a formalised blueprint for subnational public finance, is entirely novel. [v] Of course, to guarantee the stability of overall national public finances, this kind of subnational discretion has to be limited in some way. There is a trade-off between subnational autonomy and the federation's economic stability. By introducing nationally-defined restrictions on subnational fiscal discretion, our proposals can at most 'soften' the participation constraint, though not eliminate it altogether. This approach is aimed at making the federation more credible to its citizens, as well as more resilient to both internal and external credibility challenges.

Lastly, the principles-based approach outlined here is flexible and can be generalised across federations. In what follows we draw on the UK's setting to exemplify a current case where the fiscal framework is both asymmetric and lacks transparency, and where the possibility that the Union will be dissolved is significant.

Principles

Economists generally agree on which functions of government can be devolved to local government, and which competences to retain at the centre. As a general rule, powers that can be tailored to local demographies, needs or preferences are better organised at the regional or municipal level, *if* no economies of scale are lost as a result, or coordination failures are incurred (Oates, 1999). Discretion over education, welfare, health care, infrastructure, transport, or skills policies is therefore often assigned to subnational governments. Conversely, if such devolution were to lead to significant losses in agglomeration economies or significant coordination failures between local governments, policy levers should be kept in the hands of the highest level of government (Oates, 1999). As a result, areas such as defence, macro-economic stabilisation, most social security, trade and foreign policy tend to remain the prerogative of central governments (Boadway and Shah, 2009).

Unfortunately, there is no similar consensus regarding the collection of revenues to pay for these devolved functions. Finding the optimal division of revenue-raising powers almost always boils down to striking the right balance between a variety of interrelated principles, that vary in importance according to local conditions. We describe the most important principles below.

Efficiency & Accountability

Tax autonomy among subnational governments can lead to harmful tax competition, reducing the welfare gains from locally financed expenditure (Wilson and Wildasin, 2004). If, for example, Northern Ireland were to be given powers to reduce tax on company profits so that it could compete better with the Republic of Ireland, businesses from Great Britain might move to Northern Ireland to take advantage of the lower corporation tax rate. [vi] Revenue reductions resulting from such tax competition could then reduce public service provision below welfare maximizing levels. Moreover, differences in local tax rates will cause a misallocation of production factors across regions, ranging from labour to capital.

To avoid this, central government can simply provide cash transfers to subnational governments instead of granting them tax autonomy. The downside of this approach is that voters are less able to hold local politicians to account because the ties between spending and revenue raising are cut (Boadway and Tremblay, 2012). The transparency of the fiscal framework is undermined in this case, so that voters have less incentive to understand the link between revenue raising and public spending and are less likely to punish underperforming politicians at the polls (Lockwood, 2006). Similarly, poorly-informed voters are more likely to acquiesce to excessive regional borrowing if subnational governments have the power to raise debt on financial markets. This may lead to defaults if subnational governments (wrongly) assume that they will be bailed out by higher levels of government, which is more likely the more they are dependent on grant-based finance. [vii]

Responsibility

There is clearly a trade-off between the efficiency losses of tax competition and the benefits of accountability in relation to tax powers. [viii] However, tax autonomy also brings about fiscal incentives, which rely on the positive feedback loop between 'good' policies and consequent financial rewards (Jin et al., 2005; Weingast, 2009). The crux of the argument is that if a policy measure boosts regional growth, it is likely to affect the tax base of, for example, personal income, business, or property taxes positively as well. A certain degree of devolved tax autonomy incentivises subnational governments to seek to grow their own tax bases. As rent-seeking incumbents will never have enough funds to further their goals or win over potential voters, it will be in their own 'fiscal interest' to invest in such growth-enhancing policies. [ix] A virtuous cycle is thus set in motion, where the right policies increase tax revenues and, in turn, provide the incentive to continue and extend the policies.

Since local growth often also promotes local welfare, politicians are therefore held responsible for their policies through their tax revenues, if an 'uptick' in regional growth can be attributed to their actions. This possibility is particularly important in settings where democratic accountability is weak, and politicians are corrupt and/or inept. Also, the degree to which subnational governments retain the revenues raised in their jurisdictions (the 'retention rate') will be vital here. Importantly, grants from central government can also be made 'responsibility sensitive', linking their implicit retention rate to regional growth or perhaps to other performance-based measures such as (un)employment rates or schooling levels, which are better indicators to capture the efficacy of policies, as will be discussed below.

Horizontal Equity

Crucially, even if local politicians are incentivised to take local welfare into account, the state-wide welfare effects of such a 'responsibility-sensitive' fiscal framework may not be realised. When, for example, education or welfare policies are devolved and partially financed on the basis of (economic) performance as suggested above, poorer regions will have less finance available to keep schooling and welfare programs equivalent to those in the more prosperous regions. The notion of 'horizontal equity', generally understood as the equal treatment of otherwise equal citizens regardless of their location, would be violated. To compensate for such imbalances, an equalisation mechanism is usually put in place to realign inter-regional differences in fiscal capacities (Boadway and Shah, 2007). [x]

However, such equalisation payments reduce the 'retention rate' and therefore erode the fiscal independence and responsibility of local politicians. Equalisation transfers between subnational jurisdictions are often also politically controversial, especially if inter-regional inequalities (e.g. in income per capita) are persistent. [xi] In what follows, we propose funding instruments that uphold fairness in a less contentious way, without excessively eroding local political responsibility and accountability. In doing so, we trace the issue of horizontal equity back to more normative grounds and specifically to the notion of 'equality of opportunity'. We propose to extend the normative argument that individuals should only be held accountable for those circumstances that are within their control, to the case of subnational governments. They should therefore experience the gains (or losses) of only those actions for which they can justifiably be held responsible (Cohen, 1989; Roemer, 1998). Conversely, circumstances and events beyond their control should be compensated by some form of public insurance to maintain 'equality of opportunity'. Our argument is that if local politicians cannot reasonably be held responsible for adverse (or beneficial) local outcomes, then it is justifiable for the central government to offer some compensation. In contrast, no compensation should be paid for outcomes that are a clear consequence of local policy decisions.

Continuity & Predictability

The longevity of inter-governmental fiscal arrangements is contingent on continued participation by central and subnational governments. New arrangements will be required if national or subnational governments fail to adhere to fiscal rules or if external shocks undermine compliance. Several countries address these issues through institutional mechanisms, independent of central government, such as a fiscal council (Braun, et al., 2016). These are usually designed to assess the overall stability of the system, provide a platform for representatives of all parties involved to negotiate on possible reform, fiscal rules, and budgetary projections. If all else fails, subnational governments may quit the federation if their electorate takes the view that autonomy is preferable to compliance with fiscal agreements. Obviously, such a decision would also have monetary implications, but since our framework no longer applies in this case, we focus only on fiscal issues. Given the thresholds we allow central government to impose on the degree of fiscal autonomy regions can select, we can safely assume that the question of monetary policy is only relevant when secession becomes a real possibility.

A new fiscal framework

Combining the principles touched upon above, an 'ideal' framework of regional public finance would implement a positive feedback loop between political performance and (tax) revenues. It would also remain transparent to the electorate, and robust both to competitive pressures between subnational governments, as well as to credibility challenges from all actors.

Tax autonomy

A first option would be to devolve only those tax instruments which are to some measure linked to economic activity and are raised on a relatively inelastic, yet salient, tax base. Decentralised arrangements for income tax and property taxes would be obvious candidates for the UK, in the sense that these automatically funnel the proceeds of growth-enhancing policies back into local revenues, are highly visible, and are raised on less mobile tax bases. Thus, if subnational governments manage to successfully promote local growth, they will reap the rewards through higher tax takes, which can then be used to increase (re)election chances. The increased visibility of policy interventions will also improve electoral outcomes if the policies being pursued are sound. As a result, because higher levels of economic activity can be linked to higher levels of welfare, local politicians are held both accountable and responsible for their actions, to the benefit of their electorate.

Note that tax sharing, where revenues from a specific tax base are shared explicitly between national and subnational governments, apparently provide an alternative mechanism for increasing regional tax autonomy. However, tax sharing can be implemented in many ways and these vary considerably in the extent to which they genuinely extend subnational fiscal autonomy (Blöchliger & King, 2007). For example, the UK government agreed with the Scottish Government to share half of VAT revenue raised in Scotland from 2019. This measure significantly increased Scotland's tax retention rate but has had little effect in extending the Scottish Government's fiscal powers, given that it will not control either the VAT tax base, or the rates at which VAT is applied. Moreover, as it is difficult to link measures of local social and economic performance to local VAT revenues, variations in these revenues have no effect on the incentives faced by local politicians. The 'responsibility feedback loop' as described above, will fail to operate, in this case.

The need for a new grant mechanism

As discussed above, devolving tax powers to lower levels of government will almost always reduce horizontal equity between regions. The more a subnational government has to rely on its own fiscal base, the more inter-regional differences in needs come to the surface due to a variety of factors often beyond the control of politicians. This then trickles down into the quality of local public services, leading to spatially-differentiated treatment of otherwise equal citizens. Equalisation mechanisms to correct for such imbalances are generally designed to equalise both with respect to differences in fiscal capacity as well as regional needs, which does not come without its own set of problems. Because of their focus on equalisation, these systems are often very complex. [xii] Moreover, since these designs use various proxies for fiscal capacity which are potentially affected by regional policies, these are subject to manipulation.[xiii] Equalisation based on fiscal capacity also reduces the retention rate, and therefore weakens the responsibility feedback loop described above. Lastly, a relatively poorer, yet resource-rich region may end up paying into the system to the benefit of richer regions, if natural resources are counted as part of fiscal capacity.[xiv] For all of these reasons, this form of inter-regional redistribution has fomented socio-political unrest in the past, and put the stability of Unions under pressure.

The responsibility effect of tax autonomy tends to be rather blunt as well. The purpose of the responsibility feedback loop is to reward local politicians for policies that increase local welfare. But what are such policies and how do they interact with the evolution of tax revenues? Tax autonomy boosts the economic growth objective for subnational governments: it expands the fiscal base and therefore provides local policy makers with additional tax revenues *if* they can boost regional growth. But growth depends on a plethora of drivers, of which public policy is just one. Also, if growth is based on the attraction of foreign investment in polluting industries, or on developers who run down natural resources, welfare may actually be reduced alongside tax revenues. Timing matters too, since investments in, for example, education, skills and infrastructure have medium- to long-term effects on local growth and prosperity but may be less attractive to current politicians as they do not offer a sufficiently rapid political return via the fiscal base. Although economic growth may seem an obvious objective of responsible policymaking, it is necessary to consider a wider range of criteria to direct local fiscal incentives towards longer term objectives that enhance welfare.

To remedy both shortcomings of full tax autonomy, in that it erodes horizontal equity and is a blunt measure to boost local welfare without losing too many of its advantages, we propose a new grant mechanism. It allows for a more explicitly transparent, flexible and intuitive interpretation of horizontal equity, by focusing *only* on needs-based compensation. In that sense our mechanism should be more robust to internal political pressures than standard equalisation. It also takes into account various responsibility criteria in a way that allows for regional discretion, both with respect to the composition of the criteria as well as their importance. It would, however, always operate alongside a substantial degree of devolved tax autonomy to preserve the transparency benefits of the latter, while offsetting its deficiencies. Subnational governments should therefore be given some discretion over borrowing decisions to smooth region-specific revenue shocks.

Designing a new grant mechanism

In designing a new grant mechanism, we separate outcomes for which local politicians can and should be held responsible from those that are beyond their control. Hence, we propose that subnational fiscal frameworks should *explicitly* comprise both 'responsibility' and 'compensation' elements. This concept draws on the axiomatic formulation of both principles developed by Flearbaey (2008) and is founded on an 'equality of opportunity' ethical framework. Such fiscal frameworks should therefore explicitly and transparently combine compensation *and* responsibility elements in a relatively simple and understandable formula. The compensation element reflects equity considerations by reducing the disadvantages that citizens face due to the circumstances of the area in which they happen to live. It will therefore compensate for differences in regional needs. [xv] The responsibility mechanism links up outcomes in policy areas over which regional governments have discretion with *financial* outcomes in their revenue stream, so that they also face the financial consequences of their choices. To make the adoption of our framework politically feasible, we abstract from the negative side of this coin, so that the performance indicators used will only financially reward local politicians for good policy choices. [xvi] The last, entirely novel element of our proposal is that, within specified limits, subnational governments should have the right to determine the relative importance of the responsibility and compensation elements in their revenues. The limits then relate to the requirement that subnational fiscal autonomy should not undermine the overall economic stability of the Union and will be the result of national deliberation and consensus. We remain agnostic as to how national consensus in this regard will be found exactly, as this will be highly country specific. It could be based on a qualified majority across the federation, or on simple majorities in each region preceded by a citizen's assembly, for example.

The formula

In practice, our approach implies that grants from central to subnational governments will have two components. The first is linked to observable performance-related factors relating to local welfare, such as mean per-capita income, measures of inequality, labour market outcomes or capital formation (tangible and intangible, social and natural): this comprises the *responsibility* element. The second component is determined by needs-based factors comprising demographic, geographic and other indicators: this comprises the *compensation* element. We discuss both the criteria for establishing both elements in more detail below. Both mechanisms are then combined in the same formula (1), which spells out how an annual lump sum ($\boldsymbol{G_t}$) assigned by the central state for spending in all regions, would be allocated to subnational authority *i* in year *t*.

$$\boldsymbol{G_{it}} = \underbrace{(\boldsymbol{\beta_{it}}.\boldsymbol{G_t})}_{\boldsymbol{Compensation}} . \underbrace{\left[\mathbf{1} + \left(\mathbb{I}_{\boldsymbol{E}}.\boldsymbol{\omega_{i\ddot{j}}}.(\boldsymbol{\alpha_{it}} - \overline{\boldsymbol{\alpha}}_{\boldsymbol{t}})\right)\right]}_{\boldsymbol{Responsibility}} \qquad (1)$$

Where $\boldsymbol{\beta_{it}}$ is the needs-based coefficient for region *i* at time *t*

$\mathbb{I}_{\boldsymbol{E}}$ in an indicator function that determines whether or not region *i* will receive a responsibility bonus at time *t*.

$\boldsymbol{\omega_{i\ddot{j}}}$ is a weight that reflects the level of fiscal autonomy that region *i* has opted for in the decision 'epoch', $\ddot{j}$. [xvii]

$\boldsymbol{\alpha_{it}}$ is the selected performance measure for region *i* at time *t* and $\overline{\boldsymbol{\alpha}}_{\boldsymbol{t}}$ is the average performance of *all* regions at time *t*.

To illustrate, suppose the grant mechanism only finances one function, for example, Education. The lump sum G_t in (1) would then cover the total amount deemed sufficient to cover spending on it by all *k* subnational governments in the State at the time of introduction of the new grant scheme. Following its introduction, the lump sum evolves based on pre-defined indices such as inflation π_t and/or average 'performance ($\bar{\alpha}_t$), so that:

$$G_t = G_{t-1}(1 + \bar{\alpha}_t)(1 + \pi_t) \qquad (2)$$

However, this adjustment would only keep the lump sum, G_t, from eroding in real terms but would not allocate it properly between the subnational governments. This is achieved by the compensation mechanism in (1), since one, or more needs-based indicators are used for this allocation. Sticking to our example, G_t could thus be split across regions based on an appropriate and simple measure of need, N_{it}, such as the population of school age, where:

$$\beta_{it} = {N_{it}}\Big/{\sum_{i=1}^{k} N_{it}} \qquad (3)$$

Next, and to reward regional politicians for pursuing their welfare-enhancing policies, the responsibility mechanism introduces performance-based indicators, α_{it}, , which could be numbers of successfully graduated students, for example. These indicators determine the *growth* of the sub-divided lump sum, and thus provide any of the *k* regions with a bonus *if* they perform better than the average for the entire State ($\bar{\alpha}_t$), where:

$$\bar{\alpha}_t = {\sum_{i=1}^{k} \alpha_{it}}\Big/{k} \qquad (4)$$

This allows the Indicator Function to be computed as:

$$\mathbb{I}_E(\alpha_{it} - \bar{\alpha}_t) = \begin{cases} 1, if\ \alpha_{it} > \bar{\alpha}_t \\ 0, \text{otherwise} \end{cases} \qquad (5)$$

- which then sets out the conditions for receiving the bonus. Any region that achieves an above-average performance in the selected measure will receive additional funding from the centre, while all those that fall at, or below the average, will fail to do so.

Crucially, (1) allows each subnational jurisdiction to decide on the potential size of the responsibility bonus, albeit within certain nationally agreed-upon bounds. As specified in (1), the size of the bonus will be defined by the responsibility weight, $\boldsymbol{\omega_{i\ddot{j}}}$ chosen by and agreed with Region *i* for epoch $\ddot{j}$, with *x* setting the upper and lower bounds on regional discretion.

How to measure compensation and responsibility?

Choosing which criteria are relevant to introduce as needs- or performance-based indicators will follow from national consensus obtained through the democratic process. The compensation mechanism would also rely on indicators and measures of need. Once the criteria are elicited, an institutional process would still be needed to identify appropriate indicators, their weighting, and how they might be adjusted over time. There are international exemplars of such institutions, including the Australian Grants Commission (Boadway & Shah, 2007). To ensure trust, this institution or fiscal would have to be transparent and independent from government at all levels. It would also need close links with the central bank in order to ensure that aggregate regional borrowing did not strain the nation’s credibility on international debt markets.

Focussing on the UK in what follows, and based on the functions of government currently devolved to the UK nations, the accessible indicators might include the numbers of older people; dependent children; people claiming income-related benefits, or; from a minority ethnic group, or; living outside ‘large’ communities, for example. All of these are based on population numbers and are highly transparent, and for this reason, applicable to other developed countries seeking to establish stable fiscal frameworks. They will always be expressed as regional population shares in the relevant nationwide population, before being inserted into (1).

Moving on to the responsibility mechanism, the retention of revenues will be based on achievement of particular objectives. For the reasons already set out, responsibility incentives should not be limited to the retention of additional tax revenues. They could also include targets for the outcomes of spending programs such as increases in new firm formation, improvements in life expectancy, reductions in inequality or increases in skills formation. Also, broader objectives such as increased life expectancy or improved productivity might be agreed, without interfering with governmental strategy as to how these should be achieved. The fact that our mechanism allows each government to determine the relative importance of the responsibility bonus as already explained, can be expected to reduce frictions in reaching national, or regional consensus here. We discuss this process at length later.

Bridging tax autonomy and grant finance

In most countries the degree of devolved taxation usually follows from consensus-driven deliberation on a national scale. However, as was the case when determining the responsibility bonus in our grant mechanism, unilateral discretion could also be granted in relation to regional tax autonomy. This implies a transfer of risk which the devolved governments will embrace with varying degrees of enthusiasm. They could opt for a high degree of compensation via the grant mechanism and relatively little fiscal responsibility, or they could opt for full tax autonomy, which implies a complete transfer of fiscal risk. If local borrowing limits are fully relaxed in the process, this would differ from complete independence only insofar as control of monetary policy would still be the responsibility of the central government, and there would be a requirement to pay for those services financed by it that are necessary to support the State. [xviii] To guarantee a minimum amount of compensation via the grant mechanism, and also to safeguard the public finances underpinning the union, nationally-agreed limits to regional fiscal autonomy would be required to stabilise the fiscal framework at the federal level. [xix] The extent to which unilateral discretion is bound by such nationally-agreed thresholds will also serve as a check on inter-regional spillovers.

To illustrate the workings of this choice, suppose the grant scheme proposed always functions alongside a certain amount of regionally devolved tax autonomy. Denoting regional revenues from devolved taxation by $\boldsymbol{T_i}$, we can write overall regional revenues $\boldsymbol{R_i}$ of region *i* at time *t* as

$$\boldsymbol{R_{it}} = \boldsymbol{T_{it}} + \boldsymbol{G_{it}} \tag{6}$$

where $\boldsymbol{T_{it}}$ is the amount to be raised via devolved taxation in region *i* in year *t*, and

$\boldsymbol{G_{it}}$ is the amount to be given to region *i* in year *t* via the grant mechanism.

We introduce a measure $\boldsymbol{X_t}$, that represents the State's total desired spending on all devolved functions in all regions in year *t*. If we follow a compensation-based approach to compute how much of this nationwide budget $\boldsymbol{X_t}$ should be allocated to each region *i*, (6) becomes:

$$\boldsymbol{R_{it}} = \boldsymbol{T_{it}} + \boldsymbol{G_{it}} \equiv \underbrace{\beta_{it}.X_t}_{Compensation} \tag{7}$$

Now that we know the total size of the 'pie' per region, the question is how much of it will be raised via devolved taxation? The extent to which subnational governments are then allowed to decide on tax autonomy is denoted by γ_i in (8) and is bound by nationally-agreed thresholds $[\underline{\boldsymbol{y}}, \overline{\boldsymbol{y}}]$ with $0 < \underline{y} < y_i < \overline{y} < 1$. This unilaterally-chosen percentage $\boldsymbol{\gamma_i}$ is then applied to the regionally allocated nationwide budget $\boldsymbol{R_{it}}$, so that the revenues from tax autonomy in the starting year *t* of the new system in region *i* would be calibrated to equal:

$$\boldsymbol{T_{it}} = \boldsymbol{\gamma_i}.\ \underbrace{(\boldsymbol{\beta_{it}}.\boldsymbol{X_t})}_{Compensation} \equiv \boldsymbol{\tau_{it}}.\boldsymbol{B_{it}} \tag{8}$$

where $\boldsymbol{\tau_{it}}$ is the tax rate to be levied by the region *i* authority on its own tax base in year *t*, and

$\boldsymbol{B_{it}}$ is the value of the tax base in region *i* at time t

- which evolves over a time following the growth rate of the various tax bases devolved for the purpose of tax autonomy. If a counterfactual evolution of the nationwide budget $\boldsymbol{X_t}$ were maintained, for example using the indexation method used in (3), the unilateral choice defined by $\boldsymbol{\gamma_i}$ in (8) can be re-made after the end of the epoch, as was the case regarding the responsibility bonus in (1). Next, the grant scheme would cover the residual of the regionally allocated budget as follows:

$$\boldsymbol{G_{it}} = \left(1 - \boldsymbol{\gamma_{ij}}\right)\ \underbrace{(\boldsymbol{\beta_{it}}.\boldsymbol{G_t})}_{Compensation}\ .\underbrace{\left[1 + \left(\mathbb{I}_{\boldsymbol{E}}.\boldsymbol{\omega_{ij}}.(\boldsymbol{\alpha_{it}} - \overline{\boldsymbol{\alpha}}_{\boldsymbol{t}})\right)\right]}_{Responsibility} \tag{9}$$

- where the conceptualisation of the grant mechanism is exactly the same as in (1).

Bridging tax autonomy and grant finance in this way has two main advantages. First, we use needs-based indicators (such as regional population shares given by (3) to define how much of the national budget $\boldsymbol{X_t}$ to allocate to each region. This links tax autonomy to the compensation-inspired approach set out earlier, independent of the unilateral choice of how much tax autonomy each region takes on. Second, by allowing regions to unilaterally determine how much of this allocated budget they want to raise themselves by means of devolved tax authority, and how much will be financed through grants, the participation constraint will be 'softened' even more. Of course, the main implication of such flexibility will be asymmetric degrees of tax authority between the national and regional levels of government, yet often with regard to the same tax bases. [xx] Some regions may opt for a higher degree of autonomy over, for example, a shared income tax base, others for a relatively lower degree.

Towards a softer participation constraint

A fair combination of responsibility and compensation may seem normatively sound and intuitive but will not necessarily be perceived as such. Preferences regarding horizontal equity may differ across regions for many reasons, and more importantly, susceptible to change. Preference instability of this kind will then influence the process of devolution itself. If, for example, an equalisation mechanism becomes politically unpopular in a region, the fact that it is normatively fair from a nationwide perspective will matter less. As resistance to interregional fairness mounts, calls for more responsibility in the form of (tax) autonomy or even full independence can increasingly be expected. To different degrees this has happened, or is ongoing, in Spain, Italy, Belgium, the UK, Canada, and Germany.

By allowing each subnational government to set the relative weights $\boldsymbol{\omega_{ij}}$ and $\boldsymbol{\gamma_{ij}}$ in (9) of responsibility and tax autonomy directly and unilaterally, our proposed framework is meant to mitigate these issues. Moreover, and from a dynamic point of view, this flexibility of the participation constraint is guaranteed across time, as each subnational government can unilaterally decide to refashion its desired trade-off at pre-defined points, ideally after each 'epoch'. The price of this flexibility will largely be paid by central government, since any shifts in subnational support paid through the grant scheme will ultimately be financed from the national budget, and/or public borrowing. Understanding of the game-theoretical implications of a softer participation constraint is therefore crucial if the framework is to be kept stable. On the one hand, regions performing above the State's average at a consistent rate will be driven to set their responsibility weights at the maximum level as a best response in equilibrium, whilst those below the average would do the opposite. However, as economic fortunes and policies will vary over time, below-average regions would still be tempted to outperform the average in the medium term, after which they would re-adjust their weights. The incentive to do better is therefore present for underperforming regional governments, even when a certain lower bound of compensation is always guaranteed (as is the case in our scheme). Nonetheless, the responsibility and tax autonomy weights will need to be bounded by certain thresholds, framed by a nationally agreed consensus, as described above. Much in the same way as the output indicators for both compensation and responsibility themselves are chosen. Additionally, we also foresee the need to introduce, from the start, a transition mechanism to facilitate political compliance which would compensate for the differences between the old and new systems. Over a sufficiently wide time frame (to be agreed upon), the net budgetary effects of introducing the new grant system for each subnational government would be neutralised. Such a correction could then be phased out gradually as the envisaged transition period draws to an end.

Our system requires local politicians to be more closely identified with outcomes emanating directly from their policies and assumes that they have had time to implement their manifestos and for (some) outcomes to have become apparent to their electorates. Accordingly, it is unreasonable to expect them to be judged on outcomes over which they have no control (such as large-scale unemployment resulting from a Global Economic Depression), these outcomes should only be those pertaining directly to the devolved functions for which they are responsible. Admittedly, there are outcomes (such as unemployment and health) that are affected by global events *and* local policies, in which case, more-tailored measures would need to be adopted. For example, the sub-national authority might be assessed on survival durations of cardiac, stroke and cancer patients, for example, but not on the number of deaths attributable to a Pandemic. However, where a local politician seeks (re)election making specific promises, it is reasonable to hold them to account, using measurements of the associated metrics. Assuming there exists a set of agreed, transparent and otherwise 'fair' metrics to judge and reward their performance, two questions arise:

1. How is the metrics' portfolio to be selected?
2. What opportunities should there be to alter it?

It is straightforward to imagine a number of possibilities, characterised by the differing roles that the national- and sub-national authorities would play in the process, as well as the frequency of opportunities to change the portfolio's composition. At one extreme, it would be the national authority that imposed a standard portfolio on every sub-national authority with no explicit prospect of opportunities to change it. At the other extreme, each region selects the metrics it wishes to and alters them as often as it sees fit. The first process has the advantages of administrative simplicity and being seen as a desire for some form of inter-regional equity. The major disadvantage is that it confounds the incentive for local politicians to take on more responsibility and fails to promote inter-regional equity across the range of functional areas, including those that would be asymmetrically affected by an exogenous 'shock', such as a Pandemic. It may also favour those regions that have existing advantages pertaining to the imposed metrics and disfavours any that are disadvantaged in that way. It may also frustrate local politicians, vying for power from being able to materially differentiate their manifestos from each other's. Any such 'free for all' would increase the responsibility incentives, but would likely result in 'cherry picking', where only the most easily-achievable targets were selected instead of the more difficult but, perhaps, more critical policy ones. Given standard electoral cycles (typically five years), we may end up with the focus being solely on areas in which rapid returns to policy are realised, at the expense of those that require longer-term support.

Between these two extremes lie a number of alternatives: for example, the national government may insist that performance metrics for devolved functions ('A' and 'B') are included in every portfolio along with any three of 'C', 'D', 'E and 'F'. 'A' and 'B' are 'critical' functions that must be prioritised by all the sub-national authorities, where 'A' has the same standard set across all the regions, while 'B' can be set by each sub-national authority according to its needs and preferences. The sub-national authorities adopt their own sets of any three from 'C' to 'F', setting their own standards for each (perhaps with the consent of the central government *and* the other regions). This could result in some gaming of the selections but would at least promote some horizontal equity across the 'critical' functions. It would also allow opposition politicians more scope to differentiate their manifestos, advocating different priorities and/or different performance levels.

Assuming some intermediate point of the spectrum is selected, there is the matter of the process by which each region's portfolio is selected. There are, again, many possibilities, but one might be a 'Responsibility and Compensation Commission' formed of national- and sub-national representatives all mandated to negotiate, agree and bind their respective territories.[xxi] This commission could then also perform the monitoring duties already mentioned and the proposed portfolios being validated by ratification via binding regional referenda. This would also answer the second question above: the portfolios' durations. There is clearly a trade-off between *longevity* (promoting consistency and stability) and *relevance* (promoting rapid responses to unforeseen changes in circumstances, such as a Pandemic). In our illustrative model below, we assume five-year 'Epochs', where each region's needs are computed and set in the run-up to the next Epoch. This is probably too little time to permit a complete consideration of the entire philosophy and *modus operandi* of the system, but there must also be the ability to conduct a fundamental review, perhaps once every 20 years or so, and subjected to an all-Nation referendum.

Illustration

To demonstrate our proposals in action, we construct an imaginary 'state', comprised of three heterogenous regions, 'A', 'B' and 'C'. Region A is rather larger than the other two and has the highest percentage of (relatively) high-value taxpayers. Region C is the smallest, with the smallest share of taxpayers, who also have the lowest per-capita taxable income. The central government has devolved three functions ('1', '2' and '3') to the regions and allocated £10 million in the first period to be divided between them to spend on these functions as each sees fit. Each devolved function has its own needs assessment metric: Function 1 uses the numbers of non-taxpayers in each region *at the dawn of each new epoch*, Function 2 the number of taxpayers, and Function 3 the total population.

Starting with the assumed period one demographics and feasible population and spending/price growth indices, the State- and regional tax rates, expenditure shares, and demographics (including inter-regional migration) are modelled. [xxii] Having established the Base Case, where no region opts for any tax autonomy, we separately compute the effects on the key measures where:

1. Only the largest, most prosperous region (A), opting for varying degrees of tax autonomy, then
2. Where only the smallest, least-prosperous region (C) opts for tax autonomy.

Firstly, Region A: Figure Two models the State's and Region A's average tax rates for the cases of No autonomy, 50% autonomy, 75% autonomy and Full autonomy, for the entire 40 years. Given the spending and population inflators and inter-regional migrations, the State's population increases by 8% over the 40 years (though Region A's declines by 10%), the number of taxpayers increases by 13% (A = +9.5%) and the tax base increases by 255% in value, while spending on all devolved functions increases only by 197%. It is inevitable, therefore, that tax rates tend to fall over time, but are not an inevitable outcome from regional tax autonomy.

<<Figure Two around here>>

What is immediately noticeable from Figure Two is when Region A opts for any tax autonomy, it lowers its average tax rate, causing the State's to increase. It can also be seen that the greater the degree of autonomy, the greater the gap between A's and the State's average tax rates. This is shown in Figure Three which shows an index of the State's and region's tax rates (100 = No autonomy).

<<Figure Three around here>>

Also noticeable in Figure Two is the non-linearity in the increase of the State's tax rate as Region A opts for increasing tax autonomy, particularly the acceleration between 75% and 100%. Its tax rate will be 3-5% lower with full autonomy than would have been the case with none, while it would only be 1% lower with 50% autonomy. The State is losing high-value taxpayers at a faster rate than it is losing tax target, given that it is its largest and most affluent region that is progressively withdrawing its tax base. This is illustrated in Figure Four, that shows the percentage reductions in the State's tax base as Region A opts for one more percentage point of autonomy. While both decline as the degree of autonomy increases, the tax base declines more quickly from the outset and at a progressively faster rate than the tax target. This can be seen also in the measure of 'tax elasticity', ε_t, where:

$$\boldsymbol{\varepsilon_t} = {}^{\%\Delta \boldsymbol{Tax\ Base}}\!/_{\%\Delta \boldsymbol{Tax\ Target}}$$

$\boldsymbol{\varepsilon_t} = 1$ indicates that the tax base is changing in line with the tax target (i.e. the burden on the taxpayers remains the same); $\boldsymbol{\varepsilon_t} < 1$ indicates that tax base is changing more slowly than the tax target (the burden is lessening), and; $\boldsymbol{\varepsilon_t} > 1$ indicates that tax base is changing more quickly than the tax target (the burden is increasing). Here, the elasticity ranges between 1.3 and 1.9 indicating that the rate of increase in the tax burden on Region B's and C's taxpayers is, itself, increasing at the degree of autonomy approaches 100%.

<<Figure Four around here>>

We now investigate differences in response when a small and poor region opts for tax autonomy. In this second scenario, Region C opts for some autonomy, while Regions A and B do not. Figure Five plots the State's and Region C's average tax rates over the 40 periods. Again, the downward drift (by construction) of the tax rates can be seen, as can the increasing gap between the State- and Regional tax rates as the degree of autonomy increases.

As Region C opts for autonomy, its taxpayers will face a higher tax rate, increasing in the degree of autonomy, while the average tax rates in the other two regions decline. There will therefore be some migration response from the relatively scarce taxpayers in C moving to the rest of the State, repelled by its relatively high tax rate: this will further weaken C's tax base and strengthen those of A and B.

<<Figure Five around here>>

As well as the contrasting relationship between tax rates and degree of autonomy, there is also a difference in the relative impact on tax rates in the regions and the State, depending on which region opts for autonomy. If Region A selects full autonomy, its average tax rate falls by around 1%, while rates *rise* in the rest of the State by around 3%. Region C's tax rate rises by around 6% if it opts for full autonomy, while rates *fall* in the rest of the State's taxpayers by less than 1%. Region C has both a much smaller and less-affluent tax base than A and would suffer proportionately more from any outward migration of its taxpayers, making it harder for those taxpayers left to fund the ever-increasing local tax target.

Figure Six charts the decline in the State's tax base and target, along with the elasticities as Region C increases its degree of tax autonomy. The base declines more slowly than the target across the range ($\varepsilon_t < 1$) with the elasticity falling as the degree of autonomy approaches 100%, resulting in the reduction in the State's average tax rate (Figure Five).

<<Figure Six around here>>

Figure Seven illustrates the ratio of the region-to-state tax rate indices over the simulation period. In period one, with full autonomy Region A's tax rate would be 77% of the rate with no autonomy, while C's rate would need to almost double. This implies a ratio of 2.54 between the rates in the two regions. It shrinks to only 1.25 with 25% autonomy.

<<Figure Seven around here>>

The above analysis demonstrates that relatively affluent regions, that may also have the largest number of taxpayers in their territory, have an incentive to push for the highest possible degree of tax autonomy. This would increase the local government's popularity with the taxpaying section of its electorate and would also strengthen its tax base by attracting taxpayers from other regions. If this could also be allied to higher levels of per-capita public spending, this would also endear these politicians to non-taxpayers, while also attracting non-taxpayers from other regions. It is a matter for the State, and the other, less-fortunate regions to consider whether this is acceptable. Smaller, less affluent, regions, would be less inclined to opt for tax autonomy, as this would make them unpopular with its tax-paying electorate and would lead to some outward migration and, perhaps, losing power in the next election. There may be some scope for the poorer region to opt for more autonomy and to mitigate the effect of higher tax rates by using the Responsibility Bonus, though this would be a risky strategy since the benefits of the responsibility bonus cannot be guaranteed.

This simulation illustrates our proposed Framework in operation. While it makes many assumptions that will be relaxed in subsequent developments, it encapsulates the basic intentions and functioning of the Framework in a mythical, though typical State, with asymmetries in the size and affluence of its constituent regions. The main point illustrated is that, in terms of tax rates alone, regions that are more affluent than the State's average have much greater incentives to pursue autonomy than its poorest regions, while the latter have an incentive to retain the affluent region within the State. Conversely, affluent regions may have an incentive to encourage the poorer regions to opt for autonomy, or even to secede, though there are many other considerations beyond the tax rate, alone. Although we do not directly incorporate it here, the Responsibility Component would have to be applied judiciously in the poorer regions, to the extent that it would never be worse off from any degree of autonomy.

It is also clear that the effect on average tax rates as the degree of tax autonomy increases is not linear and that this may help to set an upper limit to the amount allowed. Also key, is the absolute size of the populations of taxpayers and non-taxpayers in a region: the smaller the numbers, the more responsive the tax rate to changes in, for example, the degree of autonomy.

Concluding remarks and the Covid-19 Pandemic

We suggest that the complexity, lack of transparency and independence of existing arrangements for distributing funds to subnational governments undermine both their sustainability and effectiveness. We propose that a new mechanism, which makes explicit the 'compensation' and 'responsibility' elements of their funding, should be established. This mechanism would permit subnational governments to determine the extent of responsibility and autonomy (and the level of risk) that they wished to take on, relative to a guaranteed amount of compensation for regional needs.

Applied to the UK setting, this would mean the devolved government in Scotland, Wales and Northern Ireland would potentially gain or lose relative to the English regions in the long run, depending on their decisions. As a result, our framework would necessarily involve the establishment of processes to identify relative need across different parts of the UK, and to establish a transition mechanism to adjust towards the implied distribution of funding support. It would also be necessary to monitor spill-over effects from idiosyncratic fiscal decisions. This would ideally require an institutional base: our proposal is to establish a

Responsibility and Compensation Commission (RCC). It could be expected to be scrutinised by each Parliament.

At the time of writing, the COVID-19 Pandemic is impacting significantly on the UK economy and its public finances. While the number of deaths attributed to the Virus is currently small in percentage terms [xxiii], it is disproportionately affecting sub-groups within the population, particularly those over 75 residing in Care Homes, BAME citizens, and those in the lower-income groups. While there have already been significant mitigations, including Lockdowns and a 'Furlough Scheme', the long-term impact on employment, output and, therefore, public finances are likely to be significant and adverse. Thus, the ability of both the national- and sub-national administrations to raise the revenues needed to finance even their pre-Pandemic spending plans will be impaired.

As the demographies of the UK's regions differ widely, we can anticipate asymmetric effects from the Pandemic had our system already been in force. On the one hand, each region's *needs* would be affected differently: for instance, a region that had a greater proportion of its population in one or more of the vulnerable categories would likely experience a sharper fall in that population. Where that category also contributes to the State's and Region's tax bases, the latter's tax revenue will fall more sharply than the others. Where it does not, then the effect would be felt on some of the region's needs' metrics, as will its performance in relevant functional metrics, particularly those relating to health and social housing. The effect would be to *reduce* that region's β, perforce increasing the others', meaning less budget available to it for spending on its devolved functions (*cet.par.*). At the same time, it would also find that its performance in respect to the relevant metrics counterfactually affected. Whether this is to the benefit of the region depends upon how the metric is constructed. If, for example, a lower than average death rate was to be rewarded, then the badly-affected region would have a reduced prospect of receiving a responsibility bonus. However, were the metric to be computed on surgical waiting times, it would benefit, as the demand for such services was reduced. [xxiv] The region may also be able to seek responsibility bonuses elsewhere, for instance via funds planned for Health towards Education. The less alike the regions are with respect to the key demographics (such as age, ethnicity, socio-economics status), the greater the asymmetries in the impact of COVID-19 Pandemic on the regions would be.

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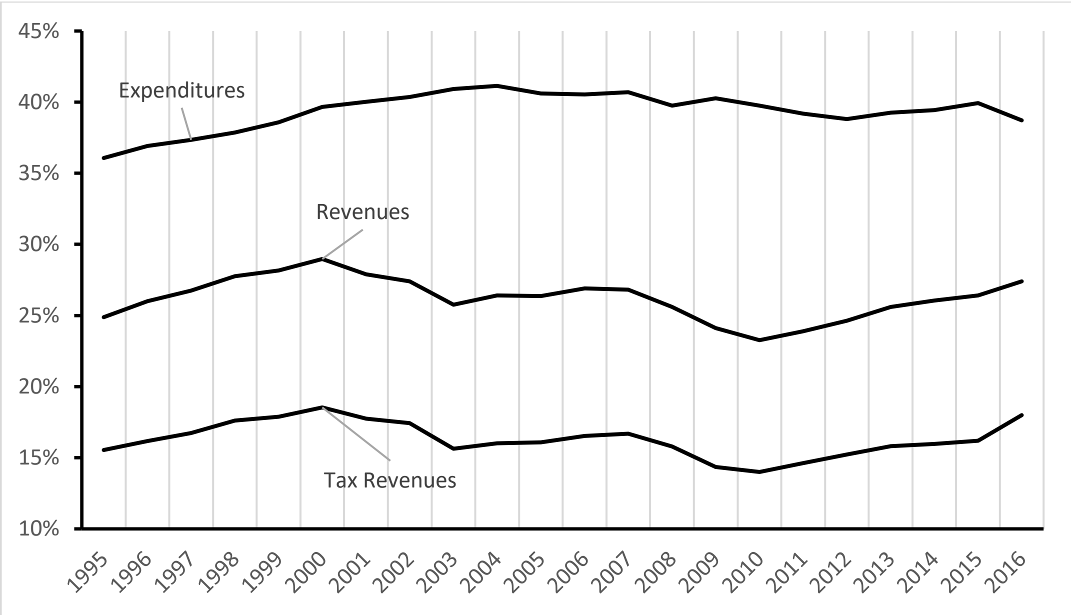
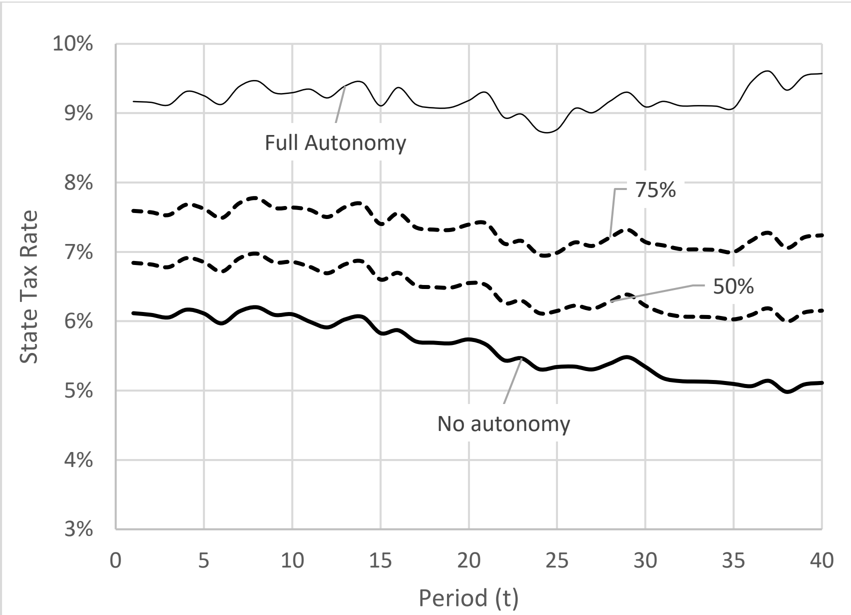
Figure One: Regional expenditures and (tax) revenues in % of total public spending

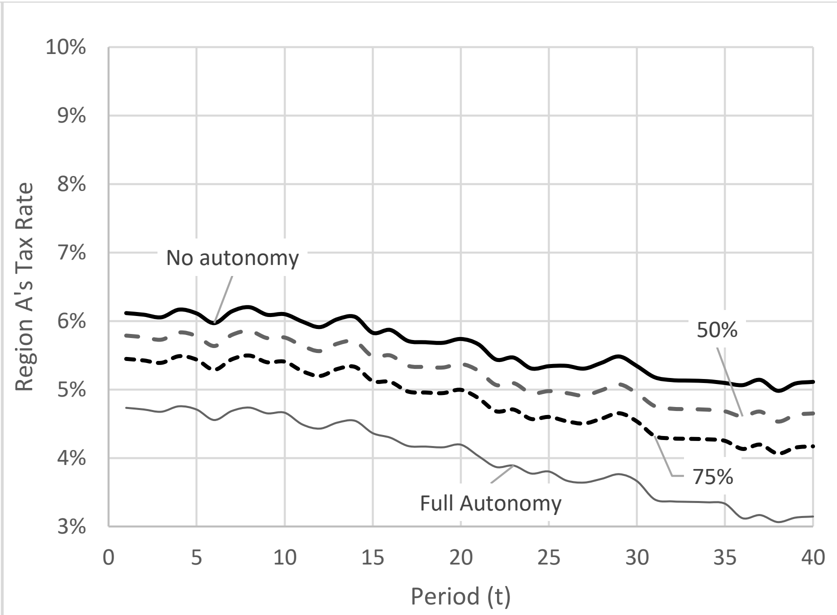


Source: own calculations, based on the OECD fiscal decentralisation database.

Figure Two Region A Tax autonomy: State's and Region A's average tax rates



State



Region

Figure Three Indices of the State's and Region A's Tax Rates

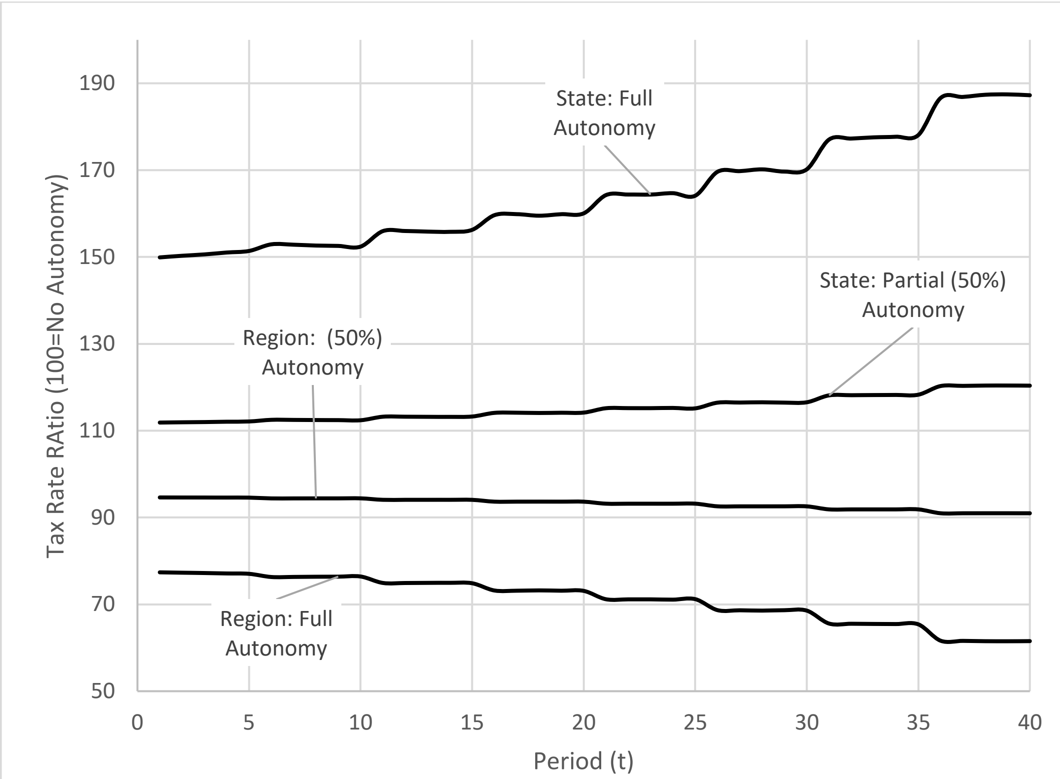


Figure Four Percentage changes in State's Tax Base and Target and elasticities (Region A Autonomy)

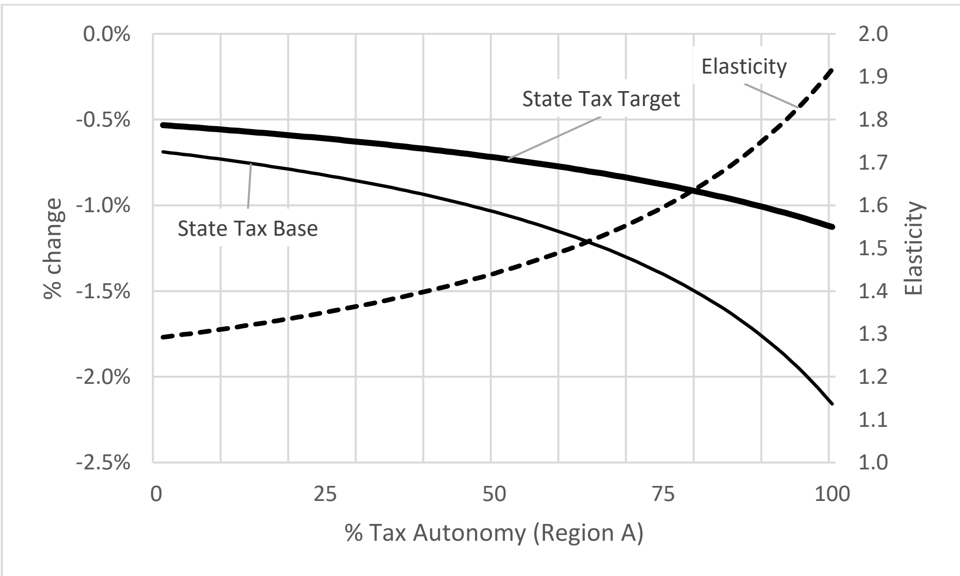
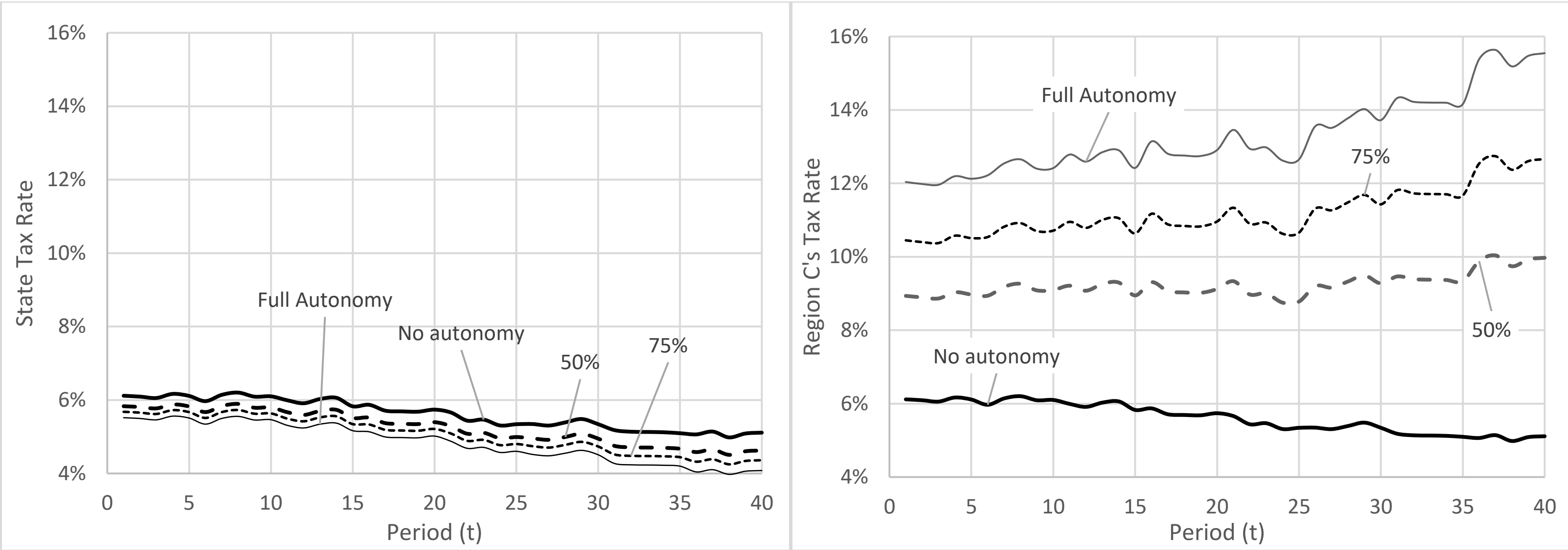


Figure Five Region C Tax autonomy: State's and Region C's average tax rates



State

Region

Figure Six Percentage changes in State's Tax Base and Target and elasticities (Region C Autonomy)

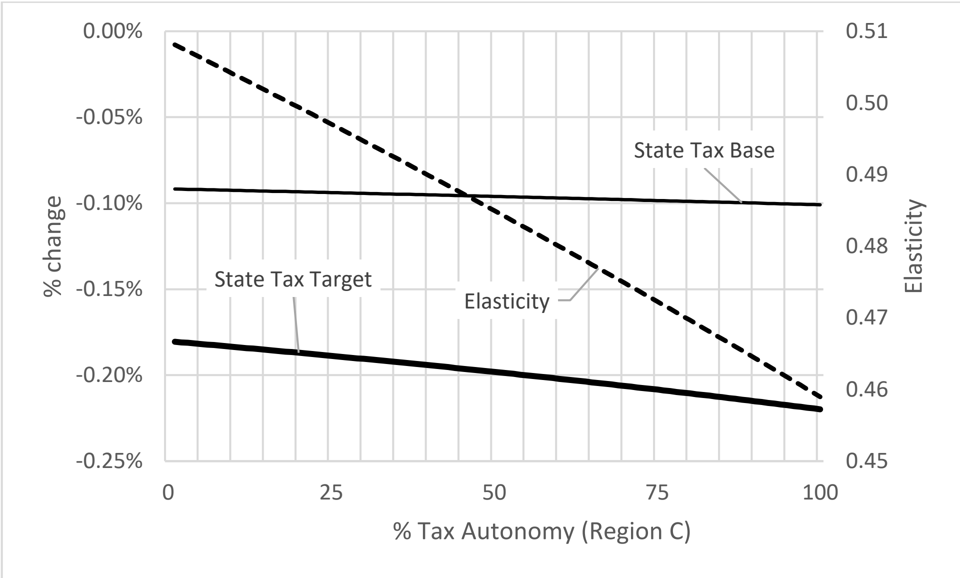
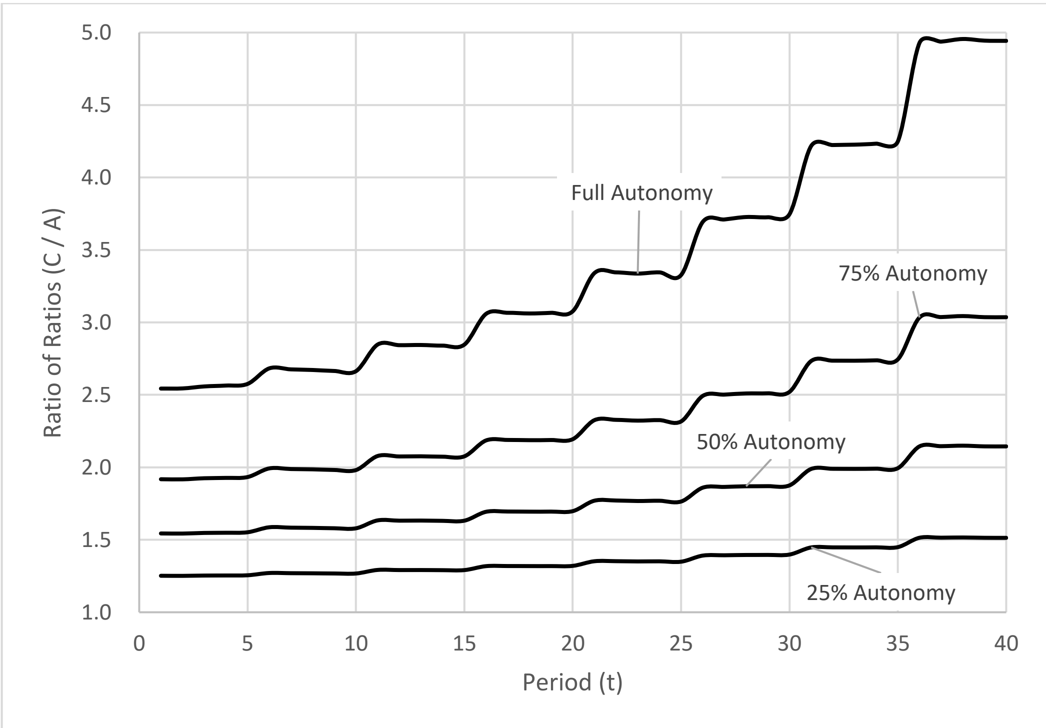


Figure Seven Ratios of Region C's to Region A's Tax Rates Indices



[i] We use the term subnational to reference the regional/state tier of government in this paper. Our proposals would also apply to the municipal level, however, even within a technically unitary country.

[ii] See, for example, Boadway and Shah (2009) for a detailed overview of the literature on fiscal federalism.

[iii] Within England itself, devolution of fiscal powers has been less extensive and is limited to some property taxes and user charges. London has the widest range of powers: for other city-regions limited changes have been linked to customised "city-deals".

[iv] See Boadway and Shah (2007) for an extensive overview of existing fiscal frameworks, and a thorough analysis of their shortcomings.

[v] There are earlier, ad hoc, examples of such an asymmetric approach. For example, in Canada, where opt-out arrangements allowed Québec to replace transfers by its own Personal Income Tax, which it then could shape to its own preferences which are more progressive and more pro-family.

[vi] This strategic behaviour will not materialise in regions with strong local agglomeration features, however, where the exact opposite can happen as local taxes are increased at the expense of weaker regions (Baldwin and Krugman, 2004). See also Collier and Venables (2018) for a recent illustration of such a 'race to the top', focusing on land taxation at city level.

[vii] Aside from a more detailed description of both theoretical arguments regarding regional borrowing, an empirical validation is given by Rodden et al. (2003). Note that some degree of regional borrowing discretion should be guaranteed in any case when taxation is devolved, to smooth regional-specific shocks to the fiscal base.

[viii] Other arguments, which rely more on the benefits from scaling up and harmonising tax bases, support the case for centralised taxation (Oates, 2005).

[ix] These rents can be thought of as public revenues siphoned off for private, socially unproductive purposes such as personal consumption, campaign finance, or rewarding cronies, but also as political ‘slacking’ (Alesina and Tabellini, 2008). Politicians then earn ‘ego rents’ from holding office, but also incur a ‘cost’ of having to provide an amount of public goods to attain their position.

[x] Equalisation mechanisms also provide insurance against region-specific, cyclical shocks, see e.g. Andersson (2008) or Arachi et al. (2010).

[xi] Sas (2017) lastly, shows that standard equalisation schemes also fail to fully mitigate harmful tax competition in realistic settings where taxes are raised on an *ad valorem* basis.

[xii] The Australian system for example, calculates revenue disabilities for 18 tax bases and expenditure disabilities for 41 programs. Whereas the first stage of the German system is fairly clear (using land tax, income tax and corporate tax to calculate fiscal capacity), its second stage formula is very complex, and mixes demographics with fiscal capacity (Boadway and Shah, 2007).

[xiii] Although representative systems in Canada, Australia or Switzerland avoid a direct link between the fiscal capacities of the region in question and its equalisation payments, an indirect link always remains (affecting the tax base or average tax rate used in the formula). In many other countries (e.g. Germany, Spain, Belgium) actual fiscal capacities are used (Boadway and Shah, 2007).

[xiv] This has re-emerged as a drawback of the Canadian system, with oil-rich states such as Alberta increasingly critical of the equalisation in place (Boadway and Shah, 2007).

[xv] By linking equality of opportunity directly to compensation for differences in needs, our mechanism takes a narrower view on equalisation than most systems, which usually include fiscal capacity as well. We argue that what we lose in absolute equalisation of net fiscal benefits, we gain in terms of clarity and hence, political applicability. When voters can clearly link needs with grants, they will more likely support the scheme, as these lie clearly beyond the control of regional governments. Compensating for differences in fiscal capacity is less intuitive, certainly more complex, and less likely beyond the control of regional governments. Regions may also try to strategically influence their fiscal stance to 'game' the system.

[xvi] What would conceptually go against the notion of responsibility here, is that the basket of performance criteria is to a certain extent skewed towards what the nation as a whole, or the region by itself, agrees on as good indicators of 'favourable' decision-making, and its quality. In this sense one could argue that certain decisions are left without consequence, but then this would also be the case with tax autonomy, and even more so when grants would solely be allocated on a needs-basis.

[xvii] We call this decision period an 'epoch' and will probably be a period of several years in which time the regions are not able to select a new level of fiscal autonomy, for example. As the epoch comes to an end, the State would invite the regions to select, and commit to a (new) weight.

[xviii] As is currently the case for Navarra and the Basque country under the Spanish fiscal framework arrangements.

xix Similarly, the feedback loop from fiscal to monetary policy through bond yields and interest rates would likely require agreement on deficits and debt between the different levels of government.

[xx] Formulas of tax sharing between the central and lower levels of government could be based on the "split rate" approach, where e.g. two entirely different tax schedules would be applied on the same, shared labour income tax base. Alternatively, a regional surcharge – or "piggy-back"– tax rate could be levied on central tax revenues, which are then lowered for the purpose. In generic form, both can be modelled as a reduction of the central tax base.

[xxi] The UK currently has its 'Office for Budgetary Responsibility (OBR)', established in 2010 and charged with advising on the fiscal implications of the UK Treasury's proposed policies. While it does some forecasting of Scottish- and Welsh tax receipts, its focus is on the UK, with its key people appointed by the Chancellor of the Exchequer. In that sense, it is not currently constituted as a representative body, acting as a liaison for key players in the devolved administrations and English Regions. There would, therefore, need to be a new 'Council' taking on some of the OBR's duties and responsibilities, representing the whole country.

[xxii] For brevity, the detailed derivations of each region's betas, inter-regional migration flows and responsibility bonuses are not shown, but are available from the authors, on request.

[xxiii] Officially, 0.06% of the UK population as at 26th September, 2020 (European Centre for Disease Control (https://www.ecdc.europa.eu), accessed 27th September 2020).

[xxiv] Though, if the principle that local politicians should only be held accountable for policies and events within their control is accepted, it would be necessary to judiciously recalculate the metrics to remove these exogeneous components.