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Analysing the options for Scotland's block grant adjustments

An independent report

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Foreword

This report, appraising the extent to which different methods for indexing the block grant adjustments (BGAs) associated with devolved tax revenues and social security spending, satisfies the requirement for an independent report as set out in the 2016 Fiscal Framework Agreement between the UK and Scottish governments. The report was commissioned jointly by the two governments, who determined the remit and scope of the report, following discussion with us. Both governments were able to provide comments on previous drafts of this report, but we can confirm they did not interfere with or unduly influence our analysis or conclusions.

We would like to thank those who have helped us undertake the work required to produce this report. This includes; HM Treasury and Scottish Government officials who helped us publish our call for evidence and process responses; those organisations and individuals who responded to our call for evidence; and Strathclyde University administrative staff, who handled contracting arrangements. All opinions and any errors or omissions in the following report are the responsibility of the authors alone.

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Executive summary

The devolution of tax and social security responsibilities has required adjustments to be made to the Scottish Government's block grant. The Smith Commission's Agreement, which recommended the tax and social security powers to be devolved, also identified a number of principles it believed should guide the operation of the Scottish Government's fiscal framework following tax and spending devolution, including these block grant adjustments (BGAs).

This report evaluates the current and alternative methods for calculating BGAs. It assesses the extent to which different methods for calculating BGAs are consistent with the Smith Commission's principles. It also considers the balance of fiscal risks and incentives faced by the Scottish Government under the different BGA approaches, and whether these differ from the balance of fiscal risks and incentives under the Barnett formula, which continues to be used to calculate the underlying Scottish block grant.

Main conclusions

1 The BGAs must be indexed to the change in equivalent revenues or spending in the rest of the UK (rUK) if the principles identified by the Smith Commission are to be met in broad terms. Indexing the BGAs to some other variable will result in outcomes that are inconsistent with the Smith Commission's principles. The key questions then are how to measure the change in equivalent rUK revenues/spending, and what adjustments to make, if any, to account for differences in fiscal and/or demographic structures and trends between Scotland and rUK.

2 No single BGA method can simultaneously achieve all of the Smith Commission's principles in full, especially when the 'no detriment' principle is interpreted dynamically, as some of the principles are mutually incompatible with each other.

3 The fundamental tension is between the taxpayer fairness principle on the one hand, and the no detriment principle on the other. Achieving the taxpayer fairness principle requires that BGAs are indexed using the 'Barnett Formula' (or 'Levels Deduction') approach, which changes the

Scottish Government's BGAs in line with a population share of the change in equivalent rUK revenues or spending. But this approach takes no account of Scotland's generally lower revenues per capita, or higher spending per capita, compared to rUK. As a result, its application would tend to cause detriment to the Scottish budget over time, in a way that would not be compatible with the 'no detriment' principle in a dynamic context in the years following devolution. The Smith Commission's reference to 'appropriate indexation' when defining the 'no detriment' principle suggests they saw this principle dynamically.

4 The two BGA methods for tax cited in the existing Fiscal Framework achieve the different Smith Commission principles to varying extents. While neither fully satisfy the 'taxpayer fairness' principle, the CM method is closer to satisfying it, as it treats population growth in the same way as the Barnett formula.

5 In contrast, the IPC method arguably better satisfies the 'no detriment' principle in the years following devolution as it adjusts for the fact that relative population growth – which the Scottish Government may have little control over – is an important determinant of aggregate tax revenue growth.

6 Both the CM and IPC methods broadly achieve the economic responsibility principle, although the CM method achieves it more comprehensively. This is because, unlike IPC, the CM approach does not insulate the Scottish budget from the effects that its policies might have on revenues via increases or decreases in population.

7 The IPC method is arguably more consistent with the principle that the UK government should bear the risk of shocks affecting the whole of the UK. This is because a common shock across the UK as a whole is more likely to have a common effect on revenues or spending per capita, rather than aggregate revenues or spending.

8 The existing Fiscal Framework for social security cites two approaches for indexing the social security BGAs: IPC and the Barnett Formula. The Barnett Formula approach is not consistent with the 'no detriment' principle in its dynamic sense (post devolution), since it takes no account of differences in initial spending per capita, or in relative population growth. The taxpayer fairness principle does not apply directly to social security, but only a Barnett Formula approach –

adopted for both tax and spending BGAs – will be fully consistent with the taxpayer fairness principle.

9 Similar to the conclusion on tax, when it comes to social security, IPC slightly better achieves the economic shock principle, whilst the Barnett Formula slightly better achieves the economic responsibility principle

10 A number of alternative BGA mechanisms for tax have been proposed. These take into account the implications for revenue and spending growth of factors such as: differences in the structure of the Scottish and rUK tax bases at the point of devolution; and differences in the rate of change of population age structure between Scotland and rUK post-devolution. These approaches generally come closer to achieving the 'no detriment' principle in the period after devolution, since they control for factors which are known about with reasonable certainty before devolution happens, and which the Scottish Government has relatively little influence over. However, such approaches would generally violate the 'taxpayer fairness' principle to a greater extent than existing approaches, since they would imply even larger effects on the Scottish budget of tax changes in rUK for taxes which are devolved in Scotland.

11 There may be a case in principle to incorporate some element of fiscal insurance explicitly into the BGA process. But it is very difficult to design a fiscal insurance mechanism that would work satisfactorily in practice once tax policy divergence exists, in particular risking violating the Smith Commission's 'economic responsibility' principle.

12 The extent to which some approaches are preferred over others may ultimately depend on one's views of the type of fiscal union that exists between Scotland and rUK in respect of taxes and social security benefits that are devolved. In particular, the extent to which the continuation of some revenue pooling and sharing of 'devolved' taxes is appropriate after devolution, and the extent to which the implications of divergent economic growth in Scotland should be borne in full by the Scottish budget.

13 Given that no single BGA method can achieve all Smith Commission principles simultaneously, the process of selecting a specific BGA to use in the Scottish Fiscal Framework will inevitably require some compromise. Both governments should aim to set out transparently the rationale for whatever compromise solution is ultimately agreed, and the

implications of that for the way in which various fiscal costs and risks are shared.

1. Introduction

The devolution of taxes and social security spending to the Scottish Government over the last six years has required adjustments to the block grant funding that it receives from the UK government. The devolution of the revenue associated with a tax, such as income tax, has been accompanied by reductions to the block grant to account for the tax revenue now flowing to the Scottish rather than the UK government. The devolution of social security spending has been accompanied by increases to the block grant to reflect the transfer of spending responsibilities from the UK to the Scottish Government.

The calculation of these block grant adjustments (BGA) has been guided by a set of principles agreed by the Smith Commission in 2014. An initial agreement on the precise methods of calculation to use for the first five years of devolution was agreed in early 2016, following intense negotiations between the Scottish and UK governments on how best to operationalise the Smith Commission's principles. The agreement reached in 2016 committed the governments to reviewing the operation of the BGAs and the wider fiscal framework, informed by an independent report analysing both the current and alternative approaches to calculating the BGAs. This is that independent report.

Our report has been informed by desk-based research, simple scenario modelling and a call for evidence to which 14 people and organisations responded. The remit for the report and consultation questions included in our call for evidence were agreed with the Scottish and UK governments. However, our analysis and conclusions are our own.

This report discusses the characteristics and potential impacts of different methods for calculating the BGAs, and in particular assesses their concordance with the Smith Commission's principles. In doing so we reach a relatively strong conclusion about the feasibility of fully satisfying these principles. However, in line with our remit, we do not make any recommendations for or against any particular option.

The rest of the report proceeds as follows. Section 2 provides an overview of why block grant adjustments are required, and the Smith Commission principles that guided the design of the block grant adjustment calculations in Scotland. Section 3 describes and analyses the current approach to calculating the block grant

adjustments. Section 4 analyses alternative approaches to calculating the block grant adjustments. Section 5 concludes. There are three appendices: Appendix A replicates our consultation document and questions; and Appendix B lists the people and organisations that responded to our call for evidence; and Appendix C provides formulaic proofs of some of our findings in relation to cyclicality of revenues and spending.

2. Block grant adjustments and the Smith Commission

This section of our report provides key background information. It first explains the block grant, the devolution of tax and social security powers, and the resulting need for block grant adjustments. It then sets out the principles agreed by the Smith Commission in 2014 to inform the design of the block grant adjustments. Subsequent sections assess the existing approaches to calculating block grant adjustments and potential alternative approaches against these principles.

2.1 The block grant, fiscal devolution and block grant adjustments

Historically the vast majority of the Scottish Government's funding took the form of a block grant from the UK government. This was paid for using UK-wide taxation, and paid for nearly all spending on devolved public services, such as health, education, justice and transport.

Each year, the change in the block grant was determined using the Barnett Formula. Under this formula, the change in the Scottish block grant is equal to Scotland's population share of the change in funding allocated by the HM Treasury to comparable spending programmes, such as health, education, justice and transport in England (or England and Wales). For example, if spending allocated to health in England increases by £1,000m, the Scottish Government would receive an additional £97m since Scotland's population is 9.7% of that in England.

The Scotland Act 2016 gave the Scottish Government new tax and social security powers. These enabled it to keep most of the proceeds of income tax raised from Scottish taxpayers, and gave it the responsibility to design and pay for most disability-related benefits, to provide two key examples. The aim of devolving these new powers was to 'better deliver prosperity, a healthy economy, jobs and

social justice', and to 'strengthen the financial responsibility of the Scottish Parliament'.[1]

Table 2.1. sets out the full set of taxes and social security benefits which were devolved to Scotland under the Scotland Act. The table shows tax revenues and spending levels for each tax and benefit devolved, in 2020/21, the most recent year for which outturn data is available for all taxes and social security benefits. For the three taxes that are intended to be devolved but which have not been implemented, the figures in the Table represent the latest estimates of revenues raised in Scotland.

Table 2.1. Taxes and social security benefits newly devolved to the Scottish Government

Tax	Date devolved	Amount of revenues or spending devolved (£m, 2020/21)	Territorial Extent (comparison geography) for BGA purposes, 2020-21
Stamp Duty Land Tax	2015/16	£517	England and Northern Ireland
Landfill Tax	2015/16	£107	England and Northern Ireland
Income Tax	2016/17 and 2017/18	£11,948	England and Northern Ireland
Air Passenger Duty	Royal Assent 2017, deferred	£26	
Value Added Tax (partial assignment)	Royal Assent 2017, deferred	£4,695	
Aggregates Levy	Royal Assent 2017, delayed	£57	
Social security benefits[2]			
Attendance Allowance	2020/21	£528	England and Wales
Carer's Allowance	2018/19	£296	England and Wales

[1] See The Smith Commission has reported - What's next?
[2] See: Scottish Fiscal Commission - Explainers - Social Security.

Industrial Injuries Supplement	2020/21	£83	England and Wales
Disability Living Allowance	2020/21	£736	England and Wales
Severe Disablement Allowance	2020/21	£7	England and Wales
Personal Independence Payment	2020/21	£1,626	England and Wales
Cold Weather Payment	2022/23	£23	England and Wales
Funeral Payment	2019/20	£11	England and Wales
Sure Start Maternity Grant	2019/20	£18*	England and Wales
Winter Fuel Payment	2024–25	£171	England and Wales
Discretionary Housing Payments	2017/18	£81	England and Wales

Sources: For the three taxes devolved to-date, figures are outturn for 2020/21. For the three taxes that are expected to be devolved, figures are latest estimates of the Scottish share for 2020/21. For the social security benefits devolved to-date, figures are outturn from 2020/21. For other benefits, figures are latest estimates.

Notes: Ten percentage points of each band of income tax on non-savings, non-dividends income was devolved in 2016/17, with all revenue from NSND income devolved in 2017/18. The dates reported for social security benefits are when responsibility for funding the benefits was transferred. In the case of child and adult disability payments, the new Scottish benefits did not begin to be rolled out until 2021/22 and 2022/23, respectively. Sure Start Maternity Grant has been replaced by Best Start grants, which also provide additional payments as children get older. Note that the choice of year as 2020/21 results in revenues for some taxes being somewhat smaller than would typically be expected. This is particularly the case for Air Passenger Duty, revenues for which might have been around ten times higher in the absence of the pandemic.

The devolution of these additional revenue streams and spending responsibilities necessitated adjustments to the Scottish Government's block grant funding. In particular, the devolution of a revenue stream, such as income tax, requires a reduction to the block grant to reflect the transfer of a revenue stream from the UK government to the Scottish Government: Scotland has gained additional tax revenue, while the UK government has lost the same amount. The devolution of an additional area of spending, such as disability-related benefits, requires an addition to the block grant to reflect the transfer of responsibility for that spending from the UK government to the Scottish Government.

These block grant adjustments (BGAs) are required every year following the devolution of new revenue streams and/or spending responsibilities. At the initial

point of devolution, it is possible (and indeed, potentially desirable) to set the BGAs equal to the amount of revenue or spending that is being transferred from the UK to the Scottish Government. However, it is not desirable for the BGAs to be set equal to the revenues actually raised, or spending actually incurred, in Scotland in subsequent years. That is because faster or slower growth in revenue (or spending) in Scotland would be offset by faster or slower growth in the BGAs, meaning no net change in the Scottish Government's funding. That would mean devolution would not satisfy its key aim: the financial accountability of the Scottish Parliament would not be increased, as just like prior to devolution, the funding available to it would not be affected by the increases in tax revenue and falls in social security spending associated with better economic performance or changes in policy. Indeed, the Scottish Government would have an incentive to cut tax rates (and increase social security benefit rates), knowing that the resulting revenue loss (and spending increase) would be offset by a lower (and a higher) BGA.

This means that after the *initial* BGA is calculated, an *indexation method* to update that initial adjustment over time is required.

2.2 The Smith Commission's principles

The Smith Commission, which agreed the devolution of powers subsequently legislated for in the Scotland Act 2016, also set out a set of principles to guide both the calculation of the initial BGAs, and the design of the subsequent indexation method. The key principles agreed were that:

- There should be no detriment to the Scottish or UK governments' budget simply as a result of the initial transfer of tax and/or spending powers ('**no detriment from the initial decision to devolve'**). In defining this principle, the Commission also stated that the BGAs should be 'indexed appropriately'.
- The devolved Scottish budget should benefit in full from policy decisions by the Scottish Government that increase revenues or reduce expenditure, and the devolved Scottish budget should bear the full costs of policy decisions that reduce revenues or increase expenditure ('**economic responsibility'**).
- Changes to taxes in the rest of the UK, for which responsibility in Scotland has been devolved, should only affect public spending in the rest of the UK; changes to devolved taxes in Scotland should only affect public spending in Scotland (this has often been referred to as **'taxpayer**

fairness', although that terminology was not explicitly used by the Smith Commission).

- The UK government should continue to manage the fiscal risks and shocks that affect the whole of the UK for the newly devolved revenue streams and spending responsibilities ('**UK economic shocks'**).

In addition, the Smith Commission agreed that the Barnett Formula should continue to determine the underlying block grant (before the BGAs). The block grant remains the single largest component of Scottish Government funding, equivalent to around 1.5 times as much as devolved income tax revenues, the second largest component.

The principle of 'no detriment from the decision to devolve' implies that the initial BGAs should be set equal to the revenues or spending being devolved, as has already been discussed. As we discuss further below, it may also have implications for how the BGAs are indexed if one interprets this principle as having dynamic implications in the years following devolution. The other principles suggest approaches to indexing the BGAs based on the change in 'comparable' UK government revenues or spending in the rest of the UK (rUK). In particular, indexing BGAs by reference to the change in 'comparable' revenues or spending in rUK:

1. Helps ensure that the UK government bears the risks of UK-wide fiscal shocks. For example, if a recession reduces revenues across all of the UK, including Scotland, the BGA will fall because 'comparable' revenues have declined. Lower Scottish tax revenues are offset by a smaller deduction from the block grant leaving the UK government bearing the cost of recessions that affect Scotland and the rest of the UK equally.
2. Helps ensure that the Scottish Government benefits from or bears the costs of its own policy decisions. For example, if the Scottish Government increases income tax rates in Scotland and this increases its tax revenues, Scottish revenues would exceed the BGA (which is determined by what happens to revenues in the rest of the UK rather than what happens in Scotland) and the Scottish budget would be 'better off' to the extent of the difference.
3. Helps ensure that Scotland does not benefit from increases in UK government spending that is funded by an increase in tax revenues in the rest of the UK for a tax that has been devolved in Scotland.

This third point is perhaps less intuitive than the first two. If the UK government increases tax rates for a tax that has been devolved in Scotland, then that tax

increase would not apply in Scotland. The associated BGA would increase, reflecting the increase in rUK revenues. At first glance, this might not appear reasonable insofar as the treatment of the Scottish budget goes. However, it must be remembered that the UK government's additional revenues would be spent.

If they were spent on 'comparable' public services in England, this would generate a consequential increase in the Scottish Government's block grant, via the Barnett formula. The higher BGA would act to approximately offset this increase in the underlying block grant. Without an increase in the BGA, the Scottish Government would see an increase in its block grant funded by a tax increase in rUK that did not apply in Scotland. Indexing the BGA to a measure of comparable UK government revenues is therefore important when we recognise that the revenue effect of tax changes by the UK government can 'flow' to Scotland via the Barnett Formula, even when the tax changes apply to a tax that is 'devolved' in Scotland.

If the UK government spent the additional revenues on 'reserved' matters (like defence, state pensions, universal credit or debt interest) that benefit the whole of the UK, the increase in the BGA would ensure that taxpayers in Scotland make a broadly similar contribution to that expenditure as taxpayers in rUK, despite the tax increase not applying directly in Scotland.

The same logic applies in the case of tax cuts and reductions in spending by the UK government: indexing the BGA to revenues in rUK offsets the reduction in funding via the Barnett formula or amount spent on reserved matters, helping ensure residents of Scotland do not see a reduction in government spending despite continuing to pay the same the same level of taxes.

The preceding discussion highlights the merits, indeed the critical importance of, indexing the BGAs to some measure of the change in comparable revenues and social security spending in rUK. Note that more precisely, the BGA should be indexed according to some measure of the change in comparable revenues and spending in those parts of the UK where UK government tax and benefits policy directly applies. This is England and Northern Ireland for the devolved taxes (because of tax devolution to Wales) and England and Wales for social security (given benefits are officially devolved to Northern Ireland). This is shown in the rightmost column of Table 2.1, but hereafter, rather than regularly switching between "England and Northern Ireland", and "England and Wales" we use the term "rUK" as a general term to refer to the relevant territorial area.

However, there is more than one way of measuring the change in comparable revenues and social security spending in rUK. Figures can be calculated on a

cash or percentage basis. They can also adjust for various factors such as differential population and demographic change and differences in the structures of taxbases that may affect expected growth in tax revenues. Most of the rest of this report considers whether different specific ways of calculating the change in comparable revenues and spending in rUK are more consistent with the Smith Commission's principles than others – as well as the risks and incentives they expose the different governments to and their potential financial implications. This is the subject of the next chapter of this report.

Another key feature of the way the BGAs are calculated that has implications for the budgetary risks faced by the Scottish Government is that they are initially determined by Office for Budget Responsibility forecasts of rUK revenues and social security spending, and subsequently reconciled to outturns once data becomes available. Similarly, the tax revenues and social security spending that accrues to the Scottish budget are also initially based on Scottish Fiscal Commission forecasts, and again reconciled to outturns later. This process of forecasting and reconciliation can mean the Scottish Government has to 'pay back' funding to the UK government (if, for example, outturn tax BGAs are higher than forecast, and/or outturns tax revenues are lower than forecasts), or may receive extra funding from the UK government (if, for example, outturn tax BGAs are lower than forecast, and/or outturn tax revenues are higher than forecast). A number of respondents to our call for evidence highlighted the uncertainty and risk associated with this process. In our view it's an inherent and unavoidable feature of BGA indexation linked to rUK revenues and spending. Other elements of the Fiscal Framework – such as powers to borrow and hold and draw down reserves – are the best mechanisms to address these uncertainties and risks.

3. The current approaches to calculating block grant adjustments

This chapter assesses the approaches to calculate the BGAs that are cited in the existing Fiscal Framework Agreement reached between the UK and Scottish governments in 2016.

The method that has been used in practice is termed the indexed per capita (IPC) method, which indexes the BGAs according to the percentage change in equivalent revenues or spending *per capita* in rUK and the change in the Scottish population. However, the comparable model (which is effectively a percentage-based approach, but which does not fully account for differences in population growth) and the Barnett formula (a cash-terms approach, which also does not fully account for differences in population growth) are also referred to in this Agreement.

3.1 The approaches agreed in the 2016 Fiscal Framework agreement

The Fiscal Framework agreement of 2016 stated that, for devolved taxes, the 'initial deduction' – which forms the starting point on which subsequent indexation is applied – would be equal to the UK government's receipts generated from Scotland in the year immediately prior to the devolution of powers.[3] Likewise, for devolved social security benefits, the initial increases in funding were set equal to the UK government's spending on these benefits in Scotland in the year immediately prior to the devolution of powers.[4]

[3] £20 million was deducted from the initial adjustment for Stamp Duty Land Tax, because analysis suggested property transactions had been brought forward to avoid plans for higher taxes.

[4] Cold Weather Payments were the exception to this, where the average spending between 2008-09 and the year immediately prior to devolution was used, so as to not be unduly influenced by the volatility of spending on this payment (which is determined by the weather).

Different indexation methods were then agreed for tax and social security benefit spending. For tax the Fiscal Framework states that the 'block grant adjustment […] should be effected by using the Comparable Model (Scotland's share), whilst achieving the outcome delivered by the Indexed Per Capita (IPC) method'. For social security spending it states that the Barnett formula would be used, whilst again achieving the outcome delivered by the IPC method.

These arrangements were agreed for a transitional period lasting five years. The Fiscal Framework envisages that these arrangements would be reviewed following planned UK and Scottish parliamentary elections in 2020 and 2021. No assumption was made about the form of the BGAs beyond the transitional period.

Using the **Barnett Formula** to determine social security BGAs would mean indexing these to Scotland's population share of the cash change in spending on equivalent social security benefits in rUK (where rUK in this case refers to England and Wales, see Table 2.1 for detail). Thus, social security BGAs in Scotland in year *t* would be equal to the BGAs in the previous year plus Scotland's population share of the change in the relevant social security spending (S) in rUK between year *t-1* and year *t.* This is illustrated in formula 1, below:

$$BGA_t = BGA_{t-1} + \frac{P_t^{Sc}}{P_t^{rUK}}\left(SS_t^{rUK} - SS_{t-1}^{rUK}\right) \quad (1)$$

where P_t^{Sc} and P_t^{rUK} are the population of Scotland and rUK, respectively and SS_t^{rUK} is aggregate spending in the rest of the UK from the same social security benefit that has been devolved to Scotland.

The Comparable Model (CM) is based on the Barnett Formula but takes account of differences in the pre-devolution levels of revenues per capita in Scotland compared to the UK for the taxes to be devolved. In particular, under this method the BGAs in year *t* would be equal to the BGAs in year *t-1* plus a population *and* "tax capacity" adjusted share of the change in the relevant tax revenue (T) in rUK between year *t-1* and year *t*. The pre-devolution estimates of relative levels of tax capacity for each tax (termed 'comparability factors') used in the CM method are set out in Table 3.1 below. This is illustrated in formula 2, below:

$$BGA_t = BGA_{t-1} + \mu\frac{P_t^{Sc}}{P_t^{rUK}}\left(T_t^{rUK} - T_{t-1}^{rUK}\right) \quad (2)$$

where μ is the comparability factor and T_t^{rUK} is aggregate revenue in the rest of the UK from the same tax that has been devolved to Scotland. For example, pre-

devolution revenues per capita in Scotland for income tax are estimated to have been 79.8% of the level of those in rUK. This means that under the CM method, the BGA for income tax would be changed by 79.8% of Scotland's population share of the change in income tax revenues in rUK.

Table 3.1. Comparability Factors

Devolved area	Comparability index (%)
Income tax	79.8
Stamp Duty Land Tax	51.5
Landfill tax	108.3
VAT	98.9
Air Passenger Duty	117.5
Aggregates Levy	189.1

The Indexed Per Capita (IPC method) indexes the change in the BGAs according to the per capita percentage change in equivalent revenues (or spending) in rUK and the change in the Scottish population. Using the percentage instead of cash-terms change in revenues (or spending) in rUK adjusts for the different levels of revenues (or spending) per capita in Scotland relative to rUK, playing the same role as the 'comparability factors' used in the CM method. In addition, using the change in revenues (or spending) per capita rUK and the change in the Scottish population adjusts the change in revenues (or spending) in rUK for differences in the rate of change in population between Scotland and rUK.

The formula used in the IPC method is illustrated in equation 3, below:

$$BGA_t = BGA_{t-1} \frac{P_t^{Sc} / P_{t-1}^{Sc}}{P_t^{rUK} / P_{t-1}^{rUK}} \frac{T_t^{rUK}}{T_{t-1}^{rUK}} \quad (3)$$

There are thus two main areas of difference between the three different methods:

- First, whereas both the CM and the IPC methods take account of the different initial levels of revenue or spending per capita (via the comparability factors and using percentage as opposed to cash changes, respectively), the Barnett Formula does not do so. In practical terms, whilst the Barnett Formula would allocate Scotland the same *per capita cash increase* in spending as occurred in rUK for the social security BGAs, the CM and IPC methods both adjust these cash-terms changes

up or down to take account of differences in initial levels of spending per capita between Scotland and rUK.

- Second, whereas the IPC method takes full account of any differential population growth (by using the change in revenues per capita in rUK and *Scotland's* population growth), the CM method and Barnett formula do not do so. In practical terms, whilst the IPC method adjusts the size of the tax BGA to fully take into account relatively faster or slower population growth in Scotland than rUK, the CM method and Barnett formula would not.[5]

In practice, the agreement to achieve the outcome delivered by the IPC method means that it is the IPC method that was agreed and has been used since 2016, irrespective of the references to the Comparable Model and Barnett formula in the 2016 Fiscal Framework Agreement. The other approaches were referenced because of disagreements between the Scottish and UK governments about which approaches best achieved the Smith Commission principles, and were in other ways 'fair' to both the Scottish and UK governments. The convoluted language of using one approach but achieving the outcome of another does not aid transparency and public understanding though – which responses to our call for evidence suggested should be a key aim for the approach agreed beyond the transitional period.

3.2 Consistency with the Smith Commission principles

We now assess the consistency of the IPC method, the Comparable Model and the Barnett Formula with the Smith Commission's principles. We first compare IPC with CM in the case of devolved taxation. We then compare IPC with the Barnett formula in the case of social security spending.

[5] It is also worth noting that because the CM method and Barnett formula do not update the previous year's 'baseline' funding for changes in relative population size, funding in any given year (T) is a function not just of how Scotland's population has changed between that period and the initial point of devolution (T_0), but the precise path of how population evolved during that period. For example, funding would be higher if more of any relative population decline occurred in later years as opposed to earlier years. In contrast, because the IPC method fully updates the BGAs for differential population growth, it is not path dependent in this year. All that would matter at time T is the relative population change between T_0 and T, not its path in the years in between. In this sense the size of the BGA under the IPC method may be seen as less arbitrary than under the CM method and Barnett formula. This issue is discussed further in Section 3.3 and Appendix C.

Taxation: comparing the IPC and CM methods

UK shocks

In broad terms both the IPC and CM methods offer significant protection to the Scottish budget from UK-wide revenue shocks. If an adverse economic shock causes tax revenues to fall UK-wide, the BGA will also fall to offset the reduction in Scottish tax revenues.

There is an important difference between the methods however. The effect of IPC is that the UK government bears the risk of UK-wide falls in revenues per capita. The effect of CM is that the UK government bears the risk of UK-wide falls in total revenues.

It could be argued that it makes more sense to think about a 'shock' in the context of how it affects revenues per capita. Primarily this is because revenues per capita are the more relevant variable on which to consider the severity of a shock for the public finances. (A situation where revenues fall only because population has fallen does not necessarily pose a fiscal constraint; equally, a situation where revenues per capita fall but total revenue grows as a result of population growth does likely pose a fiscal constraint). This would suggest the IPC method better satisfies this principle.

Economic responsibility

The Smith Commission's economic responsibility principle states that the Scottish budget should 'benefit in full from *policy decisions* by the Scottish Government that increase revenues… and should bear the full costs of *policy decisions* that reduce revenues…'

Both the IPC and CM methods broadly achieve this. If the Scottish government changes tax policy in a way that increases revenues relative to the equivalent revenues in rUK, the Scottish budget will be better off to the extent of the differential growth in revenues compared to BGA. If, on the other hand, the Scottish government introduces a tax policy that reduces Scottish revenues relative to revenues in rUK, the Scottish budget will be worse off.

It can be argued that the CM method better achieves the principle in relation to policies that boost revenue through their effect on population. For example, suppose that the Scottish Government were to undertake a policy that led to an increase in net migration into Scotland, boosting the Scottish Government's income tax revenues. Under the IPC method, this would be offset by an increase in the BGA for income tax, given that its value depends on growth in the Scottish

population. The Scottish Government would therefore not benefit fully (and indeed may not benefit at all) from the revenue effects of this policy. In contrast, under the CM method, which does not update the level of the existing BGA for differential population growth, the Scottish Government *would* benefit from the higher revenue resulting from the larger population. It is worth noting, however that the Scottish Government has few policy levers directly linked to population growth (although social security and higher education policies may affect fertility and net migration).

It is also worth noting that both methods imply that the Scottish budget bears the risk of any divergence in the growth of revenues (CM) or revenues per capita (IPC) compared to rUK, regardless of the cause of that divergence - not just divergences resulting from policy decisions. For example, Scottish revenues might grow more quickly (or more slowly) than the BGA because some aspect of the tax base – such as employment or earnings – grows more quickly or slowly in Scotland than in rUK. In theory, some proportion of any divergence in the relative growth of the tax base is likely to be the result of Scottish Government policy – whether that be policy in relation to taxation, housing, education, transport, etc., recently or further in the past – and some proportion of any divergence in tax base growth is likely to be the result of factors that are wholly outwith the control of the Scottish Government – such as the impact of the international oil price on the offshore economy and onshore supply-chain. But in practice it will never be possible to ascertain what proportion of tax base divergence is attributable to Scottish government policy, and what proportion is attributable to something else.

Strictly speaking the Smith Commission did not say that the Scottish budget should bear the risk of all divergence in tax revenue growth – it only explicitly said that the Scottish budget should bear responsibility for divergence in revenue growth that is the result of 'policy decisions'. In practice however, given the impossibility of identifying the causes of divergent revenue growth, it is inevitable that tax devolution has been designed to imply that the Scottish Government bears all risks associated with divergence in revenue growth once a tax has been devolved.

No detriment

It is worth making a distinction between the no detriment principle in a static sense, and in a longer-term, more dynamic sense.

Both the IPC and CM approaches largely achieve the principle that there should be no detriment from the *initial decision* to devolve a revenue stream. The fact that the initial deduction is defined as the revenues actually raised in Scotland the year

prior to devolution – and not, for example, its population share of UK revenues – means that the Scottish budget is not disadvantaged if a tax is devolved for which Scotland raises relatively less tax per capita than rUK. Similarly, the UK government is not disadvantaged when it devolves a tax for which revenues per capita are somewhat higher in Scotland than in rUK.

In this sense both methods achieve the no detriment principle in its static interpretation.

One possible caveat to this relates to taxes for which there is a degree of volatility in Scotland's share of revenues. In this case basing the initial deduction on a single year of data (rather than averaging over a period of several years) could cause detriment to either the Scottish Government or UK government, depending on whether the year used is one with above or below-average revenues. For this reason, the initial BGA for cold weather payments, a means-tested benefit paid to certain households during periods of particularly cold weather, the number of which varies significantly year-to-year, was based on a 10-year average of spending in Scotland on these payments.

However, averaging over several years is not always appropriate – in particular when underlying economic trends or pre-devolution policy changes are leading to secular changes in Scotland's share of revenues over time, averaging over several years will increase the likelihood of 'detriment' to either the Scottish or UK government at the initial point of devolution. Moving from using one year to averaging over several years could also lead to zero-sum arguments about which set of years to average over.

As well as considering the 'no detriment' principle from the perspective of the initial transfer of revenues, the no detriment principle can also be considered in a longer-term, or 'dynamic' perspective. Indeed, when defining the 'no detriment' principle the Smith Commission Agreement referenced not only the initial BGA, but also the need for an 'appropriate' method for subsequently indexing the BGA. The question is then: 'is a given BGA indexation method expected to cause detriment to either government in the longer term?'

For example, there may be a strong reason to expect particular factors/trends, which neither government have much control over, to lead to slower (or faster) growth in the aggregate tax base being devolved to Scotland, relative to the rUK. In this case it could be argued that failure to take this into account in the design of the BGAs would cause detriment, since the Scottish budget would be

disadvantaged (or advantaged) in expectation because of those likely future trends.

Consider the case of differential population trends. The change in population is an important determinant of the change in aggregate tax revenues. Because the Scottish population is expected to fall relative to the population of rUK in the coming decades (continuing a long-run trend) one would reasonably expect aggregate Scottish tax revenues to fall relative to those of rUK too. Conditional on the existing population projections being realised, aggregate revenues in Scotland would only keep pace with those in rUK if revenues per capita consistently increased by more in Scotland.

If one believes that there is little the Scottish Government can do to influence the rate of population change in Scotland relative to that of rUK, not accounting for differential population growth when indexing the BGAs would arguably represent a breach of the 'no detriment' principle. This is because the initial decision to devolve the tax would imply that the Scottish budget would, over time, likely be disadvantaged relative to the 'no devolution' counterfactual as a result of population trends which the Scottish Government has relatively little ability to influence.

In summary then, both the IPC and CM method largely achieve the no detriment principle in its static sense, at the initial point of devolution. However, in subsequent years, while the IPC method would prevent the Scottish budget from suffering detriment as a result of differential population growth rates, the CM method would not do so. If one believes that the no detriment principle applies not only at the initial point of devolution, but also applies dynamically in expectation in subsequent years too, the IPC method better achieves the 'no detriment' principle dynamically, over time.

Taxpayer fairness

Both the IPC and CM methods partially achieve the taxpayer fairness principle, but neither of them achieves it in full.

To see why this is the case, consider what happens if the UK government increases income tax rates in rUK, raising additional revenue. If this additional revenue were spent on services that in Scotland are devolved, the Scottish Government would receive its population share of the increase in spending via the Barnett formula. If it were instead spent on reserved services (such as defence, foreign affairs, debt interest, or the State Pension), Scotland would again receive

a share of the extra UK government spending that would, on average, be close to its population share.[6]

If this was all that happened, the taxpayer fairness principle would clearly be violated: Scottish residents would benefit from higher spending without paying the higher taxes paid elsewhere in the rest of the UK. However, the increase in revenues in rUK would lead to a higher BGA under both the IPC and CM methods of indexing the BGAs. This would offset at least part of the higher funding received by Scotland, partially achieving the taxpayer fairness principle.

However, the reason that neither method achieves the taxpayer fairness principle in full is that the changes in the BGAs under these approaches do not exactly match up with the change in UK government funding via the Barnett formula or spending on reserved services. This is because these BGA indexation methods take account of differences in revenues per capita for the devolved taxes at the point of devolution, either by using percentage changes in revenues or tax-capacity-adjusted changes in revenues as opposed to population-adjusted changed in revenues.

For taxes for which revenues per capita were initially lower in Scotland (income tax and stamp duty land tax), the change in the BGA would be smaller than the population-based change in funding. As a result, the net effect of a tax rise in rUK would be to increase overall funding for Scotland, whereas the net effect of a tax cut in rUK would be to decrease overall funding for Scotland.

Conversely, for taxes for which revenues per capita were initially higher in Scotland (such as landfill tax, air passenger duty and aggregates levy), the change in the BGA would be bigger than the population-based change in funding. In this case, the net effect of a tax rise in rUK would be to decrease funding for Scotland, and vice versa for a tax cut. Changes in taxes in rUK could therefore result in higher or lower funding for Scotland despite Scottish residents seeing no changes in the taxes they pay.

A hypothetical example, shown in Table 3.2, can help illustrate this issue. The figures chosen have been rounded to aid in exposition but roughly approximate

[6] In the case of spending on reserved social security benefits, Scotland's share would be derived explicitly depending on the number of eligible claimants in Scotland – depending on the particular benefit in question, Scotland's share may be somewhat higher or lower than its population share. In the case of non-identifiable expenditure such as spending on foreign affairs or debt interest, Scottish taxpayers are assumed to implicitly benefit from a population share of the 'benefits' of such spending.

relative levels of income tax revenues in rUK and Scotland. (In Section 3.3 we use actual tax revenue outturns to show how big a difference using the IPC and CM methods has made since 2016, relative to indexing the BGAs using an approach that would satisfy the taxpayer fairness principle).

Initially, just prior to devolution, income tax revenues in rUK are £200 billion and those in Scotland £15 billion. The population of rUK is 58 million, while that of Scotland is 5.3 million. This means revenues per capita are equal to approximately £3,450 and £2,830, respectively. Scotland's revenues per capita are therefore 82% of those of rUK. This means that whereas a £1 increase in spending in rUK funded by a tax increase in rUK would fund, on average, a £1 increase in spending in Scotland via the Barnett formula or on reserved services, the BGA would increase by only 82p, partially but not fully offsetting this. A £1 increase in revenues per capita in rUK would therefore generate an 18p increase in spending in Scotland despite no change in taxes paid in Scotland. This would violate the taxpayer fairness principle.

Table 3.2. Scenario illustrating 'taxpayer fairness' for CM and IPC methods

	Year 1	Year 2	% change	£ change
rUK				
Revenues	£200bn	£210bn	5%	£10bn
Population	58mn	58mn	0%	
Revenues per capita	£3,448	£3,621	5%	£172
Scotland				
BGA	£15bn	£15.75	5%	£0.75bn
Population	5.3mn	5.3mn	0%	
BGA per capita	£2,830	£2,972	5%	£142
Extra funding under Barnet				£0.914bn
Change in net funding (Barnett – BGA)				£0.164bn

Source: Authors' calculations.

The sums involved could be substantial. Suppose that immediately following devolution of income tax to Scotland, the UK government enacted a policy raising £10 billion in rUK, equivalent to a 5% increase in revenues. If population was unchanged in both Scotland and rUK then under both the IPC and CM methods, the BGA for income tax would increase by 5%, from £15 billion to £15.75 billion.

However, Scotland's population share of the revenue increase in rUK (£10bn*5.3/58) is £0.914 billion.

If the additional UK government revenue were spent on services that were devolved to Scotland, the Scottish Government would receive a net increase in funding of £164 million (£0.914 billion via the Barnett formula, offset by an £0.75 billion increase in the BGA) despite people in Scotland paying no additional income tax. The impact if the UK government's additional tax revenues were spent on reserved services would vary depending on what services were funded, but would again, on average, highly likely outweigh the impact of the higher BGA.

Of course, revenues in rUK may be reduced if the UK government cut income taxes. In this case, Scotland's population share of the reductions in spending (or increase in borrowing) would be bigger than the offsetting reduction in the BGA. A £10 billion tax cut in rUK would, for example, reduce the net funding for the Scottish Government by £164 million, despite people in Scotland paying the same taxes as before.

Scotland would similarly gain from increases and lose from decreases to stamp duty land tax rates in rUK, where Scottish revenues per capita are even lower relative to rUK. The overall scale of such transfers to/from Scotland would be smaller though given the much smaller revenues from this tax.

In contrast, for air passenger duty and aggregates levy, where Scotland's revenues per capita are higher than rUK's, tax increases would reduce funding and tax cuts increase funding for Scotland – although revenues from these taxes are even lower than for stamp duty land tax, meaning any transfers to/from Scotland would be small in cash-terms.

Summarising the argument so far, neither the IPC and CM methods achieve the taxpayer fairness principle in full because they account for differences in Scotland's tax capacity when adjusting the BGAs, whereas funding via the Barnett formula or through spending on reserved services does not do this.

The CM method is closer to achieving the taxpayer fairness principle though in one respect: its treatment of differential population growth. This is because the CM method, like the Barnett formula, does not fully account for differential population growth. There is therefore a symmetric treatment of population growth in the BGAs and the calculation of the underlying block grant. In contrast, as discussed already, the IPC method fully accounts for differential population growth. Using the IPC therefore means that there is an asymmetry in the

treatment of differential population growth when calculating the BGAs and the underlying block grant.

For example, consider a scenario where revenues in rUK increase only because of growth in the population, and these revenues are spent on items that generate funding for Scotland via the Barnett formula. Under the CM method, the BGA would increase by Scotland's population and tax capacity adjusted share of the increase in income tax revenues, offsetting at least part of the additional funding received under the Barnett formula.

In contrast, under the IPC method, if Scotland's population did not grow, the BGA would not increase at all, reflecting this unchanged Scottish population and the unchanged revenues per capita in rUK. Hence, the Scottish Government's funding would increase by its full population share of the change in revenues and spending in rUK, with no offsetting change in the BGA,

More of the revenues resulting from population growth in rUK would therefore be transferred to Scotland under the IPC method than under the CM method. The violation of the taxpayer fairness principle would therefore be 'greater' under the IPC method than the CM method.

Note that if population growth was greater in Scotland than in rUK, the reverse reasoning could apply: the mismatch between the treatment of population under the Barnett formula and the IPC method could effectively transfer revenue from Scotland to rUK, violating taxpayer fairness in the opposite direction.

Summary

Neither the IPC or CM methods fully satisfy all of the Smith Commission principles.

Both largely satisfy the principle that the UK government should bear the risk of UK-wide shocks, although arguably the IPC approach is a little more consistent as we may expect common shocks to lead to equivalent falls in revenues per capita rather than in total revenues.

Both largely satisfy the principle that the Scottish Government should be responsible for the effects of its policies on devolved tax revenues. Arguably, the CM method is a little more consistent though as it allows the Scottish Government to benefit from policies that increase revenues through boosting the Scottish population.

Both partially but far from fully achieve the taxpayer fairness principle, offsetting part but not all of the higher spending that Scotland would benefit from when tax revenues in rUK are spent. Arguably, the CM method is a little more consistent as it treats differential population growth in a way that is symmetric to the Barnett formula.

Both largely satisfy the no detriment principle in the first year of devolution (in the static sense) by setting the initial BGAs equal to the revenues being devolved. In subsequent years though, a projected fall in the Scottish population relative to that of rUK means that under the CM method the Scottish budget would be expected to be lower as a result of tax devolution unless revenues per capita increased more rapidly than in rUK. In contrast, the IPC method would protect the Scottish budget from the effects of this expected relative population decline. If one believes the 'no detriment' principle applies dynamically, in expectation, in the years following devolution, the IPC method is therefore more consistent with this principle.

Social Security: comparing the IPC and Barnett Formula methods

For devolved social security benefits, BGAs compensate the Scottish Government for the *additional spending* associated with these new responsibilities. Rather than reducing the Scottish budget, they increase it. The 2016 Fiscal Framework agreement suggested that social security BGAs would be determined by the Barnett Formula, but that until 2020/21 they would be set using the IPC method, after which time they would be reviewed.

As discussed previously, under the IPC method, increases in the BGA are based on the change in spending per capita in rUK and Scotland's population growth rate. The formulae for the social security BGAs are listed in equations (1) previously and (4) below for the IPC method:

$$BGA_t = BGA_{t-1}\left(\frac{P_t^{Sc}/P_{t-1}^{Sc}}{P_t^{rUK}/P_{t-1}^{rUK}}\right)\frac{SS_t^{rUK}}{SS_{t-1}^{rUK}} \quad (4)$$

The Barnett Formula approach to BGA indexation would instead imply that an increase (reduction) in spending in rUK on the relevant benefit would lead to Scotland receiving its population share of that increase (reduction).

As we noted above, there are thus two key differences between the IPC method and the Barnett formula:

- Initial differences in spending per head: The Barnett Formula increases the BGA by a population share of the total change in equivalent rUK spending, whereas IPC increases the BGA by the same percentage increase in per capita revenues as in rUK revenues, which takes into account different baseline levels of spending per capita.
- Relative population change: the IPC method takes into account relatively faster or slower population growth in Scotland and adjusts the BGA accordingly, whereas the Barnett Formula does not. Practically, if Scotland's population were to grow more (or less) quickly than rUK's, the IPC would allocate Scotland a larger (or smaller) BGA to reflect this, whereas the Barnett Formula would not.

The fact that the Barnett Formula approach does not take into account either relative population change or differences in initial spending per person in Scotland compared to rUK, means that the outcomes that it delivers over time can be difficult to predict.

If rUK spending on equivalent social security benefits increases, then the social security BGAs would be increased by a population share of this increase in spending. If population grows at the same rate in Scotland and rUK, the increase in the BGA is therefore equivalent to the same increase in nominal spending per capita as in rUK. But if Scotland has higher per capita spend on the equivalent benefits initially, this extra cash represents a smaller percentage increase in the BGA than the percentage increase in equivalent rUK spending. If this process continued indefinitely, under the Barnett Formula approach, levels of per capita funding for devolved benefits in Scotland would converge to rUK levels.

However, this assumes that there is no difference in population growth between Scotland and rUK. Slower population growth over time in Scotland could offset the impact of convergence. In fact, if population growth is significantly slower in Scotland, this could more than fully offset the impact of convergence. To see why this could be the case, suppose that population increases in rUK but not in Scotland. Population growth in rUK causes total spending on social security benefits to increase, despite there being no change in spending per capita. The Barnett Formula increases the social security BGA in line with Scotland's population share of the increase in total rUK spending. But this is despite the fact that there has been no increase in Scottish population.

The extent to which the Barnett Formula approach to indexing BGAs leads to convergence in resources per capita depends on an interaction between the growth rate of total spending on social security benefits in rUK, and differences in

relative population growth. If spending grows rapidly over time (because of higher inflation for example) and the Scottish and rUK populations grow at the same rate, convergence could occur rapidly. If on the other hand, growth in cash spending in rUK is low, and Scotland's population grows significantly more slowly than rUK's, Scotland may see its resources per capita grow by more in percentage-terms over time relative to those in rUK.

UK shocks

As with taxation, Scotland's social security budget is largely protected from the effects of UK-wide economic shocks by both the IPC and Barnett Formula mechanisms. If an economic shock is followed by expansion of the social security budget in rUK, the social security BGA will rise to increase the Scottish budget. However, under the IPC method, the increase in spending and therefore of the BGA reflects percentage changes in per capita social security spending, whereas under the Barnett Formula it reflects changes in aggregate cash-terms spending. And a UK-wide shock which increases spending on social security in would be more likely to result in equivalent per capita percentage increases in social security spending than in aggregate cash-terms spending. For this reason, the IPC method probably better meets the principle that the UK government should continue to bear risks associated with UK-wide economic shocks.

Economic responsibility

The Smith Commission 'economic responsibility' principle means that the Scottish Government should fully bear the financial costs or benefits of changes in devolved social security benefits policy.

Both the Barnett Formula and IPC approaches largely achieve this principle. If Scottish Government policy changes cause spending on devolved benefits to increase, there is no compensatory transfer through the BGAs, and the costs of the policy variation are therefore met by the Scottish Government.

It is possible however that under certain circumstances, the Barnett Formula approach will be more likely to meet the economic responsibility principle. The Scottish Government could in principle make such significant changes to policy that affect spending on devolved social security through changes in population growth, for example via migration. In this case, the IPC approach would increase the Scottish government's BGA for social security – with the implication that part of the budgetary impact of the policy change was being met by additional transfers from the UK government, rather than by the Scottish budget.

No Detriment

In relation to social security, the Smith Commission "no detriment" principle in its static sense has been implemented by setting the initial social security BGAs equal to the level of UK government spending in Scotland for each of the devolved benefits in the year immediately prior to devolution. This parallels the application of the "no detriment" principle to devolved taxes in their first year.

Most of the social security benefits devolved to Scotland are disability-related which are less responsive to the economic cycle than are tax receipts. Therefore, the criticism that the social security BGAs might be sensitive to the choice of year in which the transfer of spending power occurred has less weight than that for the case of devolved taxes. The use of the year immediately prior to devolution to set the BGA therefore is therefore unlikely to be significantly disadvantageous to either party.

As we discussed above in relation to taxes, the no detriment principle can also be interpreted in a more dynamic sense. If long-run structural issues that are likely to affect spending trends in Scotland relative to rUK are known about with a reasonable degree of certainty in advance of devolution happening, then failure to take these issues into account in calculating subsequent BGAs could be detrimental – or advantageous – to the Scottish budget.

The fact that the Barnett Formula approach does not take into account existing differences in spending per capita on the benefits devolved – which tends to be higher in Scotland than rUK -indicates that it may not meet the no detriment principle in a dynamic sense.

In 2019 Scottish claimants comprised 9.7 per cent of total Personal Independence Payments (PIP) in the UK, 15 per cent greater than its population share of 8.4 per cent[7]. Given broad equality of payment per PIP claimant across the UK, this suggests that spending per person is higher in Scotland than in the UK as a whole and therefore, as nominal spending on this benefit increases, the Barnett Formula BGA will increase more slowly than the Scottish Government's budget for this benefit since the increase in aggregate spending in rUK will reflect its lower rate of eligibility.

[7] Source: Stat Xplore, Department for Work and Pensions

The implied 'convergence' in the level of per capita resources for funding social security is likely to breach the no detriment principle in its dynamic sense.

But as we pointed out above, this convergence effect – which is a purely mathematical artefact arising from the application of cash terms spending increases to different initial levels of per capita spending – can be offset by differential rates of population growth. Slower population growth in Scotland could, in principle, completely compensate for, or even over-compensate for, the convergence effect.

Thus, it is quite likely that application of the Barnett Formula would not be consistent with the no detriment principle in a dynamic sense, but difficult to know in principle whether it will imply detriment to the Scottish or UK budget. Simulations in the next sub-section of the report look at what may happen in practice given differences in initial levels of per capita spending and projected population growth.

In contrast, the IPC approach takes account of both initial differences in spending per capita, and different rates of population growth. With IPC, the Scottish budget would not be disadvantaged over time but the application of cash terms increases to its higher initial spending, and nor would the UK government be disadvantaged by Scotland's relatively slower growing population.

Thus, taken together, the IPC approach is more consistent with the 'no detriment' principle in a dynamic sense than the Barnett formula is.

Taxpayer fairness

The Smith Commission's 'taxpayer fairness' principle was couched in terms of taxation, and does not apply directly to social security spending.

Indirectly, the parallel with taxpayer fairness in terms of social security might be a situation where the UK government raises spending on social security benefits in rUK which are devolved in Scotland, and funds this spending increase through an increase in tax rates in rUK for taxes which are devolved in Scotland.

In this situation, the taxpayer fairness principle can only be achieved if the Barnett Formula is used to determine the social security BGA, and if an approach methodological similar to the Barnett Formula is also used to determine the tax BGA.

We discuss the reasons for this in more detail in Chapter 4, where we analyse the implications of using the Barnett Formula for determining tax BGAs. From a taxpayer fairness perspective, the advantage that this approach has is that there is symmetry between the cash change in the social security BGA and the cash change to the tax BGA. The social security BGA would increase by Scotland's population share of the rUK spending increase, and the tax BGA would increase by a population share of the rUK tax increase. These two elements would offset each other, leaving the Scottish budget unchanged from the changes in rUK to taxes and social security spending.

No other BGA approach achieves this symmetry, hence no other approach achieves the 'taxpayer fairness' principle in full. This is the case even if a given approach is applied on both the social security and tax sides.

For example, imagine that tax and social security spending BGAs are determined by the IPC method. The social security BGA would increase in line with the percentage increase in rUK spending per capita, whilst the tax BGA would increase in line with the percentage increase in rUK revenues per capita.

Since Scotland's spending per capita on devolved social security benefits is generally higher than in rUK, but its revenues per capita on devolved taxes are generally somewhat lower than in rUK, the IPC approach would tend to result in Scotland's social security BGA increasing by more in cash terms than the increase in the tax BGA. Thus, in the case where the UK government increases spending on social security benefits in rUK that are devolved, and funds this by increases in tax rates in rUK for taxes that are devolved, application of the IPC method would tend to result in an increase in the Scottish budget. If spending and taxes in rUK were to be reduced, the opposite would be true, with Scotland's funding for devolved social security falling by more than its BGA for tax devolution.

The conclusion here is thus the same as the conclusion in other parts of this report where we discuss the taxpayer fairness principle – only application of the Barnett Formula, for both tax and spending aspects of the Scottish budget, will achieve this principle in full.

3.3 Financial effects of these methods

In this subsection, we first consider how differences in the size and evolution of the factors that determine the BGA under the IPC and the alternative methods - CM for tax and Barnett for social security – have affected the Scottish Government's budget since the introduction of devolved tax and social security powers.

Second, we examine how differences between the methods are likely to provide different BGA outcomes for the Scottish Government budget using current projections of population change in Scotland and assumptions about growth in tax revenues and social security spending in other parts of the UK. The focus of these projections is on the *difference* between the BGAs derived from the IPC method on the one-hand and the CM/Barnett method on the other.

The effects of the different BGA indexation methods so far

The Fiscal Framework was agreed in 2016, but the timing of devolution of different powers mean that BGAs and the association indexation methods have applied for different periods for different taxes and social security benefits: from 2015/16 in the case of Land and Buildings Transactions Tax and Landfill Tax, but only since 2020/21 for most devolved social security benefits. As discussed above, the actual BGAs applied so far have been calculated using the IPC method. For all forecasts and most outturns for the BGAs, CM/Barnett Formula alternatives are available in addition to those constructed using the IPC method. For those outturns where CM/Barnett alternatives are not available (2020/21 for income tax, and 2021/22 for other taxes and social security benefits) we use forecasts for these years, based on the forecasts published at the Spring Statement 2022.

Income tax

Figure 3.1 shows Scottish income tax revenues, and BGAs as calculated using the CM and IPC methods for the period 2017/18 to 2026/27, with figures for 2017/18 to 2019/20 being outturns and those for later years, the most recent forecasts. Figure 3.2 focuses more specifically on the difference between the BGAs calculated under the CM and IPC methods.

The Figures show that the BGA calculated using CM method would have been larger than that calculated using the IPC method actually used, with this difference growing over time. For example, in the current financial year (2022/23) the latest forecast for the BGA if the CM method was applied is £15,044 million, compared to £14,813 million under the IPC method actually applied: a difference of £231

million, or around 1.6% of revenues. By 2026/27, the BGA is forecast to increase to £18,019 million under the CM method, compared to £17,534 million – a difference of £485 million, or 2.8% of income tax revenues. This reflects the slower growth in Scotland's population each year, which the CM method partially adjusts for, but the IPC method fully adjusts for.

Figure 3.1. Income Tax revenues, IPC and CM BGAs, 2017/18 to 2026/27

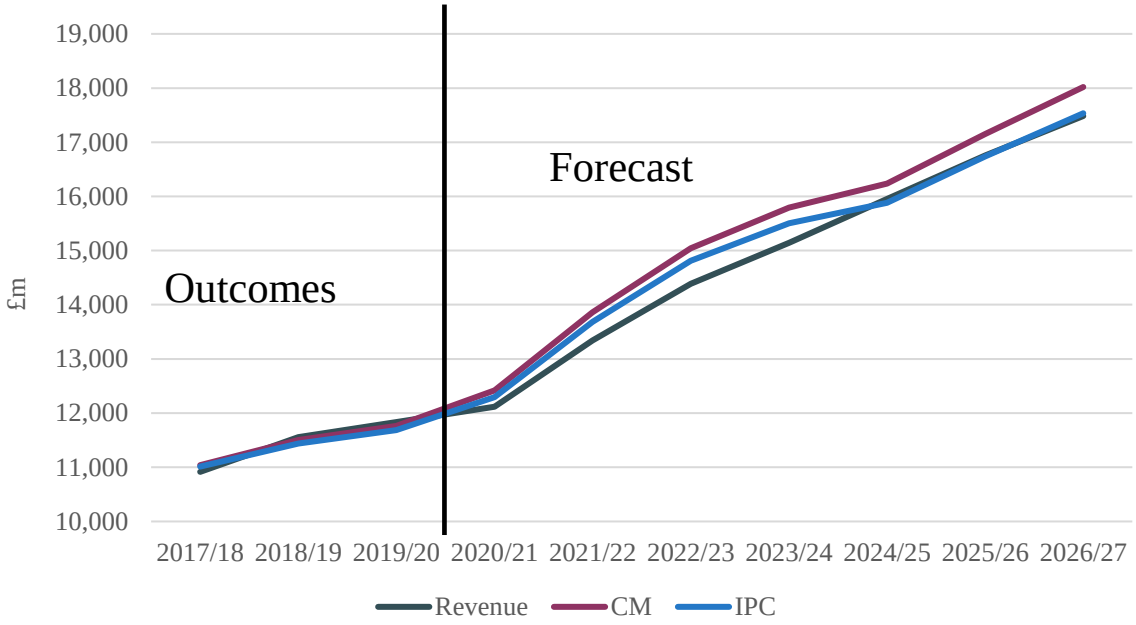
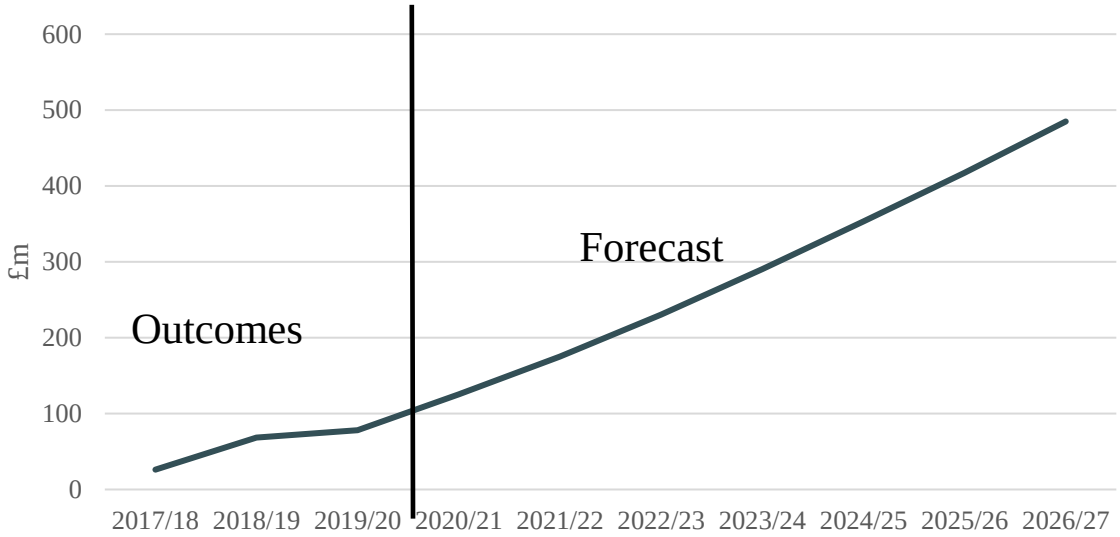


Figure 3.2. The value of the CM BGA minus the value of the IPC BGA for Income Tax



Source: Authors' calculations using HM Treasury Block Grant Transparency report and Scottish Government Fiscal Framework Data Annex.

Over the 10 years up to 2026/27, the gap between the CM and IPC BGAs is forecast to grow about £50 million per year, on average. The gap is forecast to grow more quickly over time in cash-terms, in part because overall income tax

revenues are rising, but also because the gap in population growth rates between Scotland and rUK is projected to be slightly larger too.

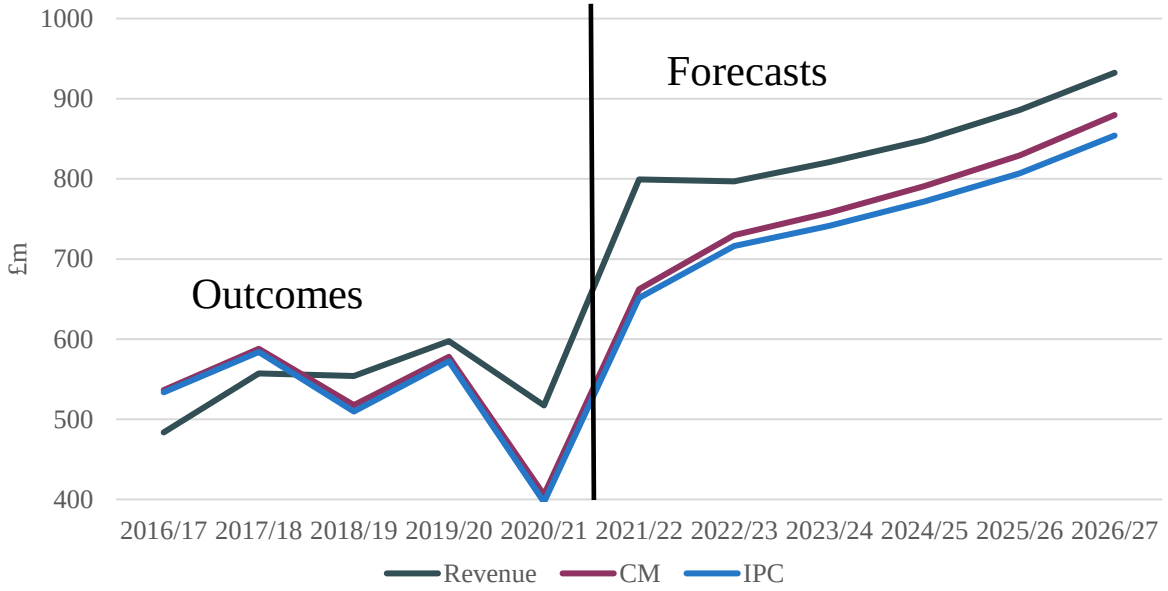
Figure 3.1 also shows that whereas the IPC BGA is forecast to be roughly similar to Scottish income tax revenues in the mid-2020s, if the BGA were calculated using the CM method, the BGA would exceed revenues by over £400 million.

Stamp duty land tax / Land and buildings transaction tax (LBTT)

Figures 3.3 and 3.4 repeat the analysis for LBTT, and use outturns data up to 2020/21 and forecasts thereafter. They again show that if the BGA were calculated using the CM method, it would be larger than under the IPC method. In 2022/23, for example, current forecasts are that it would be £730 million under the IPC method, compared to a £716 million under the IPC method – a difference of £13 million or 1.6% of revenues. The gap is forecast to grow to £26 million by 2026/27, equivalent to 2.8% of forecast revenues. On average, the CM BGA would increase by around £2.5 million a year more each between 2016/17 and 2026/27 than the IPC BGA. This is a much smaller difference than for income tax, given the much lower revenues raised by LBTT.

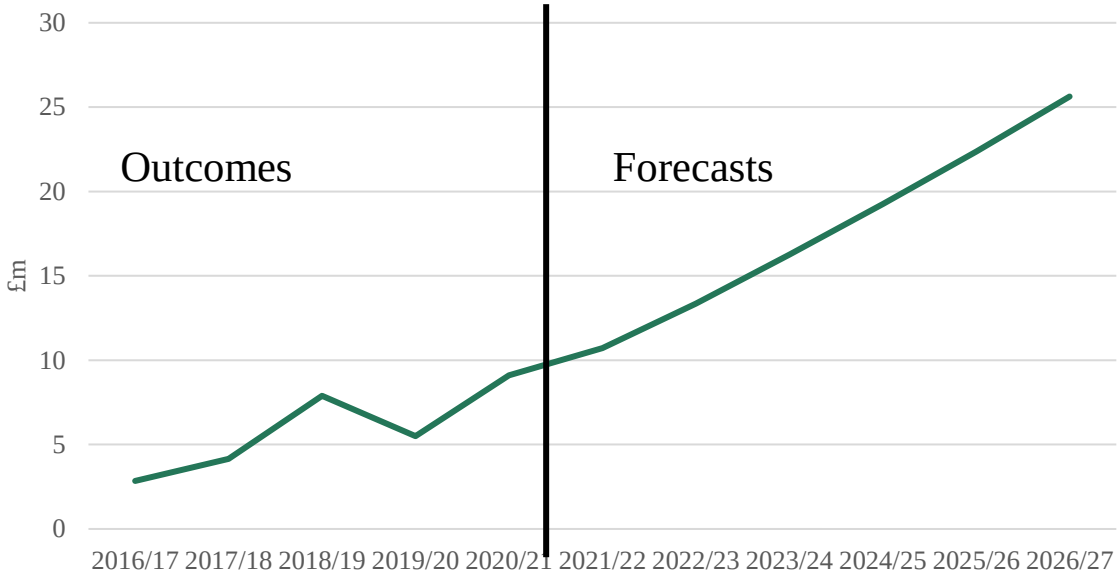
The Figures also show that after lagging the BGA in 2016/17 and 2017/18, LBTT revenues have exceeded both the IPC and CM BGAs each year since, and forecast to exceed the BGAs each year until 2026/27. For example, in that year, revenues are forecast to exceed the IPC BGA by £78 million, compared to £52 million for the CM BGA.

Figure 3.3. LBTT revenues, IPC and CM BGAS, 2016/17 to 2026/27



Source: Authors' calculations using HM Treasury Block Grant Transparency report and Scottish Government Fiscal Framework Data Annex.

Figure 3.4. The value of the CM BGA minus the IPC BGA for LBTT



Source: Authors' calculations using HM Treasury Block Grant Transparency report and Scottish Government Fiscal Framework Data Annex.

Landfill tax / Scottish landfill tax

Landfill tax generates a small and declining amount of revenue. The difference between the IPC and CM BGAs is therefore small in cash-terms. For example, in the current financial year (2022/23), the BGA under the CM method is estimated to be £3 million larger than that calculated using the IPC method actually used, with this gap forecast to grow to £4 million by 2026/27. However, given that it is forecast that revenues from SLfT will be just £16 million in 2026/27, this amounts to around a quarter of forecast revenues from the tax.

Carers allowance

Carers Allowance was the first of Scotland's new social security powers to be implemented, part way through 2018/19. Figure 3.5 compares how the BGA would evolve if the Barnett formula were used to calculate it, with its actual value under the IPC method over the period 2018/19 to 2026/27, using outturns data up to 2020/21 and forecasts thereafter. Figure 3.6 focuses on the difference between the IPC and Barnett BGAs.

The Figures show that there is very little difference between the BGAs as calculated via the Barnett Formula and the IPC method: in no year is the difference forecast to be greater than £1.6 million, with the IPC slightly smaller in all years bar 2019/20. This reflects two offsetting factors:

- First, Scotland's population growth is slower than that of rUK, which reduces the increase in the BGA when calculated by the IPC method.
- Second, Scotland's initial level of spending per capita on Carers Allowance was somewhat higher than in rUK, which means the Barnett Formula results in a smaller percentage increase in the BGA compared to the percentage increase in spending in rUK.

The first factor outweighs the second factor in all years bar 2019/20 (when the growth in the Scottish population was close to that of rUK), but only slightly.

Figure 3.5. Carers allowance spending, IPC and Barnett BGAs, 2018/19 to 2026/27

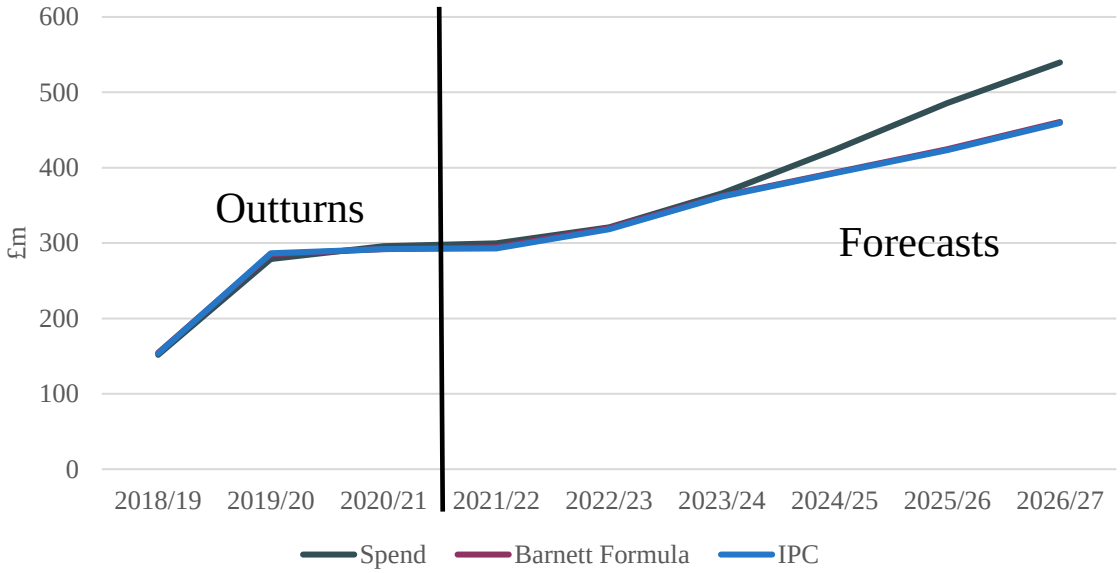
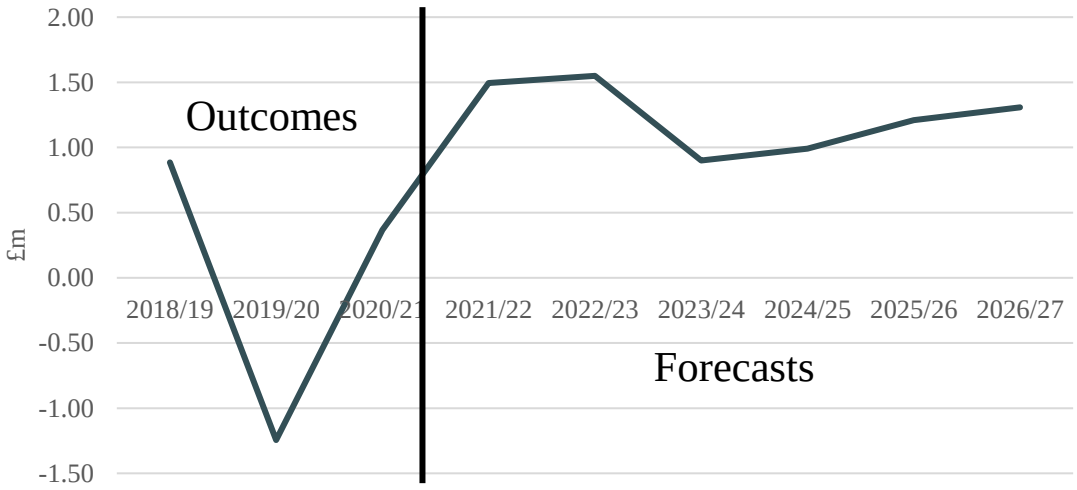


Figure 3.6. The value of the Barnett BGA minus the IPC BGA for Carers Allowance



Source: Authors' calculations using HM Treasury Block Grant Transparency report and Scottish Government Fiscal Framework Data Annex.

Figure 3.5 also shows that expenditure is forecast to exceed both BGAs by around £80 million by the end of the forecast period – reflecting higher rates and increased eligibility in Scotland.

Attendance Allowance

Responsibility for funding Attendance Allowance was devolved in 2020/21, with spending amounting to £528 million in that year. Figures 3.7 and 3.8 show that the choice of BGA mechanism again makes relatively little difference in cash terms, with the BGA calculated via the Barnett Formula generally £4 – 6 million larger than that calculated using the IPC method. This again reflects the impact of slower population growth in Scotland outweighing the initially higher levels of spending on Attendance Allowance per capita in Scotland.

Figure 3.7. Attendance Allowance spending, IPC and Barnett BGAs, 2020/21 to 2026/27

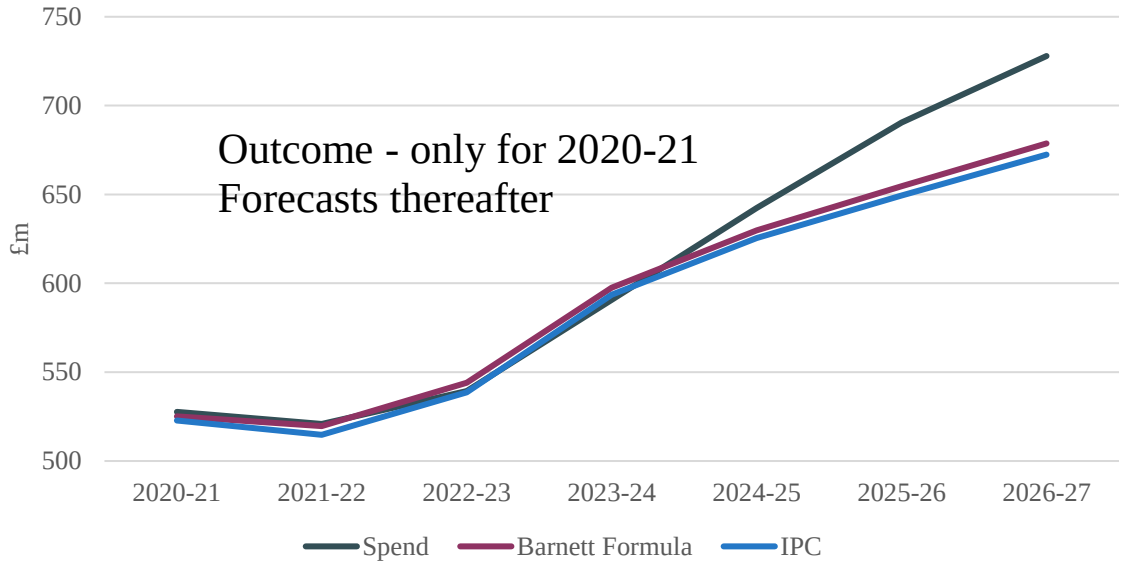
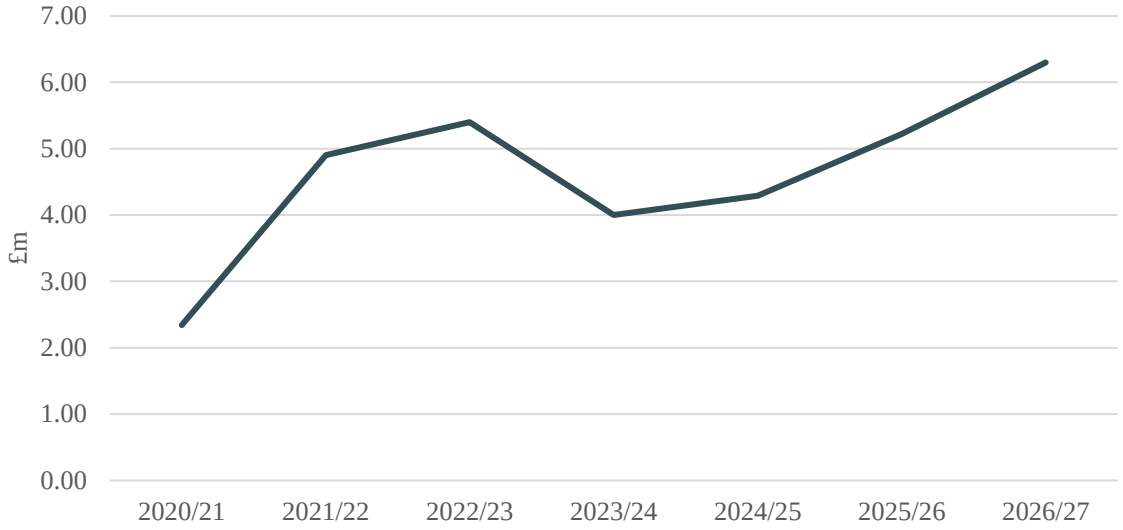


Figure 3.8. Value of the Barnett BGA minus the IPC BGA for Attendance Allowance



Source: Authors' calculations using HM Treasury Block Grant Transparency report and Scottish Government Fiscal Framework Data Annex.

Figure 3.7 also shows that expenditure is forecast to exceed both BGAs by around £50 million by the end of the forecast period – reflecting increased eligibility in Scotland.

Disability Living Allowance and Personal Independence Payments

Beginning in 2013, the UK government has been replacing Disability Living Allowance (DLA) with Personal Independence Payments (PIP). Responsibility for funding DLA and PIP was devolved in 2020/21. These benefits are being replaced

by Adult and Child Disability Payments but the BGA will continue to be linked to the legacy benefits in rUK. While there are separate BGAs for DLA and PIP we consider them together given that they are for the same client group.

Figure 3.9 shows outturns (for 2020/21) and forecasts (for later years) for the combined DLA and PIP BGAs as calculated under the Barnett formula and the IPC method. Figure 3.10 shows the difference between the Barnett and IPC-determined BGAs. The Figures show that if the BGA were calculated using the Barnett formula it would be lower than the actual BGA as calculated using the IPC method in every year, with the difference growing over time: from £32 million in 2020/21, to a forecast £85 million in the current financial year, 2022/23, and £266 million in 2026/27.

Underlying these combined figures is a somewhat different picture for the DLA and PIP BGAs. Because of the transfer of DLA recipients to PIP in rUK, DLA spending and hence the BGAs are expected to decline in future years relative to the pre-devolution baseline year, 2019/20. Because initial spending per capita was higher in Scotland than rUK, the Barnett Formula delivers a smaller percentage reduction in the BGA that the IPC method (in a reversal of the normal 'convergence' property of the Barnett formula when spending is rising). In contrast, PIP spending is rising, and this time, the higher initial spending per capita in Scotland therefore leads to a smaller percentage increase in the BGA under the Barnett formula than under the IPC method, even accounting for Scotland's slower population growth. Because PIP spending is larger than DLA spending, and is forecast to grow fairly rapidly, its influence dominates the trends for the combined PIP and DLA BGAs.

Figure 3.9 also shows that expenditure is forecast to exceed both BGAs, reflecting the fact that the design of Scotland's new disability benefits is expected to result in greater eligibility for the new benefits relative to that for DLA and PIP. If the BGAs are determined by the IPC method, spending is forecast to exceed the BGAs by just under £500 million in 2026/27. This gap would increase to around £750 million if the Barnett formula were used to index the BGAs.

Figure 3.9. DLA/PIP spending, Barnett and IPC BGAs, 2020/21 to 2026/27

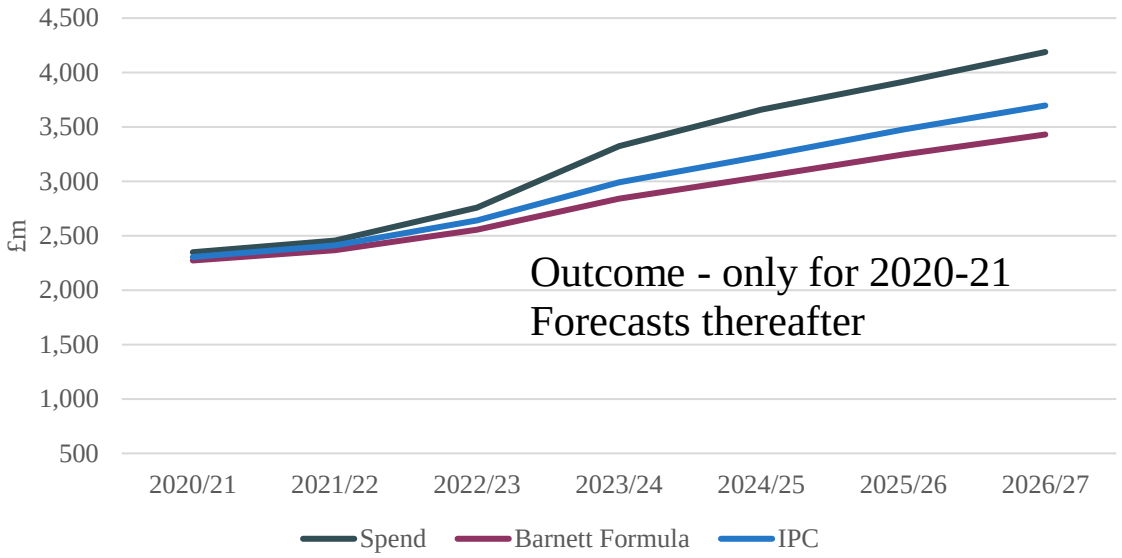
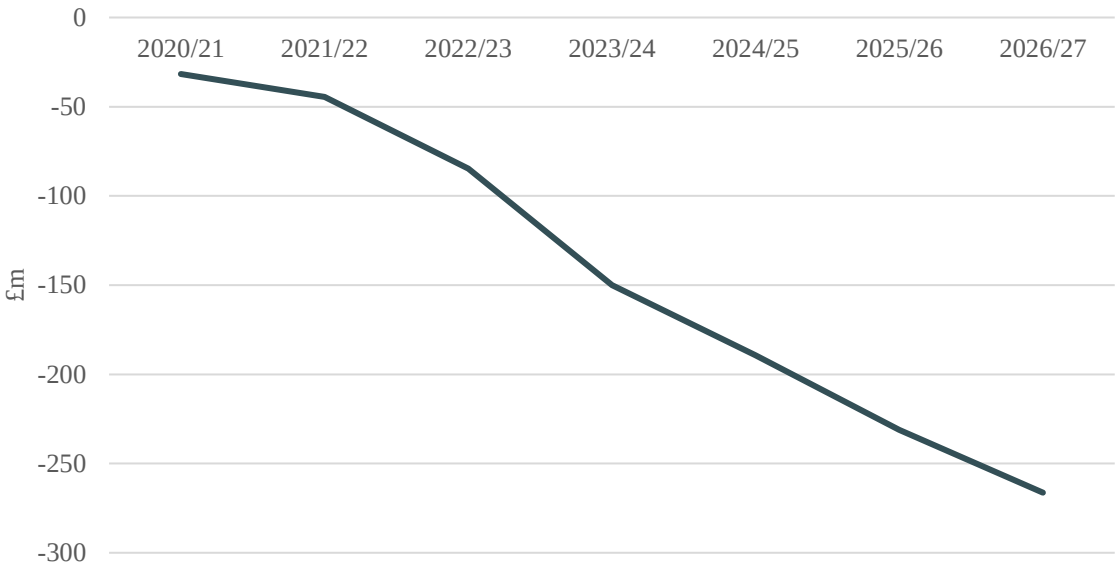


Figure 3.10. Value of Barnett BGA minus IPC BGA for DLA/PIP



Source: Authors' calculations using HM Treasury Block Grant Transparency report and Scottish Government Fiscal Framework Data Annex.

Other benefits

The remaining social security benefits are either very small (Industrial Injuries Disablement Scheme, Severe Disablement Allowance and Cold Weather Payments) or not yet devolved to the Scottish Government (Winter Fuel Payment). The choice of BGA method for these benefits will not make a substantial difference to the Scottish budget given their small size, and in the case of, the Winter Fuel Payment, the very similar levels of spending per capita relative to rUK.

Summary

Use of the IPC BGA indexation mechanism rather than the CM and Levels Deductions (i.e. Barnett Formula) BGA mechanisms has overall benefited the Scottish Government's budget – by reducing the BGAs for Income Tax and SDLT (which are deducted from its funding) and increasing the BGA for DLA/PIP (which is added to its funding). In the current financial year the additional funding is forecast to amount to around £325 million. By 2026/27, for the current set of taxes and social security benefits devolved, this is forecast to grow to around £775 million benefit relative to indexation by the CM and Levels Deduction approach for tax and social security, respectively.

Scenarios illustrating the influence of revenue/spending growth

In the previous sub-section, we calculated effects on the Scottish Budget of using the different BGA methods (comparing IPC with CM for tax and Barnett for social security), using outturns and the latest forecasts of both Scotland's revenues and spending. In this sub-section we use of hypothetical examples to illustrate how differences in revenue and spending growth affect outcomes under the different BGA mechanisms. In the next two sub-sections we consider the influence of differences in relative population change, and cyclicality.

We base our revenue trend scenarios by projecting forward from 2020/21, the most recent year for which outturns data for all taxes and devolved social security benefits is available, and take as our starting point the IPC BGA in 2020/21. We then examine how the value of that BGA would evolve under the different BGA approaches (IPC and either CM for tax or Barnett for social security) under scenarios where comparable revenues or spending are growing at 0%, 1%, 2%, 3%, or 4% per annum. Note that the growth rates are nominal, not real. Higher inflation is likely to lead to faster growth in nominal revenues or spending, even if the real terms value of revenues and spending remains unchanged. But as we show, variation in nominal revenues or spending can affect the assessment of how different BGA methods affect the Scottish budget.

We rely on the ONS' 2020-based central population forecasts, and vary only the growth rate of comparable revenues or spending. In a subsequent sub-section we also examine the effects of variation in population growth rates.

In each case we present estimates of the gap between BGA methods, both in aggregate terms and as a percentage of Scotland's estimated revenue or spending. We present this gap at two points in time: five years and ten years after the last outturn BGA data (i.e. in 2025/26 and 2030/31).

Income tax

Table 3.3 below reports how the BGA gap changes after 5 years and 10 years of nominal income tax revenue growth between 0% and 4% in rUK.

The CM method always delivers a higher BGA than IPC. This is because, as noted previously, it does not account for Scotland's relatively slower population growth.

As rUK revenue growth increases, the gap between the two approaches narrows slightly, although the effect is small. This is because, as spending increases, the CM method accounts for an increasing proportion of the population effect, because it accounts for changes in population for the incremental revenue (but not baseline revenues, as the IPC method does).

Table 3.3. Difference between CM and IPC under various scenarios for comparable revenue growth, income tax

Income Tax						
	% Nominal Growth in rUK NSND Income Tax	0%	1%	2%	3%	4%
After 5 Years	CM - IPC BGA (Level £m)	197	198	200	201	202
	CM – IPC BGA (%)	1.6%	1.6%	1.5%	1.4%	1.4%
After 10 Years	CM - IPC BGA (Level £m)	357	368	379	390	401
	CM – IPC BGA (%)	3.0%	2.8%	2.6%	2.4%	2.3%

Source: Authors' calculations using HM Treasury Block Grant Transparency report and Scottish Government Fiscal Framework Data Annex.

Land and Buildings Transaction Tax

Table 3.4 shows equivalent analysis of the gap between IPC and CM for LBTT. Again, as expected, CM delivers a larger BGA than IPC given Scotland's relatively slower population growth.

The difference between the methods, is percentage terms, is the same for LBTT as was the case for income tax. The cash difference between the methods is of course much smaller, since the BGA is much smaller (£397m in the baseline year of 2020/21).

Table 3.4. Difference between CM and IPC under various scenarios for comparable revenue growth, LBTT

Land and Buildings Transaction Tax						
	% Nominal Growth in rUK LBTT	0%	1%	2%	3%	4%
After 5 Years	CM - IPC BGA (Level £m)	7	7	7	7	7
	CM – IPC BGA (%)	1.6%	1.6%	1.5%	1.4%	1.4%
After 10 Years	CM - IPC BGA (Level £m)	12	12	13	13	13
	CM – IPC BGA (%)	3.0%	2.8%	2.6%	2.4%	2.3%

Source: Authors' calculations using HM Treasury Block Grant Transparency report and Scottish Government Fiscal Framework Data Annex.

Carer's Allowance

Table 3.5 shows that the Barnett formula delivers a larger BGA for Carer's Allowance than the IPC method when comparable spending growth is low, but that the difference between methods declines as comparable spending increases more quickly.

When comparable spending growth is unchanged (i.e. the growth rate is 0), then by definition the Barnett formula BGA will not change. However, given our assumptions on population growth, an unchanging level of total comparable spend implies that spending per capita on Carer's Allowance in England and Wales must be declining. The IPC-calculated BGA takes this decline in spending per capita into account – as well as Scotland's relatively slower rate of population growth – and the BGA declines accordingly.

When the growth rate of comparable spending in England and Wales is positive, the convergence property of the Barnett formula takes effect. The Barnett approach allocates a population share of the comparable spending increase to the BGA, and this takes no account of Scotland's slightly higher level of spending per capita on Carer's Allowance. The faster that comparable spending increases, the more rapidly the convergence property of the Barnett formula is realised.

Table 3.5. Difference between Barnett and IPC under various scenarios for comparable spending growth, Carer's Allowance

Carer's Allowance						
	% Nominal Growth in EW NSND Income Tax	0%	1%	2%	3%	4%
After 5 Years	Barnett - IPC BGA (Level £m)	5	5	4	4	4
	Barnett – IPC BGA (%)	1.7%	1.6%	1.4%	1.3%	1.1%
After 10 Years	Barnett - IPC BGA (Level £m)	9	8	8	8	7
	Barnett – IPC BGA (%)	3.1%	2.7%	2.3%	2.0%	1.7%

Source: Authors' calculations using HM Treasury Block Grant Transparency report and Scottish Government Fiscal Framework Data Annex.

Attendance Allowance

Table 3.6 shows similar analysis for Attendance Allowance. This reveals a similar story to Carer's Allowance. When spending growth is slow, the Barnett Formula delivers a larger BGA than IPC. This is because the Barnett Formula does not take account of Scotland's relatively slower population growth.

However, as the growth rate of spending increases, the convergence property of the Barnett formula increasingly dominates the fact that it doesn't take account of relative population growth.

The reason why the difference between Barnett and IPC erodes more quickly when spending increases for Attendance Allowance relative to Carer's Allowance is that Scotland's spending per capita relative to England and Wales is higher for Attendance Allowance than it is for Carer's Allowance. Hence the convergence effect is more pronounced for Attendance Allowance.

Table 3.6. Difference between Barnett and IPC under various scenarios for comparable spending growth, Attendance Allowance

Attendance Allowance						
	% Nominal Growth in EW AA	0%	1%	2%	3%	4%
After 5 Years	Barnett – IPC BGA (Level £m)	9	7	5	3	1
	Barnett – IPC BGA (%)	1.7 %	1.3 %	0.9 %	0.5 %	0.2 %
After 10 Years	Barnett – IPC BGA (Level £m)	16	13	9	5	0
	Barnett – IPC BGA (%)	3.1 %	2.2 %	1.4 %	0.7 %	0.0 %

Source: Authors' calculations using HM Treasury Block Grant Transparency report and Scottish Government Fiscal Framework Data Annex.

Personal Independence Payments

Adult Disability Payment (ADP) is replacing Personal Independence Payments (PIP) in Scotland, but the BGAs for PIP and DLA will determine the size of resources flowing to the Scottish budget.

As with Attendance Allowance, the size of the gap between the Barnett and IPC BGAs is small in cash terms compared with that on income tax and also differs in sign depending on the strength of the growth in spending on PIP in England and Wales. If spending grows by less than 2%, the Barnett BGA is greater than the IPC variant. At 2% or above, the IPC version is larger.

Table 3.7. Difference between Barnett and IPC under various scenarios for comparable spending growth, PIP

Personal Independence Payments						
	% Nominal Growth in EW NSND PIP	0%	1%	2%	3%	4%
After 5 Years	Barnett - IPC BGA (Level £m)	27	11	-6	-24	-42
	Barnett – IPC BGA (%)	1.7%	0.7%	-0.4%	-1.3%	-2.3%
After 10 Years	Barnett - IPC BGA (Level £m)	49	16	-19	-58	-100
	Barnett – IPC BGA (%)	3.1%	1.0%	-1.0%	-2.9%	-4.6%

Source: Authors' calculations using HM Treasury Block Grant Transparency report and Scottish Government Fiscal Framework Data Annex.

When spending growth is low, the fact that the Barnett formula does not fully account for Scotland's slower population growth outweighs its convergence properties. But as spending growth increases, the convergence effect becomes more dominant.

Disability Living Allowance

Disability Living Allowance (DLA) is being phased out and replaced with PIP in England and Wales, and with ADP in Scotland. Our simulations therefore range from 0% to -4% to reflect the declining spending.

In all cases the Barnett Formula yields a larger BGA than does the IPC method. When spending change is zero, there is no change in the Barnett BGA; but the IPC BGA falls, reflecting the implicit decline in spending per capita. As spending

falls more rapidly, the difference between Barnett and IPC widens. This is because, when spending is decline, the Barnett formula delivers a 'reverse convergence' effect (Scotland receives a population share of the reduction in spending, but this population share is relatively less of its total spending, since spending per capita is relatively higher in Scotland).

Table 3.8. Difference between Barnett and IPC under various scenarios for comparable spending growth, DLA

Disability Living Allowance						
	% Nominal Growth in EW NSND DLA	0%	-1%	-2%	-3%	-4%
After 5 Years	Barnett - IPC BGA (Level £m)	12	21	30	38	46
	Barnett – IPC BGA (%)	1.7%	3.1%	4.5%	5.9%	7.4%
After 10 Years	Barnett - IPC BGA (Level £m)	22	39	54	68	81
	Barnett – IPC BGA (%)	3.1%	5.8%	8.7%	11.7%	14.9%

Source: Authors' calculations using HM Treasury Block Grant Transparency report and Scottish Government Fiscal Framework Data Annex.

Combining BGA Effects

The alternative BGA indexation mechanisms produce a range of results: in some cases the CM/Barnett indexation method exceeds the IPC version. In other cases, the reverse is true.

It also needs to be remembered that the extent to which a larger BGA is advantageous or not for the Scottish budget depends on whether we are talking about tax or social security. For tax, a larger BGA implies a larger deduction from the Scottish budget, whereas on social security, a larger BGA implies a larger addition.

Table 3.9 aggregates the impacts elucidated above across the two main devolved taxes, and the four main devolved benefits. In each case, the table shows the difference between CM/Barnett on the one hand, and IPC on the other.

The difference between CM and IPC on tax amounts to around £200m after 5 years and £400m after 10 years; this is largely as a result of income tax, with LBTT making a small contribution. Remember that the positive numbers here imply that the Scottish budget is lower with CM than with IPC.

Table 3.9. Difference between Barnett and IPC under various scenarios for comparable spending growth, combined tax and social security BGAs

Combined effects for taxes and benefits						
% Nominal Growth in Combined IT and LBTT		0%	1%	2%	3%	4%
Taxes - income tax and LBTT						
After 5 years	CM - IPC BGA (Level £m)	204	205	207	208	209
After 10 years	CM - IPC BGA (Level £m)	369	380	392	403	414
% Nominal Growth in Social Security AA, CA, DLA and PIP		0%	1%	2%	3%	4%
After 5 years	Barnett - IPC BGA (Level £m)	53.3	43.9	32.8	21.0	8.5
After 10 years	Barnett - IPC BGA (Level £m)	95.8	76.4	51.9	23.1	-12.4

Source: Authors' calculations using HM Treasury Block Grant Transparency report and Scottish Government Fiscal Framework Data Annex.

When it comes to social security, the aggregate difference between Barnett and IPC across the four main payments devolved is relatively large when spending growth is low. Here, the positive difference between Barnett and IPC implies the Scottish budget is better off with Barnett than IPC.

As spending growth increases, the convergence effect of Barnett increasingly dominates the fact that it does not account for Scotland's relatively slower population growth. With nominal spending growth at 4% per annum, the difference between the two approaches is marginal. At higher rates of growth, it would become negative – the IPC approach would provide more funding.

Conclusion

This section has highlighted how the IPC and CM/Barnett BGAs would evolve over the medium to long-term, starting from 2020/21, given trend increases in the comparator fiscal measures in other parts of the UK. It has emphasised the differences in scale between income tax on the one hand and the other taxes and social security benefits on the other.

It is income tax that largely drives the gap between the IPC and Barnett/Barnett Formula BGAs. In aggregate, in all scenarios presented here the Scottish budget

benefits more from the IPC method rather than the CM/Barnett approach. This reflects two factors. First, that population projections indicate that Scotland's population growth will be slower than in the comparable geographies over the next decade, meaning IPC tax BGAs will be smaller than CM tax BGAs. Second, that the tax BGAs (and especially the income tax BGA) dominates the aggregate BGA position. At faster rate of spending growth than modelled here, Scotland would also benefit from a larger BGA for DLA/PIP under the IPC method than the Barnett Formula. This is because the faster the growth in comparable spending, the more important it is to take account of Scotland's initially higher levels of spending on these benefits (which the IPC method does but the Barnett Formula does not).

This section has also shown that the gaps between the BGA methods will widen in the future because, while IPC provides full insurance against Scotland's relatively slower population growth, the CM insurance is incomplete. The outcomes also differ from the forecast values described in the previous section since recent history, for a wide variety of reasons, has not been characterised by the smooth trends projected here. Rather, they comprise a mixture of trend and cyclical patterns. In a subsequent part of this section, we respond to this observation by exploring how the BGAs respond to the comparator measures following cyclical paths rather than smooth trends.

Scenarios illustrating the effect of relative population changes

The analysis above explores the effects of variation in the growth of spending, keeping relative population growth unchanged from the latest principal projections. But as we have noted, the rate of relative population change is also important in assessing the outcomes of the different methods.

For tax, this is relatively easy to understand. The slower the rate of population growth in Scotland relative to that in rUK, the greater will be the difference between the CM and IPC methods. If population growth in Scotland is slower than that in rUK, the CM BGA will always be larger than the IPC BGA, regardless of the rate of growth of comparable revenues.

For social security things are slightly more complex. When population growth is the same in Scotland as in England and Wales, the Barnett Formula will tend to deliver a smaller BGA over time compared to IPC. This is because spending per capita is initially higher in Scotland, and the Barnett formula allocates Scotland a population share of spending increases, leading to convergence in spending per capita over time. The faster the increase in comparable spending in England and

Wales, the faster the rate of convergence. The IPC method does not have this convergence property and maintains relative spending differentials.

However, when population growth is slower in Scotland than in England and Wales, this can offset the convergence property of the Barnett formula. This is because the Barnett formula only accounts for Scotland's slower population growth in relation to the spending increment.

Thus, whether the Barnett Formula or IPC methods delivers the most favourable outcome for the Scottish budget over time depends on an interaction between nominal spending growth and relative population change.

We investigate this issue in the following scenario analysis. We combine the four major social security BGAs – for Attendance Allowance, Carer's Allowance, DLA, and PIP into one. We estimate the difference between the Barnett and IPC calculated BGAs at two points in time – 2025/26, and 2030/31 (five and ten years from our baseline of 2020/21).

We explore five scenarios for comparable spending growth on those four benefits in England and Wales with five scenarios for relative population growth.

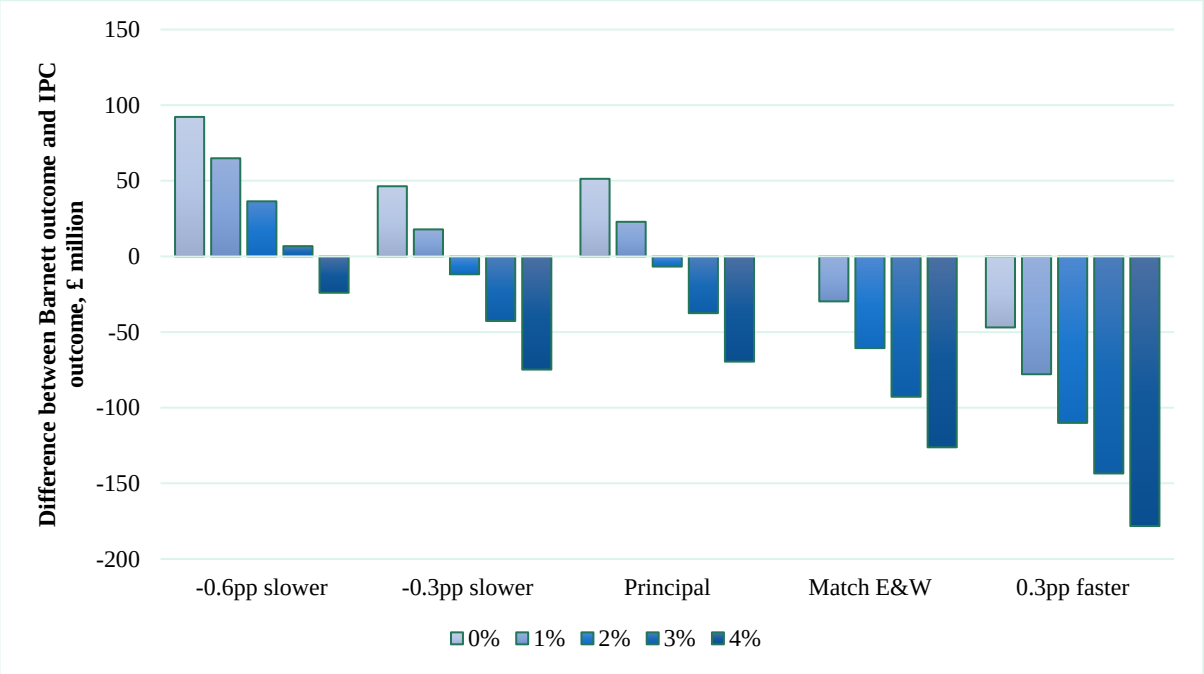
The scenarios for comparable spending growth are equivalent to those in the preceding section, and amount to annual growth of 0% to 4% respectively. The five population growth scenarios are:

- The 2020-based ONS principal population projections
- A scenario where Scottish population grows 0.6 percentage points slower than the England and Wales population each year
- A scenario where Scottish population grows 0.3 percentage points slower each year than the England and Wales population. Note that this scenario is close to the principal projection, which implies Scottish population growing 0.4 percentage points more slowly than England and Wales in the early part of the 2020s, falling to 0.2 percentage points towards the end of the decade
- A scenario where Scottish population growth matches than in England and Wales.
- A scenario where Scottish population growth exceeds that of England and Wales by 0.3 percentage points per annum.

Figure 3.11 shows the difference between the Barnett formula and IPC based BGAs in 2025/26. If Scottish population growth matched that in England and

Wales, the Barnett Formula would always deliver a lower BGA than IPC, because of the convergence effect.

Figure 3.11. Difference between Barnett and IPC based BGAs for social security under difference scenarios for spending and population growth, 2025/26



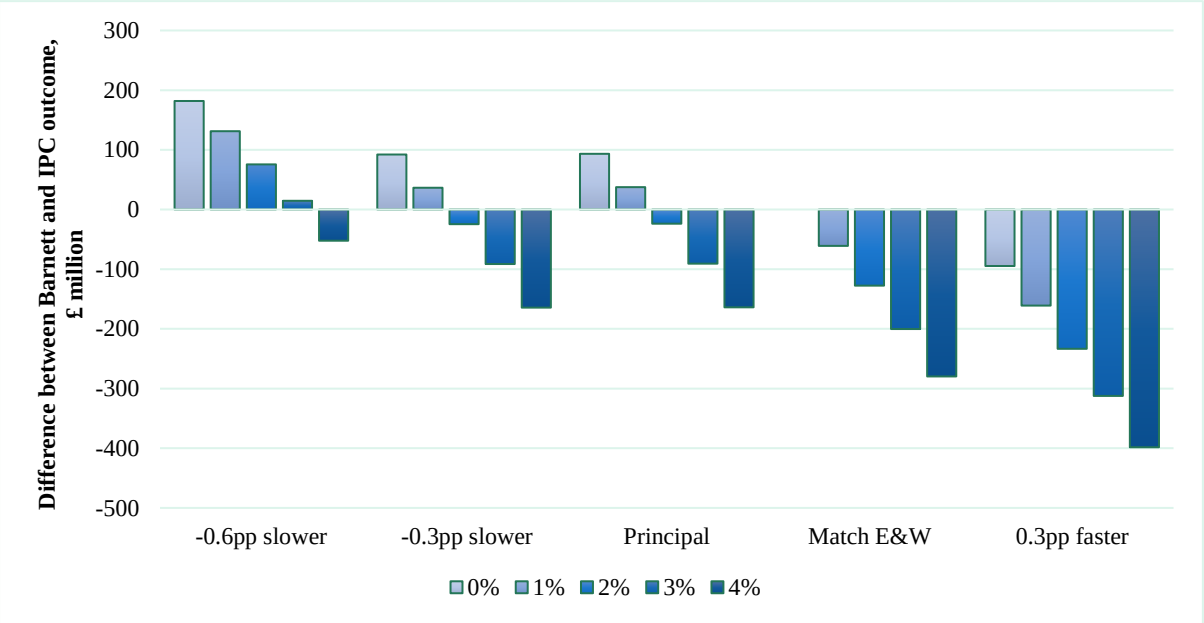
Source: Authors' calculations using HM Treasury Block Grant Transparency report and Scottish Government Fiscal Framework Data Annex.

On the other hand, if Scottish population growth were 0.6 percentage points lower than that in England and Wales, the Barnett Formula would deliver a larger BGA than IPC, as long as the growth in comparable spending was 3% per annum or less. But if spending grew at much above 3%, the convergence effect would offset Scotland's slower population.

If Scotland's population grows 0.3 percentage points more slowly than England's – which is broadly commensurate with the principal projections – then the Barnett would deliver a larger BGA than IPC only if the growth rate of comparable spending was less than 2% per annum.

Figure 3.12 shows the same analysis, but for 2030/31. The pattern of results is the same as for 2025/26, but the amounts roughly double.

Figure 3.12. Difference between Barnett and IPC based BGAs for social security under difference scenarios for spending and population growth, 2030/31



Source: Authors' calculations using HM Treasury Block Grant Transparency report and Scottish Government Fiscal Framework Data Annex.

Cyclical effects of different BGA indexation methods

We have considered how the different forms of BGA diverge in response to *trends* in equivalent tax revenues or social security benefits in rUK (formally rUK for taxes, and rUK for social security benefits). In this sub-section we consider how the different forms of BGA change following a *cycle* in revenues or spending that increases or decreases tax revenues or social security spending before returning it to its original level.

The mathematics of how a cycle in tax revenues or social security spending in rUK affects the alternative BGA methodologies are set out and explained in Appendix C. Here, we state the main results that follow from these arguments.

If rUK revenues/spending returns to its starting value after an upswing or downswing, the IPC BGA returns to its original value multiplied by the change in Scotland's population share of the rUK during the period. The path taken to get there – upswing or downswing – does not matter. The IPC method fully adjusts the BGA each year for the changes in rUK revenues/spending that have taken place since the initial year and for the change in Scotland's population share since the initial year.

The CM BGA value gives different outcomes depending on the path taken by revenues/spending in rUK even if revenues/spending return to their original value. If Scotland's population share is falling, then the changes in BGA resulting from changes in revenues/spending in the early years of an upswing or downswing will be larger due to Scotland's larger population shares in the earlier part of the cycle. Thus, even though revenues or spending return to their original value after a downswing, the CM BGA will be smaller than after an upswing. The same result holds for the Barnett Formula (and hence the Levels Deduction) BGAs because they are determined in the same way as the CM BGA with their comparability factors set to 1.

It also follows that if Scotland's population share does not change, then the CM BGA and the Barnett Formula BGA will return to their original value because the changes in revenues/spending that affect the BGA are weighted by the same population share, irrespective of when they occur during the upswing or downswing.

These properties of the IPC, CM, Levels Deduction and Barnett Formula BGA methods are explored with worked examples in Table 3.1 below. It uses tax BGAs (specifically income tax) for the example but the same logic applies to the social security benefit BGAs (and other taxes).

To keep the arithmetic simple, initial period tax revenues in rUK are set equal to 1000. The initial value of Scotland's BGA is set equal to rUK revenues times its population share (9.317%) and its tax revenue capacity (77%) for income tax: thus it equals 72.33. As in other parts of the paper, the population shares are drawn from the ONS principal population projections. Population growth rates in England and Northern Ireland are used for the comparative calculations. Over the period from 2020/21 to 2031/32 Scotland's population is expected to grow by 3.08% less than that in England and Northern Ireland.

The first row in Table 3.1 shows revenues/spending in rUK falling by 5% and then returning to its original level over an 11-year period, symmetrical around year 6. The second row shows the reverse case with revenues/spending first rising by 5% and then returning to its original value.

The 3rd and 4th rows shows how the IPC BGA evolves during first a downturn and then an upturn respectively. The rightmost column gives the percentage change in the BGA between the first and the eleventh periods. With the IPC BGA, the 11th period outcome is the same for both cases (see Appendix C equation 4). The 3.08% decline in the value of the BGA reflects the decline in Scotland's population

share between the 1st and 11th periods, which ensures that Scotland's per capita BGA remains constant.

Lines 5-8 show that, unlike the IPC BGA, the CM and Barnett Formula BGAs give different outcomes depending on the path taken by rUK revenue/spending before returning to its original value. This asymmetry reflects the greater weight given to changes in the early part of the cycle when Scotland's population share is relatively high. Correspondingly, less weight is given to towards the end of the cycle. With an upswing, the CM BGA increases by 0.07% due to this effect, while with a downswing, it decreases by 0.07%. The CM and Barnett BGAs do not just depend on how rUK revenues/spending have changed since the tax or social security instrument was devolved but also on the path such spending has taken.

Lines 5-8 also show that the changes to the BGA are smaller with CM than with the LD/Barnett Formula, because the comparability factor which is set at 0.77 – its most recent value for the income tax CM BGA – attenuate the effects of changes in revenues/spending. And in an upswing, the LD/Barnett IPC increases more than the CM version: this is consistent with our results on the effects of trend increases in revenues on the BGA in the previous section and with our previous arguments about the implications of the different BGA mechanisms.

Lines 9-14 repeat the calculations in lines 3-8 except that Scotland's population share is held constant at its 2020/21 value. Comparisons with lines 3-8 of the table, where population shares are allowed to vary, therefore show how the decline in population shares affect BGA outcomes, and the effects of economic cycles.

With Scotland's population share held constant, and hence population growing at the same rate in Scotland and rUK, the IPC and CM methods produce the same result (lines 9 – 12) in both an upswing and downswing. In addition, both the CM and Barnett Formula BGAs (as well as the IPC BGAs) return to their original values: with Scotland's population share constant, the initial increase (decrease) in the BGA is exactly offset by a subsequent equal decrease (increase). This illustrates clearly that the path-dependence of the CM and Barnett Formula BGAs arises when Scotland's population share changes over time (and its relative population growth differs to rUK).

Table 3.10. Cyclical Responses of different forms of BGA, with different assumptions about population growth

Line		Scenario	Year 1	2	3	4	5	6	7	8	9	10	11	
1		UK Revenues/Spend	1,000	990	980	970	960	950	960	970	980	990	1000	
2		UK Revenues/Spend	1,000	1010	1020	1030	1040	1050	1040	1030	1020	1010	1000	**% Change**
3	Value of BGA	IPC Downturn	72.33	71.34	70.35	69.40	68.46	67.53	68.04	68.56	69.08	69.59	70.10	-3.08%
4		IPC Upswing	72.33	72.78	73.23	73.69	74.16	74.64	73.71	72.80	71.90	71.00	70.10	**-3.08%**
5		CM Downturn	72.33	71.60	70.88	70.17	69.45	68.74	69.45	70.16	70.86	71.57	72.27	-0.07%
6		CM Upswing	72.33	73.05	73.77	74.49	75.21	75.92	75.21	74.50	73.79	73.09	72.38	**0.07%**
7		LD/Barnett Downturn	72.33	71.40	70.47	69.54	68.62	67.70	68.62	69.53	70.44	71.35	72.26	-0.10%
8		LD/Barnett Upswing	72.33	73.26	74.19	75.11	76.04	76.95	76.04	75.12	74.21	73.30	72.40	**0.10%**
9		IPC Downturn (static pop)	72.33	71.60	70.88	70.16	69.43	68.71	69.43	70.16	70.88	71.60	72.33	0.00%
10		IPC Upswing (static pop)	72.33	73.05	73.77	74.50	75.22	75.94	75.22	74.50	73.77	73.05	72.33	**0.00%**
11		CM Downturn (static pop)	72.33	71.60	70.88	70.16	69.43	68.71	69.43	70.16	70.88	71.60	72.33	0.00%
12		CM Upswing (static pop)	72.33	73.05	73.77	74.50	75.22	75.94	75.22	74.50	73.77	73.05	72.33	**0.00%**
13		LD/Barnett Downswing (static pop)	72.33	71.40	70.46	69.53	68.60	67.67	68.60	69.53	70.46	71.40	72.33	0.00%
14		LD/Barnett Upswing (static pop)	72.33	73.26	74.19	75.12	76.05	76.99	76.05	75.12	74.19	73.26	72.33	**0.00%**

Source: Authors' calculations.

4. Other approaches to calculating block grant adjustments

In Chapter 3 we examined the extent to which the BGA methods cited in the Scottish Government's existing Fiscal Framework are consistent with the principles identified in the Smith Commission Agreement. This chapter appraises a number of alternative approaches to calculating the BGAs. These include:

- **Using the Barnett Formula to index the BGAs for devolved taxes.** This method, also termed the **Levels Deduction** method, would fully meet the 'taxpayer fairness' principle when changes in rUK revenues lead to changes in funding for the Scottish Government via the Barnett formula. However, it is arguably not consistent with the 'no detriment' principle in the years following devolution – indeed it would almost inevitably make the Scottish budget significantly worse off as a result of tax devolution given Scotland's lower revenues per capita for the two largest devolved taxes covered by the fiscal framework: income tax and stamp duty land tax.
- **Approaches that control for differences in demographic change over time.** The demographic structure of the population can influence revenues and spending per capita. Some have argued therefore that the approach to calculating the BGAs should take demographic factors into account, in order that the Scottish budget is protected from the effects of demographic change on revenues and spending. This may help better achieve the 'no detriment' principle in a dynamic sense if one believes the Scottish Government has little influence on demographic change, but may be less consistent with the taxpayer fairness principle
- **Approaches that control for differences in tax structure at the point of devolution.** The distribution of Scottish taxpayers by income differs from that in rUK. These differences in the distribution of the taxbase can mean that underlying economic trends and changes in tax policy have differential effects in Scotland compared to rUK, in ways

that can cause 'detriment' to either the Scottish or UK government. Given that the Scottish Government cannot influence its historic tax revenue structure, adjusting for this would arguably be more consistent with the 'no detriment' principle in the years following devolution. However, again, this may be less consistent with the 'taxpayer fairness' principle.

- **Approaches not based on growth of equivalent rUK revenues or spending.** It is sometimes proposed that BGAs should not be indexed by reference to what is happening to the equivalent revenues or spending in rUK, but to some other index (such as inflation). Whilst such an approach might be simpler to explain and implement, it would not be consistent with the 'taxpayer fairness', 'economic shock' and 'no detriment' principles.

Finally, we also consider the case for incorporating elements of **insurance against divergent revenue or spending trends** into the BGA approach. This could help better address the 'no detriment' principle, but would be inconsistent with the 'economic responsibility' and 'taxpayer fairness' principles.

4.1 The 'Levels Deduction' approach

The discussion in chapter 3 showed that neither the IPC nor CM methods fully achieve the taxpayer fairness principle. This is because these methods take account of Scotland's differing levels of revenues per capita when indexing the BGAs in response to changes in rUK revenues, whereas when those rUK revenues are spent, Scotland is likely to receive a population-share. The changes in BGAs therefore do not fully offset the changes in funding via the Barnett formula (or in spending on reserved services), meaning Scotland can still gain or lose somewhat from changes to tax policy in rUK for taxes that are devolved in Scotland

This discussion suggests that there is one approach to indexing tax BGAs that would fully satisfy the taxpayer fairness principle: if the change to the tax BGAs are indexed by Scotland's population share of the change in equivalent UK revenues, this achieves symmetry between the BGA and spending elements of the Scottish budget. This would mean that the population-based increments in the Scottish Government's funding via the Barnett formula – when tax revenues in rUK are spent – would be exactly offset by population-based increments in the BGAs. If the additional rUK revenues were spent on reserved services, the offsetting would not be exactly equal but would likely be closer to equal than

under the IPC and CM methods given Scotland's share of spending on reserved services is close to its population share, overall. The approach has previously been referred to as the 'Levels Deduction' approach, since the changes to the BGA are based on cash-terms changes in the level of UK government revenues, rather than proportionate changes. It is an equivalent mechanism to the Barnett formula, used to allocate funding for public services, and referenced in the Fiscal Framework in relation to the BGAs for social security benefits.

To illustrate, lets return to the hypothetical example introduced when discussing the taxpayer fairness principle in section 3.2. In that example, UK government income tax revenues increased by £10 billion. It was assumed that this revenue was spent on services that in Scotland are devolved to the Scottish Government, generating a consequential increase in the Scottish budget (assuming Scottish population was equal to 9.14% of rUK's) of £0.914 billion.

Under the Levels Deduction approach to BGA indexation, the Scottish Government's income tax BGA would increase by a population share of the change in UK government revenues. In this example, the BGA would increase by £0.914 billion, since this represents Scotland's population share of the change in rUK revenues.

The £0.914 billion increase in funding under the Barnett formula is therefore exactly offset by the £0.914 billion increase in the BGA. The taxpayer fairness principle has been achieved in full because the change in tax and spending in rUK has not resulted in any change in funding for Scotland. This contrasts with the outcome under the IPC and CM methods illustrated in Table 3.2, above, where Scotland saw an increase in funding as a result of tax changes applying only in rUK, which does not fully satisfy the taxpayer fairness principle.

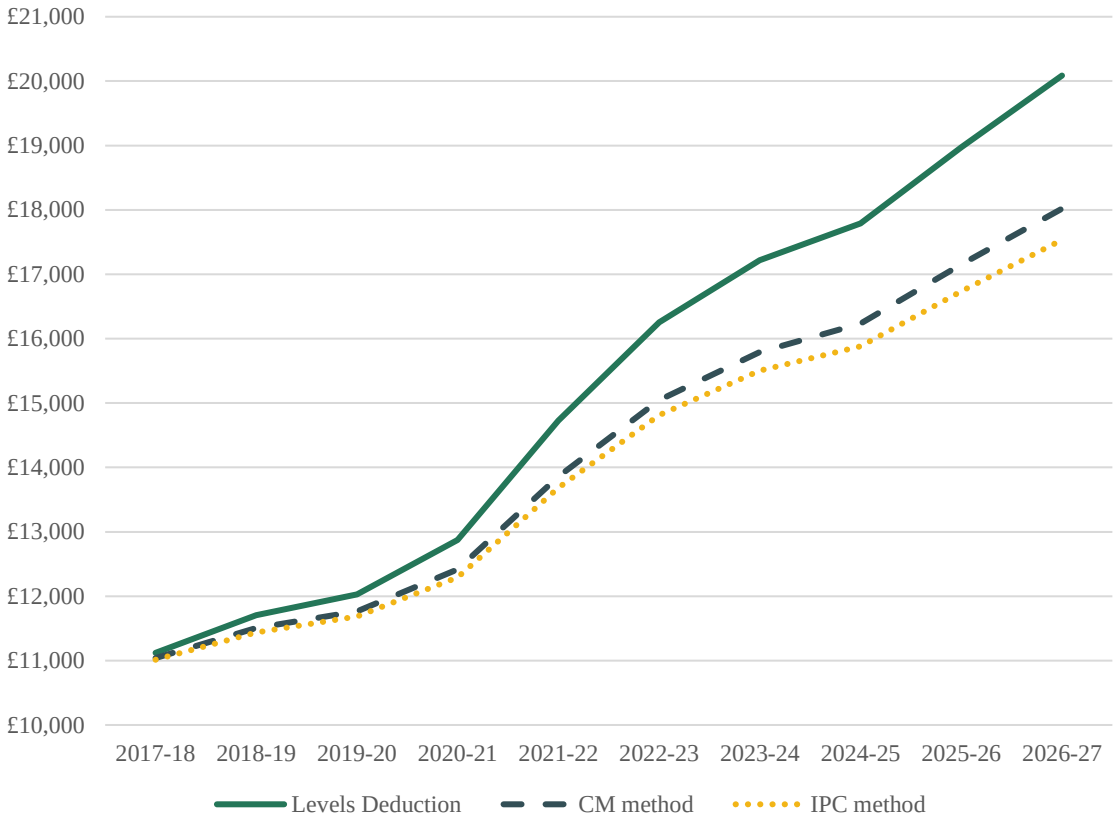
However, whilst the Levels Deduction approach better achieves the principle of taxpayer fairness, it is less consistent with the other Smith Commission Agreement principles. In particular, use of this approach would very highly likely cause significant detriment to the Scottish budget over time. This is because the lower tax revenues per capita in Scotland relative to rUK for income tax and stamp duty land tax, the two largest taxes devolved under the Fiscal Framework, mean that under the Levels Deduction approach, Scottish revenues would need to grow substantially quicker in percentage terms than those in rUK to keep pace with the BGAs.

To see this, return to the previous example, introduced in section 3.2. The £10 billion increase in rUK revenues was equivalent to an increase of 5%. But if Scotland's BGA is increased by a per capita share of £10 billion, with no adjustment for its lower tax capacity, the resultant increase in BGA from £15 billion to £15.914 billion implies a growth rate in the BGA of 6.1%. Scottish revenues would therefore need to grow by 6.1% to keep pace with the BGA and avoid detriment to the Scottish budget.

We can also examine how different the BGAs would be in practice under the Levels Deduction method compared to the IPC and CM methods. This is done for income tax in Figure 4.1, which has by far the largest BGA, and combined with a significant difference in taxable capacity, by far the largest cash-terms differences in BGAs between indexation mechanisms (in proportional terms, the effects would be larger for Stamp Duty Land Tax / Land and Buildings Transactions Tax though). The figure shows that relative to the IPC method used in practice, using the Levels Deduction method would have meant the BGA was £0.58 billion higher than it actually was in 2020/21. By the current financial year, this gap would have grown to over £1.4 billion, and by 2026/27, an estimated £2.6 billion. To put this in context, this is roughly double the Police Scotland core funding allocation this year. Relative to the CM method the BGA would be £2.1 billion higher by 2027–28.

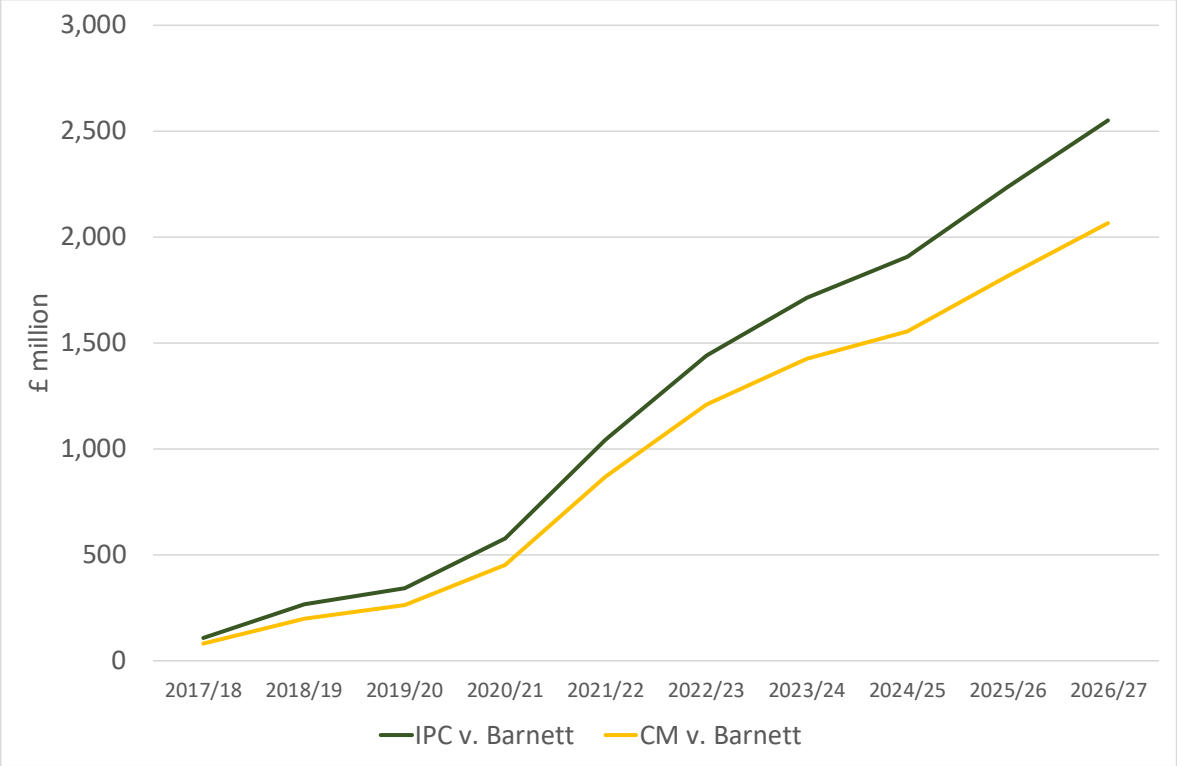
Figure 4.2 shows the same information, but examines more explicitly the *difference* between the income tax BGA under the levels deduction, or Barnett approach, and the IPC or CM approaches. The gaps here – for example the gap of around £500m in 2020/21 –represents the extent to which tax revenue growth from the rest of the UK is transferred to Scotland under the IPC and CM methods. In other words, the gap is a measure of the extent to which the 'taxpayer fairness' principle, at least according to one interpretation of it, is infringed by the other two methods.

Figure 4.1. Comparison of income tax BGA under IPC, CM and Levels Deduction methods, 2017/18 to 2026/27, forecasts and outturns, £s billions



Source: Authors calculations using Block Grant Transparency Data and Fiscal Framework Outturn report data annex.

Figure 4.2. Illustration of the taxpayer fairness principle, 2017/18 to 2026/27, forecasts and outturns, £s billions



Source: Authors calculations using Block Grant Transparency Data and Fiscal Framework Outturn report data annex.

If one interprets the no detriment principle as applying beyond the first year of devolution to factors/trends that can confidently be predicted at the time of devolution (which is reasonable given that when defining the 'no detriment' principle, the Smith Commission referred to the need for 'appropriate' indexation mechanisms) the Levels Deduction approach is not consistent with the 'no detriment' principle. This is because, given Scotland's lower tax capacity at the point of devolution, the Scottish budget would be expected to suffer detriment as a result of the decision to devolve income tax and stamp duty land tax, unless Scottish revenues grow more quickly in percentage terms than those in rUK. Indeed, use of the Levels Deduction approach would not just transfer to the Scottish Government the risk of slower or faster growth in revenues post devolution, but slowly over time transfer responsibility for having lower or higher levels of revenues per capita at the point of devolution. This is because successive population-based increments to the BGA would mean that over time

the overall level of the BGA would converge to Scotland's population share of rUK revenues, if population growth rates in Scotland and rUK.[8]

The Levels Deduction approach is also less consistent with the principle that the UK government should bear the risk of UK-wide economic shocks than the IPC and CM methods. The Levels Deduction *over-insures* the Scottish budget against the risk associated with UK-wide shocks. When revenues fall UK-wide, the reduction in the BGA would be larger than the reduction in Scottish revenues, since the former is based on the change in Scotland's population share of rUK revenues which is likely to be greater in revenue terms than the equivalent fall in Scottish revenues in percentage terms. The net effect of a negative UK-wide shock to revenues would therefore be to *increase* funding for the Scottish Government's budget. Conversely, the net effect of a positive UK-wide shock to revenues would be to *reduce* funding for the Scottish Government's budget.

On the other hand, the Levels Deduction method is more consistent with the 'economic responsibility' principle than the IPC method. This is for the same reason that the CM method is more consistent: whereas the IPC method fully insulates the Scottish Government's budget for the effects of its policies on relative population, the Levels Deduction method (and CM method) does not do this. Both the Levels Deduction and CM methods do very partially compensate the Scottish Government for population changes induced by its policies though: the population share used for *increments* to funding is updated when relative population levels change. Whether the effect is bigger for the Levels Deduction method or CM method depends on Scotland's relative levels of revenues and spending per capita. For example, for the main taxes, Scotland's initial revenues per capita (its tax capacity) was lower than that of rUK. This means that increases in the BGA under the CM method, and hence the effect of updating

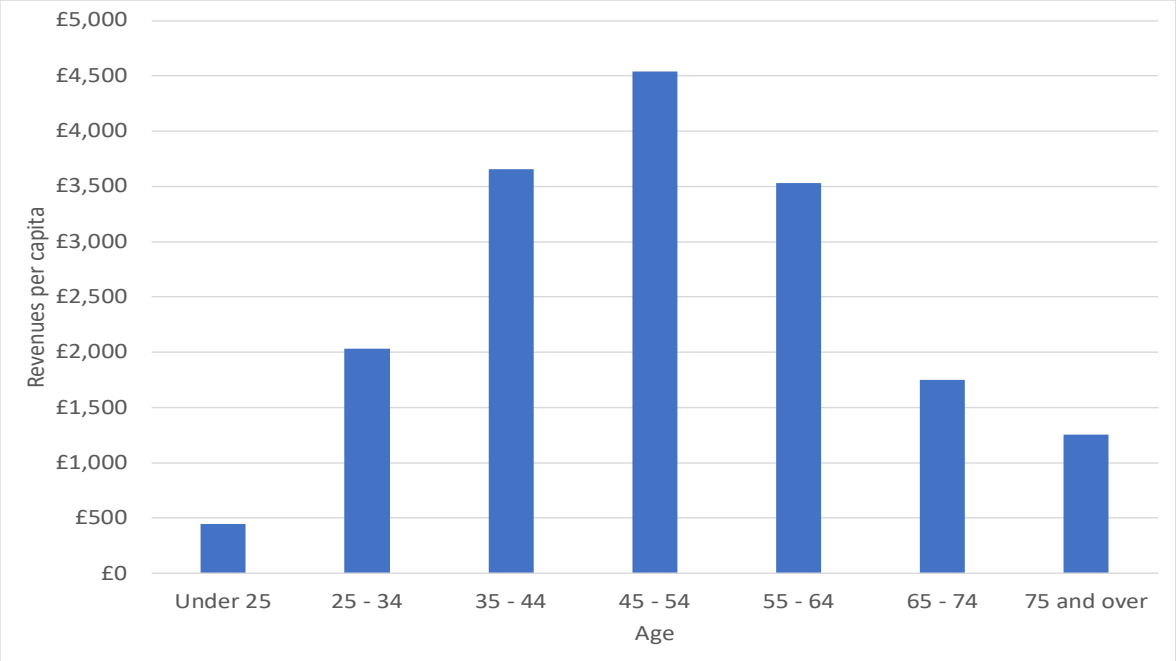
[8] This is analogous to the 'Barnett squeeze', whereby population-based increments to Scotland's funding under the Barnett formula mean that total funding would converge to Scotland's population-share of funding for England, if population growth was equal in both countries. Note that if population growth differs between the two nations, the 'Barnett squeeze' and similar 'BGA squeeze' would lead to funding and the BGAs to converge to a level that is higher or lower than Scotland's population share. For example, if Scotland's population is growing less quickly than rUK's, while each additional increment to the BGA would take account of the fact that Scotland's population share is falling, the existing BGA is not updated to account for this. This means that the BGA converges to a point where it is equal to more than Scotland's share of rUK revenues, penalising Scotland. (On the other hand, on the spending side, by not updating existing funding levels to account for Scotland's falling population share, funding under the Barnett formula converges to a level where the Scottish Government receives a higher-than-population share of funding, benefiting Scotland).

the population share, are likely to be smaller than under the Levels Deduction method. This means less of the induced-population changes will be offset via changes in the BGA for the CM method than the Levels Deduction method: i.e. the CM method will be more consistent with the 'economic responsibility' principle. But for the main devolved social security benefits, where initial spending per capita was higher than in rUK, the Levels Deduction lead to smaller increments in the BGA, and hence is less affected by changes to population shares. In this case, the Levels Deduction method will be more consistent with the 'economic responsibility' principle. It is worth noting that these differences in consistency are likely to be very marginal though.

4.2 Demographically-adjusted approaches

There is a clear relationship between age and average annual income tax liability. On average, tax liabilities are an increasing function of age throughout most of our working lives, as earned and unearned incomes increase. But from people's mid-50s onwards, income tax liabilities fall with age as earnings fall and people retire. This is illustrated in Figure 4.3. There is also a relationship between age and spending on most of the social security benefits that are devolved. Average spending per person on the main benefits being devolved tends to increase with age, driven in particular by PIP and Attendance Allowance. This is illustrated in Figure 4.4.

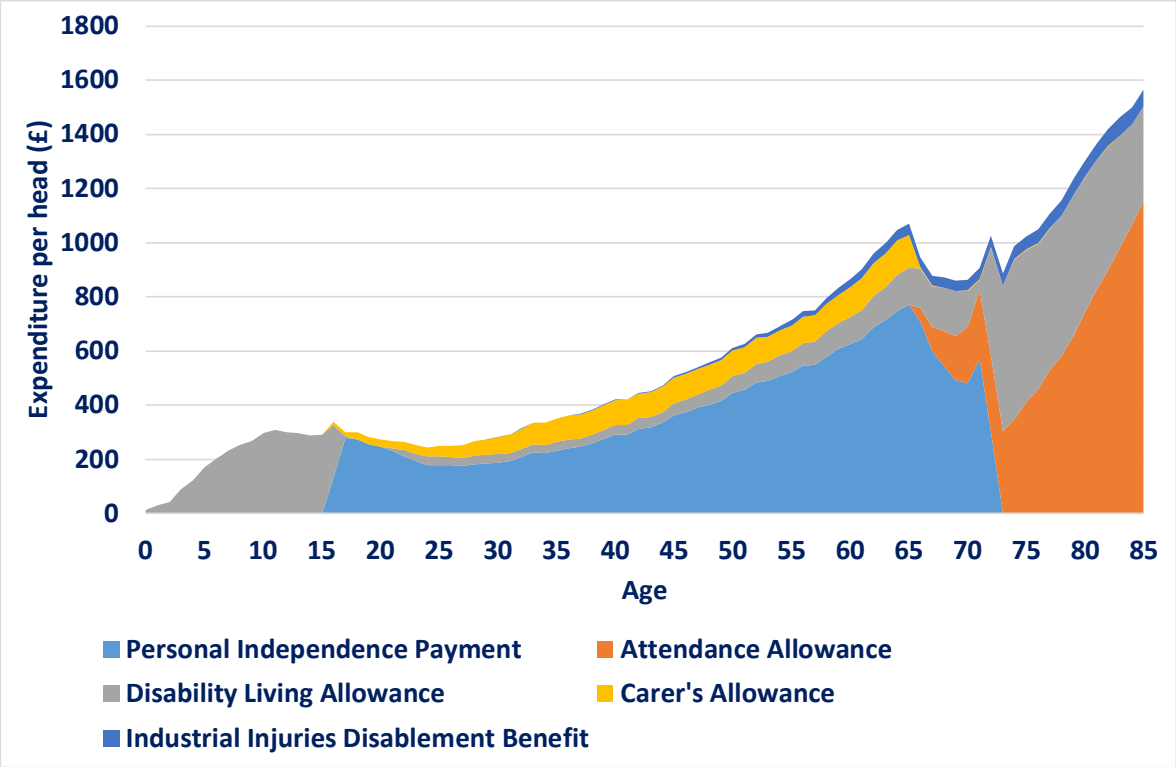
Figure 4.3. Income tax revenues per capita, Scotland, 2018/19



Notes: revenues per capita for each age group are calculated taking taxpayers and non-taxpayers into account.

Source: Author analysis of Survey of Personal Incomes and Registers of Scotland population data.

Figure 4.4. Per capita spending on devolved social security benefits, by age, Scotland



Source: Internal Scottish Government analysis based on DWP's StatXplore.

The shape of future demographic change – and the extent to which the share of the population by age varies over time – is likely to have an influence therefore on the growth rate of revenues and spending per capita. Note however that this is not as simple as saying that a more rapidly ageing population is disadvantageous, certainly in the case of income tax – the bell-shaped nature of the age-tax relationship in Figure 4.3 shows that the relationship between demographics is more nuanced than simply being about the ratio between working age and non-working population.

The observation that demographic change can influence the rate of revenue and spending growth has led some to suggest that the BGAs could take into account demographic changes over time. One way that this could be done is to adapt the IPC method, effectively estimating different BGAs for different demographic groups and summing these together to arrive at a total BGA for income tax (or one of the social security payments).

For example, the approach to calculating BGAs might involve distinguishing between six different age groups. A BGA could be calculated for each of these

age groups, by taking the growth rate of tax revenues per capita for each of those age groups in rUK, and applying these growth rates to the Scottish population in each age group. The total income tax BGA would then be the sum of the six elements.

Such an approach would insulate the Scottish Government from changes in revenues per capita (or spending per capita) associated with differential demographic change. If these changes reduced Scotland's revenues per capita relative to those of rUK, then the Scottish budget would benefit from such insulation. But the reverse is also true: if differential demographic change increased Scotland's relative revenues per capita, insulation from these effects would reduce the Scottish budget. This is perhaps not as unlikely as it sounds. The share of Scotland's population aged 40 – 55, a group which pays relatively more tax per person than other age groups, is projected to grow slightly more rapidly in Scotland than in rUK in coming years.

How consistent would a demographically-adjusted approach to calculating the BGAs be with the Smith Commission Agreement's principles?

First, note that a demographically-adjusted approach would fail to fully meet the 'taxpayer fairness' principle for the same reason that the IPC and CM approaches fail. The fact that changes in the BGA would take account of Scotland's differing levels of revenues per capita at the point of devolution and differing demographic trends, but spending changes via the Barnett formula are based just on Scotland's population share of spending changes in rUK, creates an asymmetry. In particular, tax increases applying only in rUK would, for income tax and stamp duty land tax, increase net spending on Scotland somewhat, while tax decreases for these taxes only applying in rUK would decrease net spending on Scotland, violating the taxpayer fairness principle.

Whether a demographically-adjusted approach would be more or less inconsistent with the 'taxpayer fairness' principle than the IPC method depends on whether demographic trends are likely to reduce or increase Scottish revenues per capita relative to those of rUK. For example, assuming revenues and spending are increasing in rUK, and assuming Scotland's demographic trends are unfavourable in terms of revenues per capita relative to rUK, insulating the Scottish budget from these trends would in effect transfer even more revenue from rUK to Scotland, violating the 'taxpayer fairness' principle by even more than under the IPC method. On the other hand, if Scotland's demographic trends are favourable in terms of revenues per capita relative to rUK, insulating the Scottish

budget from these trends would reduce transfers of revenue from rUK to Scotland, reducing the extent to which the 'taxpayer fairness' principle is violated compared to the IPC method.

If one believes that the 'no detriment' principle applies not just in the first year of devolution but in the years following devolution to factors/trends that can predicted with high probability in advance, then demographically adjusted methods would arguably be more consistent with this principle than methods that did not adjust for demographics, In particular, if one believes demographic trends can be predicted with high probability and the Scottish Government has limited ability to materially influence these trends, then it could be argued that failure to account for these trends when indexing the BGAs would cause undesirable detriment to either the Scottish Government (if those trends are unfavourable) or UK government (if those trends are favourable).

Demographic adjustment is also, arguably, more consistent with the principle that the UK government should bear the risk of UK-wide shocks. In particular, one may expect a common shock to affect revenues differently if demographic structures differ: for example, revenues are likely to be less cyclical (falling less in recessions and rising less in expansions) in areas where a higher fraction of the taxpaying population is aged over the state pension age. Accounting for differences in demographic structures and trends when calculating the BGAs would therefore mean the BGAs more closely approximate the shock affecting Scotland as part of a UK-wide shock.

Thus, relative to the IPC and CM methods, demographically adjusted methods are likely to be more consistent with the 'no detriment' and 'economic shock' principles but may be even less consistent with the 'taxpayer fairness' principle. They are also likely to be less consistent with the 'economic responsibility' principle because the Scottish Government would be insulated from the effects of its policies on the demographic structure of its population relative to rUK – and in turn, the effects (positive or negative) on revenues and spending. This would reduce the Scottish Government's incentive to implement policies that may help it attract more young adults (for which devolved social security spending per capita will be lower) or middle-aged adults (for which tax revenues per capita will be higher) to live in Scotland: the potentially beneficial effects to Scotland's public finances will be offset by the demographic adjustments.

It is also worth noting that demographically-adjusted approaches to indexing the BGA would further complicate the calculations, potentially undermining the

transparency of the determinants of the Scottish budget. Our consultation indicated that there is considerable concern that the current method for calculating the BGAs is already too complex for people to understand – and indeed, some respondents themselves showed evidence that they did not understand the intentions and implications of the current approach. Given that the intention was for tax devolution and the associated Fiscal Framework to enhance the accountability of Scottish ministers for the size of the Scottish budget (and hence resulting spending power), greater complexity in calculating the BGAs may be undesirable.

4.3 Taxbase-adjusted approaches

All the methods discussed so far take into account Scotland's higher or lower tax capacity at the point of devolution. This is done through the 'initial deduction' – the BGA is initially determined by the revenues actually raised in Scotland in the year prior to devolution, and all subsequent indexation is made in relation to this starting point. As already discussed, this approach ensures the achievement of the 'no detriment' principle – neither UK nor Scottish Government is immediately better or worse off as a result of the decision to devolve a tax – in the first year of devolution.

However, as well as having a different initial tax capacity, Scotland has a different initial distribution of taxpayers across the tax base. For income tax for example, Scotland had, at the point of devolution, a greater proportion of taxpayers who paid tax at the basic rate, and a lesser proportion of taxpayers who paid tax at the higher and additional rates.

These differences in the initial distribution of taxpayers can affect the outcome of a BGA indexation process. Given that Scotland has proportionately fewer additional rate taxpayers than the UK, then if the growth of income tax revenues from additional rate taxpayers is higher than the growth of income tax revenues from basic rate taxpayers, the BGA is likely to grow more quickly than Scottish revenues, even if the growth rate of revenues from Scottish taxpayers – at all points of the distribution – matches the growth rate observed for rUK taxpayers.

This type of issue has "emerged in the public domain since implementation of BGAs", as highlighted by one of the respondents to our survey. It can be illustrated with a hypothetical example. Panel 1 of Table 4.1 calculates total income tax revenues in Scotland and rUK for a base year under a scenario

where there are 2.5 million Scottish taxpayers, 25 million rUK income taxpayers, where the average tax liability in each tax band is the same in Scotland as in rUK, but where the distribution of taxpayers by band is somewhat different in the two nations.

If the growth of tax liabilities per taxpayer is equal across tax bands – for example, 5% – then both UK government revenues, and hence the BGA, and Scottish Government revenues grow at 5%. The Scottish budget is neither disadvantaged nor advantaged by its different initial distribution of taxpayers. This case is illustrated in Panel 2 of Table 4.1.

However, if the growth rate of tax revenues is not equal across tax bands, the outcome might not be as intuitive. Panel 3 of Table 4.1 assumes that, rather than growing equally across bands, tax liabilities per taxpayer grow at 3% for the basic rate band, 5% for the higher rate band, and 7% for the additional rate band, *and that this pattern of growth in revenues by band is observed in both Scotland and rUK*. This divergence could come about because of faster income growth amongst higher income earners, or it could come about because income growth is even across the distribution, but tax rates are lowered at the basic rate and increased at the additional rate.

In this case, the fact that rUK has proportionately more additional rate taxpayers causes rUK total income tax revenues to grow more quickly than those in Scotland. Specifically, Scottish Government tax revenues grow 4.5% whereas UK government revenues grow 4.9%. The result is that the BGA will grow more quickly than Scottish revenues, *despite the fact that the growth rate of Scottish income tax liabilities at all individual points in the income distribution has matched the growth rate of rUK revenues*.

Table 4.1. Illustrating the potential impacts of differences in the distribution of taxpayers on revenue growth

Panel 1: Base year					
	Proportion of taxpayers by band		Mean tax liability per taxpayer	Revenue £m	
	Scot	rUK		Scot	rUK
Basic	88%	86%	2,000	4,400	43,000
Higher	11%	12%	12,000	3,300	36,000
Additional	1%	2%	80,000	2,000	40,000
Total	100%	100%		9,700	119,000
Taxpayers (million)	2.5	25			
Panel 2: 5% tax liability growth at all points of distribution					
Basic	0.88	0.86	2,100	4,620	45,150
Higher	0.11	0.12	12,600	3,465	37,800
Additional	0.01	0.02	84,000	2,100	420,00
Total				10,185	124,950
Growth on base year				**5.00%**	**5.00%**
Panel 3: tax liability growth 3%, 5% and 7% at basic, higher at additional rate					
Basic	0.88	0.86	2,060	4,532	44,290
Higher	0.11	0.12	12,600	3,465	37,800
Additional	0.01	0.02	85,600	2,140	42,800
Taxpayers (million)	2.5	25		10,137	124,890
Growth on base year				**4.51%**	**4.95%**

Source: Authors' calculations.

Of course, the reverse is also possible. If revenues from basic rate taxpayers grew more quickly than revenues from additional rate taxpayers, in both Scotland and rUK, then this could favour the Scottish budget (since the part of the tax base experiencing the most rapid tax growth accounts for a larger share of revenues in Scotland).

Since the Scottish Government cannot control the distribution of its taxbase at the point of devolution, taking this distribution into account in the way that the BGA is indexed could be argued to be more consistent with the 'no detriment' principle in its dynamic interpretation.

One way of taking these distributional issues into account is to calculate separate BGAs for each tax band. This is the approach adopted in Wales. The

'by band' method is useful in protecting the Scottish budget from the effects of a different starting distribution of taxpayer income. Under the 'by band' approach, the devolved budget is protected from the risks of proportionately faster growth from the additional or higher rates in rUK than from the basic rate – whether that comes about through faster growth in taxpayer incomes in the upper part of the distribution, or tax policy changes that increase the share of tax revenues raised from the higher and additional bands.

Taxbase-adjustment is also, arguably, more consistent with the principle that the UK government should bear the risk of UK-wide shocks. In particular, one may expect a common shock to affect revenues differently if taxbase structures differ: revenues are likely to be affected differently depending on the tax structure in different types of economic shocks.

For example, a big shock to the stock market and finance sector of the economy will likely effect revenue growth from higher income bands more than lower income bands. Conversely, a shock to employment in low-paying occupations is likely to have a bigger effect on overall revenues when there are proportionately more taxpayers in that part of the income distribution, and hence a higher share of revenues come from basic rate taxpayers. Accounting for differences in tax base structures when calculating the BGAs would therefore mean the BGAs more closely approximate the shock affecting Scotland as part of a UK-wide shock.

However, the 'by band' approach is not fully consistent with the 'taxpayer fairness' principle, largely for the same main reason that the IPC and CM methods are not consistent with that principle. Depending on the specific circumstance, the 'by band' approach could be either less consistent or (slightly) more consistent with the taxpayer fairness principle than the IPC approach. For example, if the UK government were to change tax policy in such a way as to increase revenues from additional rate taxpayers, then the effect of the by band method is likely to be that a slightly greater proportion of the additional UK government revenues from this policy would be transferred to Scotland than under the IPC method. (This is because the by band method results in a somewhat lower increase to the BGA, since it takes account of Scotland's lower proportion of additional rate taxpayers). However, if the UK government were to introduce a policy that increased revenues from basic rate taxpayers, the 'by band' approach might lead to a slightly higher BGA than the IPC would do, reducing overall transfers of revenues from rUK to Scotland.

Thus, relative to the IPC and CM methods, taxbase adjusted methods are likely to be more consistent with the 'no detriment' and 'economic shock' principles but may be even less consistent with the 'taxpayer fairness' principle. As with demographically-adjusted approaches, taxbase-adjusted approaches are more complex, potentially posing issues for accountability and transparency. However, there may be an opportunity to learn from the experience of Wales, where such an approach is in use for income tax.

4.4 Approaches that provide insurance against divergent revenue and spending trends

Setting the initial BGAs equal to the revenues and spending being devolved provides full insurance, at the point of devolution, to the Scottish Government for revenues being lower per capita and spending higher per capita than rUK at that initial point.

As discussed in the sections above, the various methods (IPC, CM, Levels Deduction, demographically-adjusted methods, taxbase-adjusted methods) provide insurance against shocks affecting the whole of the UK – albeit sometimes too little and sometimes too much insurance. However, the methods provide little insurance against divergences in revenue or spending trends post-devolution, except for those related to the specific factors adjusted for: such as differential population (IPC), differential ageing trends (demographically-adjusted methods), and different initial taxbase structures (taxbase-adjusted methods).

Under the IPC method for example, the Scottish Governments bears the full risk of slower or faster percentage rate of growth of revenues or spending than in rUK. Under an approach that adjusted for demographic trends and taxbase structures, the Scottish Government would bear in full the risk that people of a given age and income level saw a slower or faster rate of growth in tax payments or spending receipts, on average, in Scotland than rUK.

If differences in the appropriately adjusted rates of growth in revenues and spending are driven to some extent by factors outside the control of the Scottish Government, there may be a case for providing insurance against the risk of ongoing and growing divergences. In its response to our consultation, the Scottish Government argued that "there is a case for some form of limited fiscal

insurance that could be incorporated into the devolved taxes, that could be a revision to the current BGA system or something more akin to the Welsh Government's "funding floor".[9] The Scottish Government also said it thought that this could be done "whilst remaining consistent with the Smith Commission principles".[10]

It is beyond the scope of this report to consider changes to how the underlying block grant itself is adjusted – although we note that the Smith Commission Agreement said that it should continue to be determined by the Barnett formula.

With regards to the BGAs themselves, there are, in principle, two broad approaches available for incorporating insurance in to the Scottish Fiscal Framework: the specification of pre-determined limits on the size of the gap between BGAs and revenues (or spending) that are allowed to open up; and periodically 'resetting' the BGA to account for changes in underlying taxbases or spending needs since the BGAs were initially set (or last reset).

The first approach is to specify pre-determined limits (a 'floor', and to ensure fairness and symmetry, 'a ceiling') on the gap between devolved revenues and spending and the corresponding BGAs that are allowed to appear before there are funding transfers to or from the Scottish Government to limit further divergence. For example, it might be agreed that if the BGA for income tax exceeded devolved income tax revenues by more than a certain percentage or cash amount, the UK government would provide additional funding to cap the Scottish Government's net funding reduction. On the other hand, if devolved revenues exceeded the BGA by more than a certain percentage or cash amount, the Scottish Government would transfer any further net gains to the UK government.

A more nuanced version of this arrangement would also be possible, whereby below and above pre-determined thresholds, the Scottish Government's budget would be exposed to some proportion (between 0% and 100%) of further divergence between devolved tax revenue (or spending) and the corresponding BGA.

The second approach is to periodically update or 'reset' BGAs to account for changes in Scotland's relative tax base or spending needs. For example, after a

[9] Paragraph 33 of the Scottish Government's evidence submission.
[10] Paragraph 34 of the Scottish Government's evidence submission.

predetermined period of five or ten years, the Scottish and UK governments could agree to update the BGAs to account partially or fully for changes in tax bases or spending needs in the intervening years. Such an approach would mean that immediately following a reset, the Scottish Government would bear the risk of divergences for the full five or ten years until the next reset, whereas just prior to a reset it would bear the risk for just a year, at which point the BGAs would be reset. This would mean the Scottish Government's incentives to undertake policies that could help increase the tax base and reduce spending needs would vary over time. And indeed, the Scottish Government could have an incentive to engage in actions that temporarily depress the tax base or push up spending needs immediately prior to a reset, so that BGAs were correspondingly adjusted. (For example, the timing of salary payments for government employees could be adjusted, or processing times for fully devolved taxes increased).

A variation on a fixed periodic reset is to reset the BGAs on a rolling basis. For example under a 5-year rolling reset, in the sixth year of devolution, the BGA would be updated based on the taxbase or spending needs in the first year of devolution; in the seventh year, it could be updated based on the taxbase or spending needs in the second year of devolution; and so on. This is the approach that the UK government has previously suggested for resetting revenue baselines for English councils as part of the business rates retention system.

Implementing any of these approaches in practice would be subject to a significant challenge: Changes in tax and social security policy post-devolution in both Scotland and rUK mean it would be difficult to estimate what revenues and spending would be in Scotland if policy had remained in line with rUK. But resets of limits have to be set on the basis of policy being the same in Scotland and rUK, otherwise the Scottish Government would be compensated for tax cuts (and spending increases) and penalised for tax increases (or spending cuts).

For example, a decrease in income tax rates in Scotland relative to rUK would reduce revenues relative to the BGA. But it would not make sense for the Scottish budget to be insured against this policy-induced reduction in revenue as this would mean that Scottish residents would be paying lower taxes but not bearing the full costs. This would be inconsistent with the 'economic responsibility' principle and would incentivise the Scottish Government to reduce taxes and increase social security spending, knowing that it would not bear the full costs.

There are two stages to adjusting revenues and spending for divergences in policy post-devolution: adjusting for the mechanical effects of differences in policy given the tax base and spending needs pertaining; and adjusting for the behavioural effects of policy divergences, which can affect tax bases and spending needs.

To do the first, one would need to calculate what Scottish revenues and social security spending would be if the policy in place in rUK applied in Scotland. For taxes where the only things that have diverged post-devolution are tax rates and bands, such as income tax, this should be feasible. This should also be the case for benefits where all that has changed are payment amounts. However, for taxes where there have been changes to taxbases, and benefits where there have been changes to eligibility criteria and assessment processes, such as disability benefits, this would be a much more difficult challenge.

Adjusting for behavioural effects is also difficult. For example, if the tax base or number of people eligible for a benefit has grown more or less in Scotland than in rUK post-devolution, to what extent is this driven by differences in policy, versus being driven by other underlying socio-economic factors. This is an important question to address, because while we may want to insure the Scottish Government against risks associated with the latter, we would want it to bear the behavioural as well as the mechanical effects of its policies on its revenues and spending. For example, if the Scottish Government were to have a substantially higher tax rate on incomes above £150,000 (a highly responsive group of taxpayers), we would want it not only to gain revenues as a result of the higher tax rates, but also to lose as a result of behavioural responses undertaken by taxpayers to reduce their tax liabilities (such as reducing the work effort, engaging in greater tax avoidance or evasion, or migrating). If the Scottish Government does not bear these costs, its incentives are skewed towards setting higher tax rates and more generous benefits policies than would otherwise be the case.

However, even after a policy is implemented, one cannot know for sure what the behavioural response to it is – one can only estimate it statistically, and such estimates are subject to both measurement error and methodological difficulties. For a tax such as income tax, even relatively small differences in estimates of the scale of behavioural response can mean differences of tens of millions of pounds in revenue. Agreeing the size of the behavioural adjustments to make to estimates of the tax revenue capacities of the devolved governments would therefore likely be very politically difficult. It is for this reason that the 2016 Fiscal

Framework suggests that behavioural 'spillover' effects of one government's decisions on the revenues or spending of other governments should only be compensated for in exceptional circumstances.

Thus, implementing insurance via the BGAs in a way that is consistent with the principle of 'economic responsibility' is likely to be difficult in practice. It will prove difficult to adjust for even the mechanical effects of policy divergences for taxes and benefits where there have been major changes in the design post-devolution; and adjusting for the behavioural effects of policy divergence would require agreement on uncertain behavioural elasticities.

How would the provision of insurance relate to the other Smith Commission Agreement's principles?

With regards to the principle that the UK government should bear the risk of UK-wide shocks, the implementation of floors/ceilings or resets to the BGAs would not adversely affect this.

With regards to the 'no detriment' principle, if one believes that this applies dynamically beyond the first year of devolution, then in principle, insurance against long-term divergences in tax base and spending needs growth could make the BGAs more consistent with this principle. This is because it would stop the Scottish Government or UK government suffering detriment over time from factors outside of the Scottish Government's control.

With regards to the 'taxpayer fairness' principle, the effect of insurance will depend on how Scottish taxbases and spending needs evolve relative to rUK. As discussed above, the methods considered so far would likely violate this principle over time by transferring to Scotland part of the revenues raised from devolved taxes in rUK. This is because the BGAs take account of Scotland's lower initial revenues per capita, whereas Scotland will in general benefit from a population-based share of higher spending funded by those higher taxes. If post-devolution, Scotland's tax base was to decline relative to that of rUK (as it has done so far for income tax, for example), implementing a floor or updating the BGAs would result in further transfers of revenue from rUK to Scotland, further violating the taxpayer fairness principle. In contrast, if post-devolution, Scotland's tax base was to grow relative to that of rUK, implementing a ceiling or updating the BGAs would result in reduced transfers of revenues from rUK to Scotland, meaning that the taxpayer fairness principle would be less violated.

In summary therefore, providing insurance via the BGAs is technically difficult, especially in a way fully consistent with the 'economic responsibility' principle. Insurance arguably would be consistent with the 'no detriment' principle. And whether it further reduced or increased consistency with the 'taxpayer fairness' principle would depend on whether Scotland ended up benefiting from or losing from the insurance system.

4.5 Approaches not based on revenues or spending in rUK

It is sometimes suggested that the growth of BGAs should be indexed not to the growth of equivalent revenues or spending but to some other measure instead. Mooted candidates have included nominal GDP, inflation or earnings.

Such an approach might be relatively simpler to understand and interpret. But it would not be consistent with the Smith Commission Agreement's principles.

Such an approach would not meet the 'taxpayer fairness' principle. If the UK government changed tax policy in a way to raise revenues and spending, the Scottish budget would benefit from the increased spending but there would be no commensurate increase in its tax BGA, if this were indexed to something other than comparable revenues. Conversely, if the UK government cut tax rates and spending, the Scottish budget would be reduced despite the tax cut not applying in Scotland.

More generally, whenever rUK revenues were increasing more rapidly than the alternative index (whether that is GDP, earnings, inflation, or something else), the outcome would be detrimental to rUK taxpayers (since the BGA would increase less quickly than the increase in rUK revenues and spending). If rUK revenues increased more slowly than the alternative index, the result would be detrimental to Scottish taxpayers.

Indexing to an alternative measure would also be unlikely to meet the principle that the UK government should manage the fiscal risks of UK-wide economic shocks. A UK-wide shock that reduces tax revenues across the UK (or that increases social security spending across the UK) may not have proportionately similar effects of alternative indexes.

In 2020/21 for example, revenues from property transactions taxes fell by nearly one quarter, and revenues from income tax revenues grew by 1%. Nominal GDP fell by 5%, earnings grew by around 2.6%, and CPI inflation was about 0.6%. None of these alternative indexes would therefore have done a good job at protecting the Scottish budget from the effects of the fall in LBTT revenues across the UK (including Scotland). On income tax, the Scottish budget would not have been protected from the effects of weaker revenue growth if the BGA had been indexed to earnings, but would have been significantly 'over-insured' had the BGA been indexed on the basis of GDP.

Indexing the BGAs to an alternative measure would be unlikely to achieve the 'no detriment' principle in its dynamic sense. Whether or not the Scottish budget ended up better or worse off as a result of tax devolution would largely be arbitrary, and would depend on the extent to which revenues or spending grew differentially to whatever index had been chosen.

The alternative approaches would largely meet the 'economic responsibility principle' though. For example, suppose that the BGA is indexed to the growth in GDP, or earnings. If the Scottish Government implemented a tax policy which increased revenues, it would gain from the increase in its revenues at the margin, relative to a decision not to implement the tax increase. However, as noted above, the baseline on which this marginal effect is considered is essentially arbitrary. And if the alternative index was related to Scottish (rather than rUK) revenue or economic performance, this principle would be significantly violated.

In summary, indexing the BGAs to changes in equivalent, or comparable, rUK revenues and gets much closer to the achievement of the Smith principles than any of these alternatives would achieve.

5. Discussion and conclusions

Devolution of tax and social security responsibilities requires adjustments to be made to the Scottish Government's block grant. The Smith Commission's Agreement, which recommended the tax and social security powers to be devolved, proposed a number of principles it believed should guide the operation of the Scottish Government's fiscal framework following tax and spending devolution, including the calculation of these block grant adjustments (BGAs).

This report has evaluated the current and alternative methods for calculating the BGAs. In particular, it has assessed the extent to which different methods for calculating BGAs are consistent with the Smith Commission's principles. It has also considered the balance of fiscal risks and incentives faced by the Scottish Government under the different approaches, and how these differ from the balance of fiscal risks and incentives for previously devolved spending responsibilities, funding for which is updated each year via the Barnett formula.

No single method for indexing the BGAs can fully achieve all of the Smith Commission's principles

Our overarching conclusion is that it is not possible to fully satisfy all of the Commission's principles for the design of the Scottish fiscal framework. Some of the principles are mutually incompatible with one another. Several approaches to calculating the BGAs can achieve the Smith Commission principles partially, but none can achieve them all in full.

The fundamental tension is between the 'taxpayer fairness' principle on the one hand, and the 'no detriment' principle on the other. Achievement of the taxpayer fairness principle requires that BGAs are calculated using the 'Barnett Formula' approach (also known as Levels Deduction in the case of tax BGAs). This approach – which increases the Scottish Government's BGA in line with a population share of the change in total rUK revenues or spending – best ensures that tax changes in rUK do not affect spending in Scotland, by exactly offsetting changes in funding for pre-existing devolved services via the Barnett formula.

However, the Barnett Formula/Levels Deduction approach is not compatible with the 'no detriment' principle in its dynamic context. It is reasonable to interpret the 'no detriment' principle as having implications beyond the first year of devolution, since the Smith Commission highlighted the need for 'appropriate' indexation when defining this principle. Scotland's lower tax capacity would mean that, for example, revenues per capita would need to grow at a faster percentage rate than those in rUK to keep pace with BGAs that increase by population-based increments. This would mean that the Scottish budget would be expected to suffer detriment as a result of the decision to devolve taxes to Scotland, unless revenues grew at a faster rate per capita in Scotland until they converged with rUK levels.

The IPC and CM methods – which are the arrangements cited in the existing Fiscal Framework for tax BGAs – are more compatible with the 'no detriment' principle, since they do not require Scottish revenues to grow proportionately faster simply for the Scottish budget not to suffer detriment as a result of devolution. However, these methods do not meet the taxpayer fairness principle in full.

The IPC and CM methods account for Scotland's lower overall tax capacity at the point of devolution. This means that when revenues are increasing in rUK, a portion of these is effectively transferred to Scotland. This is because while Scotland would typically benefit from a population-based share of the increase in spending funded directly by those higher revenues (either via the Barnett formula or when they are spent on reserved services), the increase in the BGA would be based on Scotland's tax capacity, which is generally lower than its population share. The increase in the BGA would therefore not fully offset the increase in underlying funding for Scotland. As a result, revenues raised from devolved taxes in rUK would partly be funding spending in Scotland, violating the 'taxpayer fairness' principle.

Different BGA methods achieve the Smith Commission's principles to varying extents

Our second conclusion is that different BGA approaches achieve each of the Smith Commission principles to varying extents.

For example, the IPC and CM methods satisfy the 'taxpayer fairness' and 'no detriment' principles to different extents. While neither *fully* satisfy the 'taxpayer fairness' principle, the CM method is closer to satisfying it, as it treats population growth in the same way as the Barnett formula. In contrast, the IPC method

arguably better satisfies the 'no detriment' principle in the years following devolution as it fully adjusts for the fact that relative population growth – which the Scottish Government may have little control over – is an important determinant of aggregate tax revenue growth.

Similarly, the IPC and CM methods satisfy the 'economic responsibility' and 'economic shocks' principles to different extents. In terms of economic responsibility, the IPC approach insulates the Scottish budget from the effects that its policies might have on revenues via increases or decreases in population, contrary to the 'economic responsibility' principle. In contrast, under the CM method, which does not fully adjust for differential population growth, the Scottish budget would increase if its policies caused population (and hence revenues) to increase.

On the other hand, the IPC method is arguably more consistent with the principle that the UK government should bear the risk of shocks affecting the whole of the UK. This is because a common shock across the UK as a whole is more likely to have a common effect on revenues or spending *per capita*, rather than aggregate revenues or spending.

As well as examining the IPC and CM methods, this report has also considered the extent to which a number of other BGA mechanisms are consistent with the various Smith Commission principles.

The Table overleaf summarises our conclusions. The more consistent we judge an approach to be for a given principle, the darker the shade of green. For ease of reference in interpreting the table, we reproduce here the Smith Commission principles:

- **UK economic shocks**: The UK government should continue to manage the fiscal risks and shocks that affect the whole of the UK for the newly devolved revenue streams and spending responsibilities.
- **Economic responsibility**: The devolved Scottish budget should benefit in full from policy decisions by the Scottish Government that increase revenues or reduce expenditure, and the devolved Scottish budget should bear the full costs of policy decisions that reduce revenues or increase expenditure.
- **No detriment from the initial decision to devolve**: There should be no detriment to the Scottish or UK governments' budget simply as a result of the initial transfer of tax and/or spending powers. In defining

this principle, the Commission also stated that the BGAs should be 'indexed appropriately'. This implies that as well as relating to the **initial year** in which devolution occurs, the principle also has a **dynamic** interpretation, i.e. is the existence of particular issues or trends when devolution occurs likely to cause detriment to the Scottish budget in future years?

- **Taxpayer fairness**: Changes to taxes in the rest of the UK, for which responsibility in Scotland has been devolved, should only affect public spending in the rest of the UK; changes to devolved taxes in Scotland should only affect public spending in Scotland.

Table 5.1. Consistency of different BGA indexation mechanisms with the Smith Commission Agreement's principles

Indexation Mechanism	UK-wide shocks	Economic responsibility	No detriment, initial year	No detriment, dynamically	Taxpayer fairness
IPC	Largely achieves – insulates Scottish budget from the way that UK-wide shocks effect revenues or spending per capita	Largely achieves – but Scottish budget insulated from effect of SG policies on relative population growth	Fully achieves – initial deduction based on revenues/spending actually incurred immediately prior to devolution	Largely achieves - accounts for different initial tax capacity or social security spending per capita and differences in population growth rates	Partially achieves – but tax revenue increases in rUK can increase spending in Scotland, tax cuts in rUK can lead to spending falling in Scotland
CM	Mostly achieves – but inferior to IPC because it makes sense to think about the effects of fiscal shocks in per capita terms	Very largely achieves – but Scottish budget is still partially insulated from effect of SG policies on relative population growth	Fully achieved, as above	Mostly achieves - accounts for different initial tax capacity or social security spending per capita and differences in population growth rates	Mostly achieves – while similar to IPC in many respects it treats population in a manner consistent with Barnett formula
Levels Deduction	Partially achieves – BGA adjustments are made in population terms rather than percentage terms, leading to under or over insurance	Very largely achieves – but Scottish budget is still partially insulated from effect of SG policies on relative population growth	Fully achieved, as above	Very partially achieves – does not account for Scotland's different initial tax capacity of social security spending per capita or differences in population growth rates	Very largely achieves – and fully achieves when changes in tax revenues are associated with changes in funding via the Barnett formula rather than in reserved spending
Taxbase-adjusted	Very largely achieves – insulates Scottish budget from the way in which UK-wide shocks effect revenues or spending per capita, including via the effects on different groups of taxpayers	Largely or very largely achieves – depends on whether it is combined with IPC or CM	Fully achieved, as above	Very largely achieves – in addition to IPC, also controls for effect of initial distribution of taxpayers on future revenue growth	Partially achieves – for same reasons as IPC
Demographically-adjusted	Very largely achieves – insulates Scottish budget from the way in which UK-wide shocks effect revenues or spending per capita, including via the effects on different demographic groups	Mostly achieves – but Scottish budget is insulated from effect of SG policies on demographic structure	Fully achieved as above	Very largely achieves – in addition to IPC, it also controls for differential demographic trends, which may be difficult for SG to influence directly	Partially achieves – for same reasons as IPC
Not linked to rUK revenues	Will not achieve in general – no mechanism to adjust when rUK revenues or spending change during a shock	May fully achieve – but not if chosen indexation method reflects Scottish revenues or economic performance	Fully achieved, as above	Will not achieve in general – no mechanism to reflect	Will not achieve – no mechanism to mitigate impact of rUK tax changes on Scottish spending

Note: Darker shades indicate greater consistency with a given Smith Commission principle.

Source: Author's analysis of the BGA indexation mechanisms.

The Table shows that indexing the BGAs in a way that accounts for different initial taxbase structures would be more consistent with the 'no detriment' principle in the years following devolution. This is because, at the point of devolution, the Scottish Government did not have a meaningful ability to influence its tax base structure. (Although arguably, different policies in the years before devolution could have influenced it).

Indexing the BGAs in a way that accounts for differential demographic trends would be more consistent with the 'no detriment' principle in the years following devolution if one believes that the Scottish Government has little ability to influence relative demographic trends. However, if such adjustments were to lead to slower increases in the BGA than otherwise, additional revenues would be transferred from rUK to Scotland, further violating the taxpayer fairness principle.

Using the Levels Deduction method would be most consistent with the taxpayer fairness principle, and would like the CM method be more consistent with the economic responsibility principle than the IPC approach. But because it does not account for differences in tax capacity or spending per capita, it would be less consistent with the 'no detriment' principle in its dynamic form, and would 'over-insure' Scotland's budget against UK-wide economic shocks.

The Table also shows that, with the exception of the 'economic responsibility' principle, indexing the BGAs according to factors other than revenue growth in rUK would violate each of the Smith Commission's principles.

In addition, it is also worth remember that while introducing an element of insurance against divergence in revenues trends could, in certain circumstances, improve consistency with the 'no detriment' principle, it would be very challenging to make this consistent with 'economic responsibility'.

Finding compromise… can the principles be prioritised?

If no method is fully consistent with the Smith Commission Agreement's principles, and different methods better satisfy the different principles to varying extents, the Scottish and UK governments have two ways forward when determining which BGA indexation method to use.

One option is to agree how much weight to put on different principles. For example, the higher the weight one applies to the 'no detriment principle', the more attractive methods that adjust for factors such as initial revenues per

capita, tax base structures, and population and demographic change, are likely to be. Such methods are also likely to be more attractive the more weight one places on the idea that the UK government should continue to bear the risk associated with UK-wide shocks, given such factors are likely to affect how UK-wide shocks impact on Scotland specifically.

In contrast, the more weight one applies to the 'taxpayer fairness' principle, the more attractive the Levels Deduction and to a lesser extent the CM method would be. These methods would also be more consistent with the 'economic responsibility' principles.

In its response to our consultation, the Scottish Government said that it felt the 'no detriment' principle should be prioritised. The UK government did not respond to the consultation, but in 2016 interpreted the 'no detriment' principle as applying in the first year of devolution only, with the 'taxpayer fairness' principle applying in subsequent years.[11] Agreement would therefore require compromise.

The Scottish Parliament Finance and Public Accounts Committee asked that this independent report make a recommendation on which principles to prioritise. This would be beyond the terms of reference agreed for this report, which explicitly requested that this we do not make recommendations. It is also our view that this fundamentally political decision needs to be made by elected politicians. However, we can make some suggestions on the issues only should consider when prioritising the principles.

Two seem most relevant.

The first is the priority placed on redistribution and sharing within the UK's fiscal union. The more priority placed on this, the greater the priority one would want to assign to the 'no detriment' principle (including in years following devolution) and the principle that the UK government should bear the risk of UK-wide economic shocks.

If one puts significant emphasis on redistribution and sharing as key tenets of the fiscal union, one would presumably accord lower priority to the taxpayer fairness principle. In particular, one would presumably be relatively unconcerned

[11] See the letter from the Chief Secretary of the Treasury to the Chair of the Scottish Affairs Committee, CST_response_SAC.pdf (publishing.service.gov.uk).

about revenues being redistributed from rUK to Scotland to compensate for its lower tax capacity – indeed, this could be seen as a positively good thing if one prioritises redistribution and sharing within the Union. In addition, a concern for redistribution and risk sharing would also suggest an openness to considering a role for fiscal insurance and updates to the BGAs for large and/or long-term divergences in revenue and spending trends. This could redistribute funding from rUK to Scotland or vice versa, depending on relative tax base growth.

The second is the importance placed on increasing the responsibility of the Scottish Government for improving the economic performance of Scotland. The greater the emphasis placed on this, the greater the emphasis one would wish to place on the 'economic responsibility' and 'taxpayer fairness' principles. For example, if one feels that the Scottish Government should be responsible for addressing its low revenues per capita for income tax post-devolution, one may be willing to see the unwinding of existing redistributive flows, as implied by the Levels Deduction approach.

In other words, the question here is fundamentally about what type of fiscal union that exists between Scotland and rUK in respect of taxes and social security benefits that are devolved. Does devolution mean a fundamental shift towards greater local responsibility for relative economic performance, and an unwinding of previous risk-sharing and redistributive arrangements? Or does devolution take place in the context of a fiscal union which still emphasises a high degree of risk-sharing and solidarity, even for taxes and spending which is devolved?

The extent to which this question can be answered by drawing on wider precedence in the operation of fiscal arrangement across the UK is ambiguous. On the one hand, for taxes that have been devolved prior to 2016, such as Non-Domestic Rates and Council Tax, there is no explicit revenue sharing between Scotland and rUK. Effectively, something akin to Levels Deduction operates for Non-Domestic Rates, with changes in revenues for this tax in rUK translating into a population-based adjustment to the Scottish Government's block grant funding. Similarly, there is no explicit needs assessment on the spending side, which allocates the Scottish budget population-based shares of changes in rUK spending.

On the other hand, arrangements in Wales now incorporate a 'funding floor' to prevent funding for the Welsh Government falling below a particular per capita level relative to equivalent spending in England, and do take account of the

differential tax base structure in Wales. More generally, the benefits of fiscal pooling and sharing are frequently stressed by the UK government as major principles of UK's fiscal union.

Finding compromise…the division of responsibility for different types of fiscal risk

An alternative approach to agreeing the BGA mechanisms would be to focus on the types of risks and incentives one thinks the Scottish Government should face in relation to devolved taxes and social security benefits. One of the respondents to our consultation suggests that the Smith Commission was a "rushed fix" and argues that it should not be "decisive for the decisions to be taken in the Fiscal Framework Review".

For example, one may decide that the Scottish Government cannot now influence its initial levels of revenues per capita and tax base structure. On the other hand, one may decide that while relative population and demographic trends are largely explained by factors outside of the Scottish Governments control, it does have sufficient influence – through policies that make Scotland a more attractive place to live and raise a family – for it to face the financial effects of such policies.

Such reasoning would point towards the use of the CM method, with an appropriate tax base structure adjustment (such as separate BGAs for each tax band). This could be complemented by a degree of fiscal insurance to prevent large divergences in population and demographic trends having substantial detriment to the Scottish budget, given that a significant part of such divergences are likely to be outside the Scottish Government's control.

If instead, one felt that the Scottish Government should be insulated from risks associated with differential population growth, but that it should bear the consequences of having fewer high earners than rUK, one could favour the standard (i.e. currently used) IPC method.

The need for transparency

Both during and following the re-negotiation of the Scottish Fiscal Framework and BGA calculation methods, the Scottish and UK governments should also bear in mind the transparency and public understanding of the operation of the BGAs. These issues of transparency and understanding were raised by a number of respondents to our consultation. There may be a trade-off between

more complex mechanisms which better meet certain Smith Commission or other principles, and the ability of key stakeholders in the Scottish and UK parliaments and civil society to understand the rationale for and implications of the arrangements.

The governments should set out not only the calculations that will be used but explain clearly why these arrangements have been chosen, and what their implications are for the types of risks and incentives the Scottish Government will face. They should highlight which Smith Commission principles have been prioritised, and if alternative principles have guided decisions, what those principles are.

The governments should continue to publish – and if possible improve – analysis of the outcomes of the operation of the Fiscal Framework. This should include figures for the BGAs and devolved revenues and spending. Additionally, where adjustments have been made to account for differential population and demographic change and/or differences in tax base structures, or insurance mechanisms been implemented, the impacts of these on the BGAs (and the net tax/spending positions) should be shown so that the transfers to/from the Scottish Government that these entail can be monitored, informing any further future reviews of the Fiscal Framework.

In summary, the BGAs are a critical component of tax and social security devolution. No single method perfectly meets all the principles of the Smith Commission Agreement simultaneously. In agreeing a mechanism to use in future, compromise will be required. Both governments should aim to set out transparently the rationale for whatever compromise solution is ultimately agreed, and the implications of that for the way in which various fiscal costs and risks are shared.

Appendix A. Call for evidence documentation & questions

1. Introduction

1. This note provides background information to help you respond to our survey on the design and operation of the block grant adjustments (BGAs) made to the Scottish Government's funding to reflect recently devolved tax revenues and social security spending.

2. The survey is informing our independent report on the BGAs, commissioned jointly by the Scottish and UK governments, to feed into a wider review of the Scottish Government's fiscal framework.

3. The requirement for an independent report into the BGAs was set out in the 2016 agreement on the fiscal framework between the two governments. The 2016 agreement identifies different approaches to calculating the BGAs, but specifies one approach (known as indexed per capita) that will apply for a 'transitional period'. The transitional period is set to last from the adoption of the 2016 framework until the conclusion of the governments' review of the arrangements. The 2016 agreement specified that the governments' joint review of the arrangements would be informed by an independent report on the BGAs. The agreement states that the identified approach to calculating the BGAs had been agreed for the transitional period and it "does not include or assume the method for adjusting the block grant beyond the transitional period".

4. Throughout this note, we describe the approach to calculating BGAs that has operated during the transitional period as the 'current approach'.

5. This note is structured as follows:

    - Section 2 explains Scotland's block grant funding and why BGAs are needed.
    - Section 3 sets out the principles that guided the design and calculation of the BGAs as set out in the 2016 fiscal framework.
    - Section 4 explains the general approach to calculating the BGAs implied by these principles.
    - Section 5 describes the specific approach to calculating the BGAs during the transitional period.
    - Section 6 discusses other options, and how they share risks between the Scottish and UK governments.
    - Section 7 lists our survey questions.

2. Funding and BGAs

What is the Block Grant?

6. The Block Grant is the money transferred from the UK government to the Scottish Government each year to pay for devolved public services in Scotland, such as health, education, justice, and transport. It is updated each year using the Barnett Formula.

What is the Barnett Formula?

7. The Barnett Formula is used to determine the *change* in the block grant from one financial year to the next. The size of the change is given by Scotland's population share of the change in funding allocated by HM Treasury to *comparable* spending programmes, such as health, education, justice and transport, in England. For example, if spending allocated to health in England increases by £1,000m, the Scottish Government would receive an additional £97m since Scotland's population is 9.7% of that in England. The Scottish Government can spend this additional funding as it sees fit. The Barnett Formula does not provide any incentive for the Scottish Government to improve Scotland's economic performance. It receives the same funding change via the Barnett Formula no matter how fast or slow the Scottish economy grows.

What are the block grant adjustments?

8. The Scotland Act 2016 gave the Scottish Government new tax and social security powers. These enabled it, for example, to keep most of the proceeds of income tax raised from Scottish taxpayers. The aim of this was , in line with the Smith Commission recommendations, to better 'deliver prosperity, a healthy economy, jobs, and social justice (pillar two)' and 'strengthen the financial responsibility of the Scottish Parliament (pillar three)..

9. Whenever a revenue stream, such as income tax, is transferred from the UK government to the Scottish Government, a deduction needs to be made to the Scottish Government's block grant. This deduction initially reflects the revenues that the UK government has foregone as a result of the transfer of the revenue stream. This deduction is known as a "Block Grant Adjustment (BGA), and is illustrated in the Figure below:

10. Likewise, when a new social security spending power is transferred from the UK government to the Scottish Government, an addition needs to be made to the Scottish Government's block grant to reflect the transfer of spending responsibility. This addition initially reflects the spending undertaken by the UK government prior to the point of devolution.

11. Separate BGAs are needed for each tax and social security benefit that is devolved. They are required not just in the first year that revenues or social security powers are devolved, but in all subsequent years, to reflect the permanent transfer of revenues/spending from the UK government to the Scottish Government.

12. While it is possible to set the BGAs in the first year of devolution equal to the revenue (or spending) that is devolved, it is not desirable for the BGAs in subsequent years to be set this way. That is because faster or slower growth in revenue (or spending) in Scotland would be offset by faster or slower growth in the BGAs, meaning no net change in the Scottish Government's funding. This would mean it still had no incentive to grow the economy to boost tax revenues and reduce social security spending. Indeed, the Scottish Government would have an incentive to cut tax rates (and increase benefits), knowing that the resulting revenue loss (and spending increase) would be offset by a lower (and a higher) BGA.

13. The key challenge in designing BGAs is therefore how they should be calculated in years following the initial devolution of the revenues or spending that avoids these problems, while being 'fair' to both the Scottish and UK governments.

3. Principles guiding the design of the block grant adjustments

Is there a set of principles that can inform the design of the BGAs?

14. The way that the block grant adjustments are calculated has been informed by a set of principles that were set out by the Smith Commission.

15. The key Smith Commission principles include:

- The UK government should continue to manage the fiscal risks and shocks that affect the whole of the UK ('**UK economic shocks'**).
- The devolved Scottish budget should benefit in full from policy decisions by the Scottish Government that increase revenues or reduce expenditure, and

the devolved Scottish budget should bear the full costs of policy decisions that reduce revenues or increase expenditure ('**economic responsibility'**).

- There should be no detriment to the Scottish or UK governments' budget simply as a result of the initial transfer of tax and/or spending powers ('**no detriment from the decision to devolve'**).
- Changes to taxes in the rest of the UK, for which responsibility in Scotland has been devolved, should only affect public spending in the rest of the UK; changes to devolved taxes in Scotland should only affect public spending in Scotland (this has often been referred to as **'taxpayer fairness'**, although that terminology was not explicitly used by the Smith Commission).

4. Implications for how to calculate the block grant adjustments

What broad approach helps satisfy these principles?

16. These principles suggest an approach involving two components. First, *initial adjustments*, set at the point of devolution, and *indexation mechanisms* to update the BGAs in subsequent years.

17. For devolved taxes, the *initial deduction* is simply the annual revenue raised from the tax by the UK government in Scotland in the year prior to devolution. For social security powers, the initial deduction is the annual amount spent by the UK government at the year prior to devolution.

18. The *indexation mechanism* is a measure of the subsequent growth in equivalent, 'comparable' UK government revenues or spending in the rest of the UK, for the tax or social security benefit devolved to Scotland.

19. This way of calculating the initial deduction is simple and accords with the Smith Commission's "no detriment" principle because neither the Scottish or UK governments is worse off at the point of devolution as a result of the transfer of fiscal power.

Why is the indexation mechanism calculated on the basis of the growth in comparable UK government revenues or spending?

20. Indexing the BGAs in subsequent years to the growth in comparable UK government revenues or spending in the rest of the UK (rUK) helps at least *partially* meet the other principles identified by the Smith Commission:

    - It ensures that the UK government bears the risks of UK-wide fiscal shocks. For example, if a recession causes revenues to fall across the UK, the BGA

will fall. Lower Scottish tax revenues are thus offset by a smaller deduction from the block grant.

- It ensures that the Scottish Government benefits from its own policy decisions. If the Scottish Government were to increase income tax rates in Scotland and this increased tax revenues, then Scottish revenues would exceed the BGA (which is determined by what happens to revenues in the rest of the UK) and the Scottish Budget would be 'better off' to the extent of the difference.
- It helps ensure that the Scottish budget does not benefit from increases in UK government spending that is funded by an increase in tax revenues for a tax that has been devolved in Scotland.

21. This third point is less intuitive to understand than the first two. If the UK government increases tax rates for a tax that has been devolved in Scotland, then that tax increase would not apply in Scotland. The income tax BGA would increase, reflecting the increase in rUK revenues. At first glance, this might not appear reasonable insofar as the treatment of the Scottish budget goes. However, it must be remembered that the UK government's additional revenues would be spent by the UK government. If they were spent on 'comparable' public services in England, this would generate a consequential increase in the Scottish Government's block grant, via the Barnett formula. The higher BGA would act to approximately offset this increase. Without this, the Scottish Government would see an increase in its block grant funded by a tax increase in rUK that didn't apply in Scotland. Indexing the BGA to a measure of comparable UK government revenues is therefore important when we recognise that the revenue effect of tax changes by the UK government can 'flow' to Scotland even when the tax changes apply to a tax that is 'devolved' in Scotland.

22. If the UK government spent the additional revenues on 'reserved' matters (like defence, state pensions, universal credit or debt interest), the BGA ensures that taxpayers in Scotland make a broadly similar contribution to that expenditure as taxpayers in rUK, despite the tax increase not applying directly in Scotland.

How can the growth in comparable UK government revenues or spending be measured?

23. There are many ways to measure growth in comparable UK government revenues and spending, and hence to index the growth of the BGA. These include:

- Accounting for differential population growth compared to Scotland, or not;
- Accounting for other differences in demographic or economic trends, or not;

- Accounting for differences in the nature of tax bases or spending distributions.

24. And in relation to each of these, the change in revenues or spending can either be measured in cash or percentage terms.

25. Each of these would at least partially meet the Smith Commission principles, but they would expose the Scottish and UK governments to different risks, and lead to different BGAs and, in turn, different levels of funding for the Scottish Government.

Should the indexation mechanism account for differential population growth in Scotland?

26. One of the big debates when the Scottish Government's fiscal framework was being negotiated in 2015 and 2016, was about how the indexation mechanism should adjust for differences in population growth between Scotland and rUK. Specifically, whether the BGA should be based on a measure of the change in total rUK revenues/spending; or alternatively, a measure of the change in rUK revenues/spending *per capita* that is then used in conjunction with growth in *Scotland's* population.

27. On the one hand, given that one could reasonably expect in advance for Scotland's population to grow less quickly than that of the rUK (this has long been the case historically, and is set to continue according to the latest population projections), one could argue that protecting Scotland from the risk of differential population growth is consistent with the 'no detriment' principle. This is particularly true if one believes there is little the Scottish Government can do to affect the rate of Scotland's population growth relative to that of rUK.

28. Population growth is an important determinant of revenue (and spending) growth, and so to index the BGA to changes in total revenues/spending in rUK, without adjusting for slower population growth in Scotland, means that Scottish revenues per capita would need to grow more quickly than those in rUK simply to match the change in the BGA. (On the spending side, the argument is reversed – failure to take account of Scotland's likely slower-growing population would fund faster growth in spending per capita than is being seen in rUK, benefiting the Scottish Government).

29. On the other hand, calculating the BGAs in a way that adjusts for differential population is creates an asymmetry with how the Barnett Formula treats population growth when calculating the underlying block grant. This takes no account of differential population growth. To see why this may concern some people, consider what would happen if revenues in rUK grew only because of population growth. If Scotland's population was unchanged and the BGAs adjusted for differential population growth, the BGA would also be unchanged. However, Scotland would still receive a share of the spending increase funded by the higher aggregate revenues in rUK via the Barnett formula or reserved

spending, meaning it has benefited from increases in devolved tax revenues in rUK. This could be considered to be inconsistent with the 'taxpayer fairness' principle.

30. The Smith Commission's principles do not explicitly address whether or not the approach to indexing the BGAs should or should not control for relative population growth. People's views on this depend on exactly how they interpret the Smith Commission principles, and the weight accorded to some principles over others.

5. The approach to calculating the block grant adjustments during the transitional period

What is the Comparable Model and how does it fit in?

31. As well as the IPC method, another approach to indexing the BGAs for tax is referenced in the existing Scottish Government fiscal framework. The other method is known as the **Comparable Model**.

32. The Comparable Model increases the BGA by Scotland's population and tax-capacity adjusted share of the cash-terms change in revenue from equivalent taxes in rUK. Tax capacity is measured as Scotland's revenues per capita as a share of rUK's revenues per capita prior to devolution. For example, Scotland's revenues per capita for income tax prior to devolution were 79.8% of the level in rUK. Thus, if rUK income tax revenues increased by £1,000m, Scotland's income tax BGA would increase by around £73 million (£1,000m*9.2 %*79.8%). This is consistent with how the Barnett formula treats population (with no adjustment for differential population growth).

33. The main practical difference between the Comparable Model and the IPC method is that the Comparable Model does not take account of relative population growth.

34. However, the Comparable Model, while referenced in the Scottish fiscal framework, is not used in practice to determine the BGAs. This is because the 2016 fiscal framework says:

"For a transitional period covering the next Scottish Parliament, the Governments have agreed that the block grant adjustment for tax should be effected by using the Comparable Model (Scotland's share), whilst achieving the outcome delivered by the Indexed Per Capita (IPC) method for tax and welfare."

35. Of course, if it is the IPC outcome that is delivered, it is the IPC method that is being used.

How are the BGAs for social security payments indexed?

36. For social security benefits the 2016 fiscal framework begins by saying that the approach to be used is to increase the BGAs by **Scotland's population share of the cash-terms change in spending on equivalent benefits in rUK**. This is the same as the **Barnett formula** which applies to devolved public service spending.

37. Similar to tax however, the fiscal framework states that for a transitional period up to and including 2020/21, the social security BGAs will for practical purposes be calculated using the **IPC method**.

Why are these alternative methods mentioned if they are not used?

38. The alternative methods are mentioned in the fiscal framework agreement because of differences in opinion about which methods are more consistent with the Smith Commission principles between the Scottish and UK governments.

39. The Scottish Government favoured the **IPC method**, in order to protect its budget from the effect of differential population growth on devolved tax revenues.

40. The UK government favoured the **Barnett Formula** and **Comparable Model** for the transitional period because using these approaches for devolved public spending and the tax BGAs, respectively, would treat risks associated with differential population growth in a consistent manner on both the spending and revenue sides of the Scottish Government's budget.

41. Both methods were included in the agreement to reflect the fact that while the IPC approach is being used in practice for the transitional period, these differences in opinion have not been resolved.

6. Other approaches and how they share risks

What other risks could the BGAs take account of?

42. In 2016, the main debate around BGAs boiled down to the question of whether or not the BGAs should take account of differential population growth. But there are a number of other fiscal risks that BGAs could be designed to take account of.

Should the BGAs be designed to take account of demographic change?

43. One of these is **demographic change** after devolution has occurred. Differences in the share of population growth driven by the working-age and

pensioner-age populations can matter if spending or revenues per capita for these groups differ. The BGAs could be calculated to protect the Scottish Government's budget from the effects of a more rapidly ageing population on its revenues (because its tax BGAs would be lower to offset this). However, they would also mean the Scottish Government would not benefit from the higher revenue associated if its various policies helped it attract more working-age people to live in Scotland (because its tax BGAs would be higher to offset this).

Should the BGAs be designed to take account of the structure or characteristics of tax bases?

44. Another is the **structure of the tax-base at the point of devolution**. The IPC and Comparable Model both take account of Scotland's lower tax capacity (revenues per capita) and higher spending per capita at the point of devolution, and do not disadvantage the Scottish budget as a result of its starting point. But there is a slightly separate risk which neither method takes account of. This is the risk associated with having a tax base which differs in structure or characteristics from the equivalent rUK tax base.

45. An example is income tax. Scotland has proportionately fewer high-income taxpayers than rUK. This means that, if tax revenue growth was being driven by high income taxpayers, the income tax BGA would likely grow more quickly than Scottish revenues, even if the growth in income of both high- and low-income taxpayers in Scotland matched that of rUK – because Scotland's smaller proportion of higher-income taxpayers would generate less growth in overall revenues.

46. The BGA can be designed to mitigate this risk (as it is in Wales). However, such methods would also prevent the Scottish Government from benefiting in cases where more of the growth in revenues is being driven by low-to-middle income taxpayers.

47. The BGAs can therefore be designed to account for these (and other) fiscal risks. Protecting the Scottish budget from any one risk always implies that the Scottish budget would not benefit if the risk went in its favour. It also implies that the approach to calculating the BGAs becomes increasingly divergent with the approach to the Barnett formula (because the Barnett formula does not account for these risks).

Can any BGA mechanism fully achieve the taxpayer fairness principle?

48. Neither the IPC nor Comparable Methods fully achieve the UK government's view of the taxpayer fairness principle. The Barnett Formula allocates Scotland a population share of increases in comparable spending by the UK government, whereas the BGA is increased in a way that takes account of

Scotland's (generally lower) tax capacity,[12] and in the case of the IPC method, its slower population growth too.

49. This means that if the UK government's tax revenues increase and are used to fund public spending, the Scottish budget would receive a population share of the spending increase, but its BGA would increase by less than a population share of the tax increase. Hence there is scope for the Scottish budget to benefit from an increase in rUK tax revenues for taxes that are devolved. The flipside is that the Scottish budget could be worse off if a UK government were to cut tax rates and reduce spending.

50. If tax BGAs are calculated by indexing them on the basis of a population share of the change in rUK tax revenues (but not a tax-capacity adjusted population share), then the taxpayer fairness principle can be achieved. However, such a method would require Scottish revenue growth per capita to significantly and persistently exceed rUK revenue growth per capita in order for the Scottish budget to avoid being worse off as a result of tax devolution. This could be considered to be inconsistent with the 'no detriment' principle.

Should the BGAs be periodically reset, or include aspects of fiscal insurance?

51. Any BGA method will protect the Scottish budget from certain specific fiscal risks, but leave it exposed to other risks indefinitely. For example, the IPC method protects the Scottish budget from the effect of relatively slower population growth. But if the Scottish tax base declines (e.g. due to structural changes in the economy) persistently over time relative to rUK, there is in theory no limit to the extent to which the tax BGA could grow relative to Scottish revenues. Conversely, there is no limit on the extent to which the Scottish Government could gain if its tax base grew consistently relatively faster than that of rUK.

52. The approach to the design of the BGAs could in principle incorporate some checks to limit the extent to which the Scottish budget could deteriorate as a result of a slower growing tax base. This could occur through establishment of some kind of 'floor', or a periodic 'reset' of the BGA.

53. However, such mechanisms would also mean the Scottish Government would not benefit in full from the higher revenue associated if its various policies helped it increase the rate of economic and underlying tax-base growth (because its tax BGAs would be higher to offset this). This could be considered inconsistent with the 'economic responsibility' principle of the Smith Commission.

[12] The exception of is Landfill Tax, where Scotland raises slightly more per capita than in rUK.

7. Survey questions

a. What do you consider to be the strengths and weaknesses of the current approach to calculating block grant adjustments for devolved taxes and social security spending for Scotland?

b. To what extent do you think that the various approaches to calculating the Scottish block grant adjustments, outlined in the background note, are consistent with the Smith Commission's principles? How could the calculation of the BGAs be made more consistent with the Smith Commission principles?

c. To what extent do you think the various approaches to calculating the Scottish block grant adjustments shares risks between the Scottish and UK governments appropriately? To what extent do you think it is important that the allocation of risks implied by the BGA mechanism aligns with the balance of risks held under the Barnett formula?

d. Do you have any other suggestions for how the block grant adjustments should be designed beyond the transition period?

e. Do you have any suggestions for how understanding of block grant adjustments among stakeholders can be improved?

Appendix B. Respondents to the call for evidence

Chartered Institute of Taxation (CIOT)

Institute of Chartered Accountants Scotland (ICAS)

Convention of Scottish Local Authorities (COSLA)

Relationships Glasgow

Scottish Government

Scottish Fiscal Commission

Scottish Parliament Finance and Public Administration Committee

Scottish Parliament Social Justice and Social Security Committee

6 individuals

Appendix C: The Maths of BGAs

In this appendix, we demonstrate some of the mathematical properties of the BGA methods. We particularly contrast how the IPC and CM/Barnett Formula BGAs adjust to an economic cycle, where revenues or social security spending in that part of the UK used as the comparator initially rise or fall before returning to their initial value. We thus compare the BGA in period 0 with that in period *t* (an arbitrary time in the future at the end of an economic cycle).

In the equations that follow BGA_t represents the value of the BGA at time *t*. P_t^{Sc} and P_t^{rUK} are the populations of Scotland and the rest of UK (see Table 1 for the relevant geographical extent for each fiscal instrument) at time *t.* T_t^{rUK} is the tax revenue or social security spending at time *t* in the relevant geographical extent.. Using these conventions, we can write the IPC method as shown in equation (1) below.

The Indexed Per Capita Method

$$
\begin{aligned}
BGA_t &= BGA_{t-1}\frac{P_t^{Sc}}{P_{t-1}^{Sc}}\frac{T_t^{rUK}}{P_t^{rUK}}\frac{P_{t-1}^{rUK}}{T_{t-1}^{rUK}} \\
&= BGA_{t-2}\frac{P_{t-1}^{Sc}}{P_{t-2}^{Sc}}\frac{T_{t-1}^{rUK}}{P_{t-1}^{rUK}}\frac{P_{t-2}^{rUK}}{T_{t-2}^{rUK}}\cdot\frac{P_t^{Sc}}{P_{t-1}^{Sc}}\frac{T_t^{rUK}}{P_t^{rUK}}\frac{P_{t-1}^{EW}}{T_{t-1}^{EW}} \\
&= BGA_{t-2}\frac{P_t^{Sc}}{P_{t-2}^{Sc}}\frac{T_t^{rUK}}{P_t^{rUK}}\frac{P_{t-2}^{rUK}}{T_{t-2}^{rUK}} \\
&\text{and by repeated substitution ..} \\
&= BGA_0\frac{P_t^{Sc}}{P_0^{Sc}}\frac{T_t^{rUK}}{P_t^{rUK}}\frac{P_0^{rUK}}{T_0^{rUK}}
\end{aligned}
$$

(1)

After *t* periods, the IPC BGA depends solely on its initial value, the growth in Scottish population since the initial period, and the change in per capita revenue/spending in the comparator part of the UK since the initial period.

Equation 2, which follows from Equation 1, shows the relationship between the initial period BGA and that in period *t* if tax revenue/social security spending returns to its initial value.

$$\text{if } T_t^{rUK} = T_0^{rUK} \text{ then } BGA_t = BGA_0 \left(\frac{P_\tau^{Sc}}{P_0^{Sc}} \Big/ \frac{P_\tau^{rUK}}{P_0^{rUK}} \right) \tag{2}$$

The IPC BGA depends only on its initial value and the relative growth of Scotland's population since the first period which can also be interpreted as the ratio of Scotland's population to that of the comparator part of the UK. The final BGA is equal to its initial value multiplied by the relative growth in population since the first period in Scotland versus the comparator part of the UK. If that growth is held constant at its initial value, the final BGA value is equal to its initial value multiplied by the initial period relative population growth rates. Scotland is completely insured against slower population growth with the IPC method during an economic cycle in which comparator tax revenues/social security spending return to their initial value.

The Comparable Method

With the Comparable Method, the BGA equals last period value *plus* Scotland's population share of the change in equivalent revenues in the rUK, adjusted by the comparability factor, which adjusts for the difference between the amount of tax raised per head in Scotland, relative to that in the rUK. Successively substitution for lagged value gives the expression shown in (3), which implies that the BGA in time period t is equal to its initial value *plus* the sum of the annual changes in revenues in England and Wales multiplied by Scotland's population share at that time and all multiplied by the comparability factor.

$$\begin{aligned} BGA_t &= BGA_{t-1} + \mu \frac{P_t^{Sc}}{P_t^{rUK}} \left(T_t^{rUK} - T_{t-1}^{rUK} \right) \\ &= BGA_{t-2} + \mu \left(\frac{P_{t-1}^{Sc}}{P_{t-1}^{rUK}} \left(T_{t-1}^{rUK} - T_{t-2}^{rUK} \right) + \frac{P_t^{Sc}}{P_t^{rUK}} \left(T_t^{rUK} - T_{t-1}^{rUK} \right) \right) \\ &= BGA_0 + \mu \sum_{\tau=1}^{t-1} \frac{P_\tau^{Sc}}{P_\tau^{rUK}} \left(T_\tau^{rUK} - T_{\tau-1}^{rUK} \right) \end{aligned} \tag{3}$$

Suppose that revenues return to their initial value after an economic cycle and that Scotland's population share remains constant, taking the value θ. Then (4) follows from (3) and shows that the CM BGA will return to its original value if revenues return to their initial vale and the population share remains constant. The same argument applies to the Barnett Formula, which takes the same form as the CM, except that the comparability factor is set equal to 1.

$$BGA_t = BGA_o + \mu\theta\left(\sum_{\tau=1}^{t-1} T_\tau^{rUK} - \sum_{\tau=0}^{t-2} T_\tau^{rUK}\right) = BGA_o \text{ since } \sum_{\tau=1}^{t-1} T_\tau^{rUK} = \sum_{\tau=0}^{t-2} T_\tau^{rUK} \text{ if } T_\tau^{rUK} = T_0^{rUK} \quad (4)$$

Thus, an increase in social security spending in the rUK followed by a return to the initial level will result in the Barnett BGA also returning to its initial value if Scotland's population share remains constant. If it declines, then from (3) the effect on the BGA will depend on the timing of changes in population share in relation to the positive and negative movements in spending in the rUK. If, for example, the decline in population share takes place only in the last period when, by definition, spending in the rUK is falling, then the smaller population share is only applied once, and hence the positive increments to the BGA as spending rises will outweigh the offsetting effects as it falls, leading to an outcome where the BGA in period t exceeds its initial value.

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