



A preliminary investigation into modelling the impact of measures to reduce child poverty in Scotland

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Executive Summary

The Child Poverty (Scotland) Act provides targets for child poverty that must be reached by 2030/31. The next Child Poverty Delivery Plan, setting out the next tranche of policies to move towards the targets is due in Spring 2022.

One crucial element of the success of this plan will be the extent to which it can demonstrate progress towards the targets. To do this requires a modelling approach that takes account of a range of factors across a range of policies related to social security, housing and work. In addition, the cost and implications across the wider economy are also critical pieces of information that will ensure a credible plan is in place to meet the targets.

This modelling capacity was not available for the last Child Poverty Delivery Plan in 2018, meaning that it was not possible to judge the extent to which progress towards the targets would be met. With the devolution of new powers over the course of the last parliament, there is an urgent need for the development of modelling capacity to fulfil the requirements of policy makers and stakeholders in this area.

Building the modelling capacity which adequately takes into account the specifics of the devolution settlement and Scottish context is a significant undertaking. The Poverty and Inequality Commission, in funding this work, have allowed the Fraser of Allander Institute (FAI) and Manchester Metropolitan University (MMU) to build a modelling framework that can start to answer key policy questions with regards to how the child poverty targets can be met, along with the wider impact on the economy of the type of policies that will be required.

This report provides an overview of the development of modelling capacity to date. It includes a linkage to a macrosimulation model to help understand the wider impact on the economy. This work is a significant step towards consolidating the knowledge and skills required for credible modelling for policy development and scrutiny ahead of the next Child Poverty Delivery Plan. However, the results, although based on robust data and modelling, are based on hypothetical policy scenarios. Therefore, this report on its own does not provide a credible route map for meeting the targets.

With the development of this preliminary stage of model development complete, we now have a firm basis for future, more complex, modelling work that can provide helpful solutions to the question of how the targets could be reached. Although modelling cannot provide all the answers, and indeed some evidence gaps remain, it is a crucial tool in the development of evidence-based policy.

This report provides a large amount of technical information to help provide sufficient detail required for those interested in the modelling approach. For others, the first three sections should provide enough of an overview for anyone who wishes to gain a basic understanding of how the work has been approached and the key (hypothetical) results based on this preliminary development work.

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1. Introduction

The Child Poverty (Scotland) Act was passed in 2017 with the full consensus of the Scottish Parliament. It mandated the Scottish Government to significantly reduce child poverty and defined a number of targets that would provide a measure of whether this had been achieved.

One of these measures, which is the focus of this report, is that by 2030/31 there must be fewer than 10% of children in Scotland in relative poverty. An interim target was also set stipulating that there must be fewer than 18% of children in relative poverty by 2023/24.

The purpose of the analysis in this report is to demonstrate the scale of the challenge posed by these targets and investigate ways in which modelling can help map out possible routes towards the targets. It illustrates this by using a limited number of policy levers to see the extent to which, if used in isolation, each would need to be used to reach the targets.

This is an objective piece of analysis and we make no comment on whether these are the right levers, or the extent to which they should be utilised.

If we imagine the next delivery plan as a structure, built with policies, then this analysis represents the foundations; it does not resemble the finished structure but it gives a good indication of its scale and the potential challenges to be overcome.

What do we mean by child poverty in this report?

The statutory child poverty targets that this analysis focusses on are based on after-housing cost measures of household income, which are net of families' cost of housing. They measure *relative poverty* - defined as the proportion of children living in households with income below 60% of the population median. Having an income below this level represents having a standard of living well below the average family in the UK. This is likely to translate into being unable to afford basic goods and services and being unable to participate in extracurricular or social activities, such as sports clubs or birthday parties, without cutting back on already constrained spending on essentials.

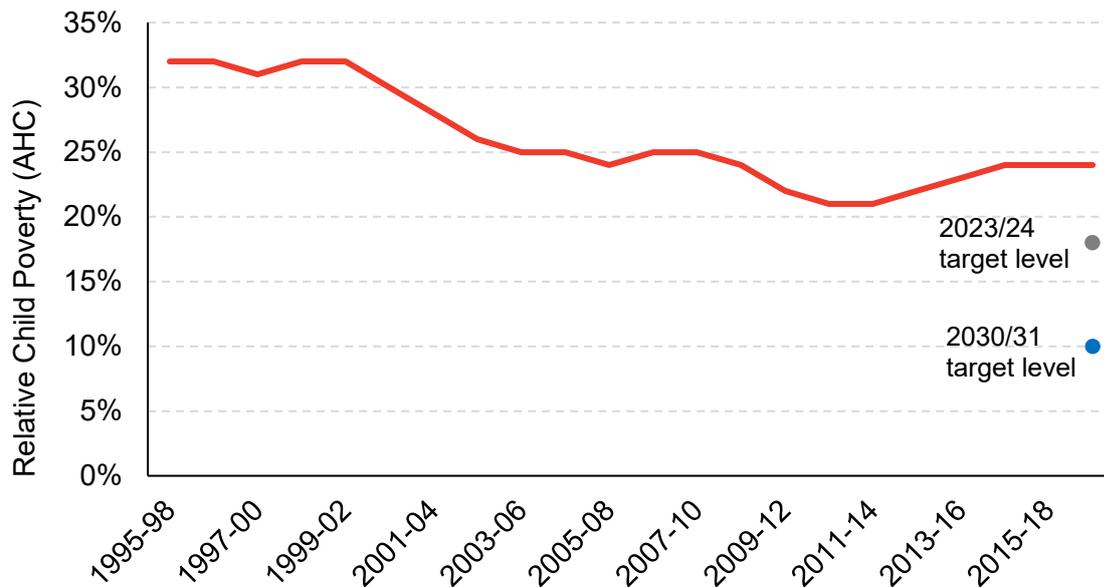
Although not the only measure of child poverty referred to in the Child Poverty (Scotland) Act, relative poverty is the most often used measure of poverty in analyses of household incomes. In the rest of this report, relative child poverty (using the after-housing cost measure) is referred to simply as child poverty.

Child Poverty since the Act

The rate of child poverty has not changed significantly since the passing of the Act in 2017. Chart 1.1 shows relative poverty between 1995 and 2018 in Scotland based on three-year averages. The child poverty target levels are also shown in the chart by the blue and grey dots.

The chart shows that whilst child poverty still remains above the requisite targets, it has also not always been this high. There were a number of contributing factors to the decline in the early 2000s, including increases in social security for families with children, policies to incentivise and support labour market participation for parents, and policies which helped keep housing costs low, particularly in the social rented sector. Many of these factors have been analysed in the existing literature on poverty.¹

Chart 1.1 - Child Poverty in Scotland (Relative poverty, after housing costs)



Source: Family Resources Survey, DWP

Overview of the analysis

Our analysis looks at three possible channels available to the Scottish Government for increasing household incomes:

- increasing social security further via the Scottish Child Payment
- reducing housing costs by subsidising rents
- boosting earnings by making it easier for parents to work and increase hours through active labour market programmes.

These policies are within the devolved powers of the Scottish Parliament. However, here they are used as hypothetical policies for illustrative purposes.

As well as analysing the impact of these policies on poverty, we also examine their cost and the wider impact on the economy. In doing so, we hope to illustrate some potential economic trade-offs associated with different types of policies. We carry out this analysis by combining two models that can be used to simulate the effects of changes to the tax and benefit system: a microsimulation model that calculates the effect of such changes on household incomes; and a macrosimulation that

¹ See for example Joseph Rowntree Foundation Poverty in Scotland 2019, available: <https://www.jrf.org.uk/report/poverty-scotland-2019> and Brewer et al. (2016).

subsequently estimates how these changes to households filter through the economy to generate changes in outcomes such as GDP and employment.

As already mentioned, our analysis is not designed to inform which policies should be implemented. In reality, a range of policy channels might be used and combined in attempt to meet the targets. Our analysis is illustrative, with the purpose of highlighting the likely scale of different types of investment required to meet the child poverty targets and the wider implications of implementing policy at scale.

This report, in which we only analyse the levers in isolation, should be thought of as the first stage in analysis building towards a more comprehensive model in which a range of policies are analysed simultaneously. This type of combined analysis is beyond the scope of this report, although we do discuss some of the possible ramifications of combining policies later on in the report.

The possible impact of Covid-19

Given the focus of this report is on future rates of child poverty, it is important to briefly consider the effects of the Covid-19 pandemic, and subsequent lockdowns, on the economy and household incomes. There is currently enormous uncertainty around the path of the economy and incomes in the near future.

Whilst we make some adjustments to economic variables in our modelling to account for expected changes (based on official forecasts from the Office for Budget responsibility in November 2020), these do not produce large changes in the expected baseline poverty statistics in 2023/24.²

Others, for example, the Resolution Foundation, have attempted to forecast changes in poverty based on a series of assumptions regarding how the pandemic has affected different types of household. The results of their modelling suggests that child poverty in Scotland will be higher in 2023/24 than it was projected to be pre-crisis.³

Forecasting rates of child poverty is outwith the scope of this report, and given the extent of uncertainty at the present time over the post-pandemic economy, doing so would likely offer no improvement on the already available forecasts. However, if the Resolution Foundation's forecasts are more accurate than those of the OBR then then we would be understating the extent of the investment required.

Report structure

The remainder of this report is structured as follows. Section 2 provides a summary of the policy changes that we have modelled along with our main results and Section 3 provides a discussion of the main implications of our analysis and a guide to how the results should be interpreted. These early sections should provide adequate information for those who wish to understand the main findings of our analysis. Section 4 then provides a comprehensive overview of the methodology we use, and Section 5 provides our full results. Finally, Section 7 concludes. We also include

² <https://obr.uk/efo/economic-and-fiscal-outlook-november-2020/>

³ <https://www.resolutionfoundation.org/app/uploads/2021/01/Living-standards-outlook-2021.pdf>

additional appendices which provide a more detailed technical explanation of the models we use in the analysis.

2. Summary of policy levers and headline results

This section provides an overview of the hypothetical policy levers that we modelled and the headline results. Further detail is contained in the rest of the report and in the annex.

2.1. Policy Levers

We analysed the direct impact on income of hypothetical policies that a) increased social security payments; b) reduced housing costs; and c) increased earnings for families with children in poverty.

For each, we modelled the extent to which these changes would help achieve the interim (18% by 2023/24) and final (10% by 2030/3) child poverty targets if used in isolation.

We provide a brief explanation of each of these levers here:

Social Security

The social security option is modelled using the Scottish Child Payment. This is a social security payment that is currently being introduced in Scotland. It provides a fixed rate per child, based on eligibility for Universal Credit and legacy benefits. It is similar to the child element in Universal Credit with two important differences: there are no additional premiums for the first child, and there is no limit on the number of children who can receive the payment. This makes it particularly effective for tackling child poverty among larger families.

Our modelling simply increases the amounts paid out weekly to each child to the point where the interim and final targets are met. The amounts we model are net of the current plans for the £10 a week uplift – for example a £20 a week payment would be £10 additional to what is already planned.

Housing costs

Rent is the largest component of housing costs, and a key contributor to after housing cost poverty. There already exists a mechanism within the reserved benefit system for offsetting the cost of rent – either through housing benefit or the housing element of Universal Credit. These already offset a large proportion of rent for those eligible – but crucially, in many cases for people in poverty, not all of their rent is covered and take-up is not 100%

Our modelling sought to show what would happen if families with children in poverty had no rent to pay. In theory this could be via a) increasing social security support to cover full rent, or b) intervening in some other way to reduce rents at source – for example a rent subsidy or an increase in social housing provision.

In effect, we have modelled something akin to a rent subsidy that means parents in poverty have no rent to pay. Because housing support is already provided through the reserved benefit system, if rents were removed, then there would be savings made through the reserved benefit system. We show two scenarios. In the first, we assume that the UK reimburses the Scottish Government for savings they make in housing support through the reserved social security system. Throughout we refer to this as the “full-cost” or “full cost raised” housing scenario. In the second, we assume that the Scottish Government has to fund the full outlay without reimbursement. Both are possible outcomes. Hereafter, we refer to this version as the “net-cost” or “net-cost raised” scenario.

We adopt this approach of a rent subsidy rather than looking at other ways of ‘topping up’ reserved housing support which are complex in design and risk complicating the operation (and intended simplicity) of Universal Credit for people in Scotland. This would take away from the intended outcomes of the modelling which is to show the scale of housing support that would be required to meet the targets. In other words, our modelling here has not concentrated on the ‘how’ but instead focussed on the impact. The implications of the way we have modelled the policy are discussed in Sections 5 and 6 of the report.

Earnings

Earnings are a product of hours worked and an hourly wage rate. In the current devolution settlement the Scottish Government does not have powers over minimum wage setting so instead we focussed on increasing hours of paid work. Whilst we do not set out the exact way this policy would be achieved, devolved policy levers are available, and there is precedent (albeit on a much smaller scale than our modelling implies).⁴

Our modelling attempted to understand the extent to which average hours worked for parents in poverty would need to increase in order for the poverty targets to be met. We do not place any limits on who is eligible. Therefore, these are upper bound estimates as some parents will not be able to work, for example if they have a limiting health condition.

We also assume that the additional hours are available, which itself depends on other economic factors outside the model. We place parents who move into work on the minimum wage for their age, and for those already in work, we assume they continue to receive the same hourly wage.

⁴ See Evaluation of the Working for Families Fund (2009), published by the Scottish Government and available at <https://www.webarchive.org.uk/wayback/archive/20170701074158/www.gov.scot/Publications/2009/04/20092521>

2.2. Results

Here, we provide a brief summary of the results on the scale of impact of our hypothetical policies used in isolation: a) increasing the Scottish Child Payment, b) reducing rent payments for parents in poverty and, c) increasing hours worked by parents in poverty. More complete explanations of the results are provided in Section 6 of the report, with additional details provided in the appendices.

Impacts on poverty

Table 2.1 shows the scale of each policy lever required to meet the interim and final targets. Where the targets are out of reach, we show the maximum impact of the policy lever.

Table 2.1 – Summary of the micro-simulation results attempting to meet the intermediate and final child poverty targets

	Interim target (18% by 2023/24)	Final Target (10% by 2030/31)
Scottish Child Payment	An increase to £40 a week per eligible child would meet the interim target.	An increase of £165 a week per eligible child would meet the final target.
Rents (setting rents to zero)	The maximum impact (all rents set to zero for families in poverty with children) would not achieve the interim target (maximum achievable is a 2 percentage point fall).	The maximum impact would again fail to achieve the final target (maximum achievable is a 2 percentage point fall).
Hours Worked	If all parents in poverty worked 20 hours a week, the interim target would be met ⁵ (assumes either minimum wage or current hourly wage for those already in work)	The 2030/31 target could not be met, even if all parents in poverty worked 35 hours a week (an assumed full-time threshold). Maximum impact achievable is a 6 percentage point fall.

The zero rent policy is not able to meet even the interim target in isolation. The Scottish Child Payment is the only lever modelled here that could theoretically be used, in isolation, to meet the final target. However, this is at a high cost.

⁵ Due to technical aspects of the algorithm the microsimulation model uses to simulate hours increases, the *actual* child poverty rate is 18.8%. In some runs of our simulation, or using a slightly different methodology, we find poverty rates under 18%. For this reason we interpret the results here as meeting the target, since the actual estimate of the child poverty rate being 18.8%, which is slightly above the 18% target, is partly caused by uncertainty in our modelling. We provide more detail on the microsimulation model and this result in Appendix 1.

Observable direct fiscal costs and benefits

Table 2.2 - Summary of the fiscal costs and benefits of using each lever in attempts to meet the intermediate and final child poverty targets

	Interim target (18% by 2023/24)		Final Target (10% by 2030/31)	
	Expenditure	Saving	Expenditure	Saving
Scottish Child Payment	£600m. Paid for by a 1percentage point increase in income tax (all bands).	£0	£3bn. Paid for by a 4 percentage point increase in income tax (all bands)	£0
Rents (cost of setting rents to zero)*	(1) £600m (SG). Paid for by a 1 percentage point increase in income tax (all bands).	£300m to UKG, largely from Housing Benefit saving	£700m (SG). Paid for by a 1percentage point increase in income tax (all bands)	£400m (to UKG largely from Housing Benefit saving)
	(2) £600m (SG). Paid for by a 0.5 percentage point increase in income tax	£300m transferred back to the SG by the UKG	£700m (SG). Paid for by a 0.5 percentage point increase in income tax	£400m transferred back to the SG by the UKG
Hours Worked		Small increase in Scottish income tax and savings on Scottish Child Payment and Council Tax Reduction (£40m). Majority of savings (£200m) to UKG		Larger benefit to SG budget (£200m) and larger savings to UKG (£900m)

Note: *Scenario (1) is the full cost scenario in which we assume we assume that the Scottish Government has to fund the full outlay without reimbursement. (2) is the net cost scenario in which we assume the UK reimburses the Scottish Government for savings they make in housing support through the reserved social security system.

Where possible, we looked at the direct fiscal expenditure required to meet the targets, and any savings that would be returned to either the Scottish Government or the UK Government as a result of the policy.

We also estimated the amount that the Scottish Government would need to raise to fund net expenditure, and how this could be paid for hypothetically using Scottish income tax powers. Box 2.1 explains the reason why we do not currently have comparable estimates for expenditure on policies to increase hours worked.

Box 2.1. Why do we not have expenditure estimates for increasing hours of paid work?

The cost of increasing hours worked is not observable in our model. This is because government cannot directly 'pay' people to increase hours worked (unless, of course, they are public sector workers) and instead need to find ways to help them achieve additional hours. The costs involved in doing this will be realised through money spent by government on supplying employment support services.

The best available evidence we are aware of on the cost of successful programmes that help parents increase their participation in the labour market is from an evaluation of the Working for Families programme which ran between 2004 and 2008 in Scotland.⁶

The 2009 evaluation found the cost per client who had a successful outcome to be in the region of £3,400 - £6,800.⁷ Most of the successful outcomes related to a parent moving into paid work after a period of being out of work, although there was also some success in helping with progression and moving employer, as well as in helping some to take further education.

To reach our interim target, our modelling finds that approximately 210,000 parents would need to either move into work (96,000) or increase their hours (115,000).

Using an adjusted for inflation Working for Families cost estimate we may therefore expect costs for the programme in the region of £800m - £1.7billion between now and 2023/24, with some costs being one offs and others recurring into the future. This, of course, is unlikely to be feasible given the lead in times and is only provided as a guide to the scale of investment that may hypothetically be required.

There are many reasons why this may not be a good estimate of additional expenditure and many parts of the policy landscape have changed since this programme. For example, the provision of free childcare hours for some parents may limit the additional expenditure required via an employment support scheme.

Further work is needed to understand more up to date costs of current employment schemes, as well as the success rates for different groups of the population.

⁶ Evaluation available at:

<https://www.webarchive.org.uk/wayback/archive/20170701074158/www.gov.scot/Publications/2009/04/20092521>

⁷ The higher estimate takes into account assumed deadweight i.e. it assumes that around 50% of parents would have moved into work anyway, even without the policy

Impacts on the wider economy

Lastly, we looked at the impacts on the wider economy, for example on GDP and employment. The size of the economy, and its ability to provide jobs is likely to be important in sustaining reductions in child poverty and ensuring that tax revenues remain robust to fund any recurring costs. The Scottish Government's inclusive growth agenda makes clear their belief that growth and inclusivity are mutually beneficial. Hence, the wider economic impacts of policies aimed at reducing child poverty are an important consideration that our modelling seeks to shed some light on. To summarise the wider economic effects of our hypothetical policies, we show results for the interim targets in Table 2.3 below. The impacts when attempting to meet the final target are generally more pronounced versions of these.

All of the policy instruments that we consider involve a significant boost to the incomes of households in child poverty. However, when the Scottish Child Payment and the rent subsidy policies are income-tax-financed this comes partly at the expense of higher income households. Nevertheless, even in this case there is an overall stimulus to consumption demand since lower income households have a higher propensity to consume. If this is the only impact of the policy interventions economic activity would be stimulated.

However, there may be additional effects since. For example, when income tax is raised, there may be a "wage push" effect as workers seek to restore their take home pay.

To highlight the various economic factors at play, and their sometimes countervailing forces, we consider two main cases that differ in terms of wage responses. In the first case we assume that wages do not rise in response to any increase in income tax that may be required to fund the policy change (fixed wage case). Within this case we distinguish between the "policy only" or unfunded/not fiscally neutral sub-case, where the Scottish Government does not have to fund the policy change, and the alternative in which income tax rates have to rise to pay for the policy.^{8,9} Whilst there is no wage-push effect, there is an impact on consumption of those on higher income who see their income reduced through tax.

⁸ We consider possible motivations for "sticky" or inflexible wages below.

⁹ We use the terms "unfunded" and "not fiscally neutral interchangeably throughout. Given the restrictions on the Scottish Government's borrowing powers and the absence of alternative external sources of finance (such as a sovereign wealth fund), the unfunded case seems rather unrealistic. However, the results of this case are instructive in that they assist in understanding the full macroeconomic impacts of the policy changes.

Table 2.3 – Summary of the simulated long-term macroeconomic effects of using each lever in attempts to meet the intermediate child poverty target

	Policy only (no wage push)	Policy + tax (no wage push)	Policy + tax (with wage push)
Scottish Child Payment	Aggregate consumption ↑ due to increases in income. Consumption ↑ larger for low-earning households Unemployment ↓ due to increased demand Overall GDP ↑	Aggregate consumption ↑ only slightly: higher income households pay more tax and their consumption ↓, while that of lower income households still ↑. Overall GDP ↑, but employment falls negligibly (reflecting smaller labour intensity of goods consumed by lower income families).	Aggregate consumption ↓ due to decreases in real take-home pay. Consumption still ↑ for low-earning households Unemployment ↑ due to increased costs & weakened demand. On aggregate, expected ↓ GDP.
Rents (full cost raised)*	Aggregate consumption ↑ due to increases in income. Consumption ↑ larger for low-earning households Unemployment ↓ due increased demand. Overall GDP ↑	Aggregate consumption ↑ only slightly: higher income households pay more tax and their consumption ↓, while that of low income households still ↑. Overall GDP ↑, but employment falls negligibly (reflecting smaller labour intensity of goods consumed by lower income families).	Aggregate consumption ↓ due to decreases in real take-home pay. Consumption still ↑ for low-earning households Unemployment ↑ due to increased costs & weakened demand. On aggregate, expected ↓ GDP, although to a lesser extent than when increasing the Scottish Child Payment.
Hours Worked**		2.4% ↑ in the overall labour supply Aggregate consumption ↑ Consumption ↑ concentrated in lower-income households Employment ↑	

Note: * for simplicity, we only include the full-costed rents scenario whereby the UK Government do not reimburse the Scottish Government for savings made through reserved benefits. For the net-cost scenario, whereby the Scottish Government is reimbursed, the scale of negative impact on consumption and any wage push effect is lower. The aggregate impact is close to zero. ** we are not able to isolate the effects of the hours scenarios in the same way as with increasing the Scottish Child Payment and Rents. We focus on the overall results here.

In the second case we assume that, in line with most of the longer-term evidence on wage determination, workers bargain over *net-of-tax* real wages. In this case any rise in income tax results in a wage push effect. That pushes up domestic costs and prices and reduces export demand. We find that this tends to dominate the beneficial impact of the policies on demand and so leads to a fall in economic activity.

We discuss the macroeconomic effects in more detail in Sections 4 and 5. As table 2.3 shows, a cash transfer to those in poverty has many positive impacts on the

economy, but increasing income tax to pay for it has largely negative aggregate economic impacts.

The magnitude of these impacts on GDP in meeting the interim targets are, on aggregate, relatively small. These figures refer to the size of the economy after the intervention compared to a counterfactual where the change didn't occur.

The impact of the Scottish Child Payment and the rent subsidy scenario are in the region of 0% to -0.7% for the interim target. The positive impact that could result from an increase in hours worked to meet the interim target is in the region 1.7% in terms of GDP.

The Scottish Child Payment is the only measure we model in isolation that could meet the final targets. Our simulations suggest that using it at the scale required to meet the targets could have a larger impact on GDP, in the region of 0% to -2.3%.

3. Discussion

This section reflects on what the headline results of our modelling show, with a more detailed explanation of the methodology and results provided in Sections 4-6.

3.1. How to interpret the results

It is important to stress that not only are these policy levers that we have modelled hypothetical, but they are built on a set of assumptions that may not translate into the real world. The impact of Coronavirus is one such uncertainty that is likely to alter some of underlying assumptions, for example on household income and employment. Whilst we have used available forecasts, we cannot be sure that these will be accurate. Our results may also differ from those produced from other models, due to both differences in the assumptions on which they are based and the data they utilise. This variability from one model to another perhaps adds an additional layer of uncertainty to analyses such as ours, however no model is completely accurate and the purpose of this analysis is not to provide exact estimates of the effects of policy changes. As a result, generally differences in results would only be deemed alarming if they are extremely large or contradictory in terms of their direction. Nevertheless, users of this report should ensure that they interpret the results with these caveats in mind.

Even if we had more a more certain economic outlook, there is always likely to be variability in actual outcomes compared to those that are predicted. The most informative way therefore to use modelling such as this is to compare the different scenarios modelled. If the assumptions vary, the results will vary, but the relative difference between scenarios should vary less – i.e. the most cost-effective scenario now will likely remain the most cost-effective scenario later even if the scale of costs and benefits change.

The results do show that the scale of the challenge is large. However, by modelling policy levers in isolation, it is likely that we are likely to be exaggerating the cost involved in meeting the targets. It is unlikely that the government will follow only one route to try and meet the child poverty targets. Indeed, our results reaffirm that this would be impossible for some of the levers we have modelled. However, it is clear that taken together, a combination of policies such as the ones we have modelled could achieve substantial progress towards the target rates, and in combination should be more cost effective than only pursuing one policy route in isolation. We discuss some of the further implications of combining policies at the end of this section.

A challenge that our results highlight is the likely presence of economic trade-offs. That is, the likelihood of adverse wider economic impacts when using some of the levers to reduce child poverty, in particularly due to the tax rises that would be required in order to fund the policies in question. It is important to note that our models do catch some, but may not capture all, the potential benefits from reducing poverty to the scale implied by the targets. For example, from improved educational attainment leading through to increased productivity, or better long-term health in the population freeing up government resources to allocate elsewhere or reduce the tax burden. These benefits could be sizeable, but empirical data on which to estimate how this might feed into our modelling is lacking. When interpreting the results of our macrosimulations, these potential benefits must be borne in mind. Similarly, the type of trade-off in question is important for interpretation. For example, a small reduction in GDP might be deemed acceptable if poverty can be drastically reduced. Similarly, there may be other modes of funding the policies we simulate, for example through diverting funding from other areas, which would create different trade-offs.

Our analysis depends on the strength of the evidence in favour of the assumptions underpinning the models we use – this is of a particular concern for the macro model. This is not a shortcoming of the model (which can be adapted) but an absence of empirical data that can be translated into assumptions and used with confidence within the model. The Fraser of Allander Institute and Manchester Metropolitan University hope to play an active part in augmenting the evidence base so that more of the potential long-run benefits of reducing child poverty can be modelled, however this is unfortunately outside the scope of the analysis we present in this report.

The remainder of this section outlines the key takeaways from our analysis, firstly focussing on the direct policy costs and benefits, then the wider economic impacts, with the last section discussing the potential benefits and trade-offs of combining policies and how future analysis could help to understand this more fully.

3.2. Direct policy costs and benefits

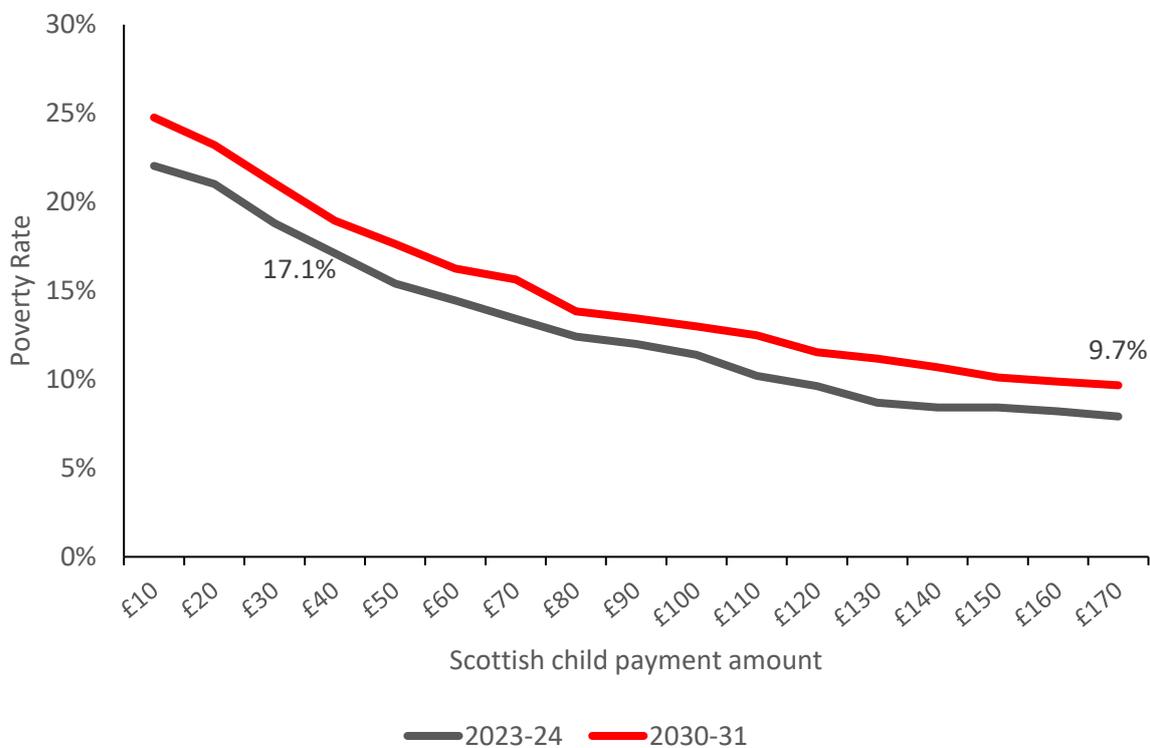
a. Increase in the Scottish Child Payment

It is feasible to meet the interim target using the Scottish Child Payment alone although this comes with a high annually recurring cost of £600m. Further, as the

weekly amount of the payment increases, there are diminishing returns in terms of cost effectiveness. For example, whilst £40 per child per week is enough for a 5 percentage point reduction in child poverty between now and 2023/24, to simulate an additional 7.5 percentage point fall by 2030/31 requires more than a quadrupling of that amount.

Chart 3.1 shows the decreasing marginal return to increasing the Scottish Child Payment in terms of the child poverty rate in both 2023/24 and 2030/31. The cost per child taken out of poverty in meeting the interim target is approximately £10,300 whereas to meet the final target in this way has a cost per child taken out of poverty of £19,900.

Chart 3.1 – The incremental changes in child poverty rate in the intermediate (23/24) and final (30/31) target years as the Scottish Child Payment is increased



b. Reducing Rents

It is perhaps surprising that reducing housing costs to zero is not enough to meet either the interim or final target. This is mainly because of the existence of housing support embedded in the social security system which already provides a relatively high degree of support. The policy we have modelled would help those not eligible (or claiming) housing support through housing benefit or Universal Credit, and those who do not get full housing support due to Local Housing Allowance, the benefit cap, or due to breaching the (relatively low) earnings limit above which people are expected to contribute themselves.

Whilst there is potential for some reduction in poverty in the region of 2 to 3 percentage points, this comes at high cost unless it can be funded by topping up the existing reserved housing support, or the UK Government agrees for any savings from reserved benefits to be repatriated in some way. If the Scottish Government pay the full outlay with no reimbursement (the full cost scenario), the cost effectiveness for 2023/24 is in the region of £19,800 per child taken out of poverty, and in 2030/31 it is roughly £36,500. However, when we assume the UK Government transfer savings in reserved benefits to the Scottish Government (the net cost scenario), these figures are roughly halved. This brings the cost effectiveness of the policy to something more in line with the Scottish Child Payment.

There is no provision currently in the Fiscal Framework that would automatically lead to a flow of savings back to the Scottish Government due to reduction in need for reserved benefits, and therefore it would require agreement between both parties. In Sections 5 and 6, we provide more detail on the assumptions regarding where costs and benefits accrue and their impact it has on or results.

c. Increasing hours worked

The interim target is met by moving all parents in poverty to working at least 20 hours a week at either minimum wage or their existing wage if already in work.

A surprising finding from our analysis is that even increasing hours worked to their maximum (i.e. a 35 hour week) is insufficient to meet the final 2030/31 targets. This happens for a variety of factors, including that it gets harder to meet the 2030/31 targets due to the two child limit. However, it is also a signal of diminishing returns to the benefits of increasing hours once every parent is in paid work.

There are direct financial benefits which accrue to both the Scottish Government and the UK Government. The main benefit is savings from means tested social security, the bulk of which are provided by the reserved benefit system, although there are some savings returned to the Scottish Government through the Scottish Child Payment. Income tax receipts increase, although these are fairly low in the 20 hours a week sample, with many of those newly in work earning below the personal allowance. Income tax receipts are much higher when parents in poverty are moved to working 35 hours per week.

As we discussed in Box 1, quantifying additional expenditure is more difficult for this lever, making it difficult to compare to the others. However, if we take the Working for Families evaluation figures on an annualised basis over 4 years as, expenditure to meet the interim targets would be in the region of £200m and £400m, with a cost per child taken out of poverty between £2,500 and £5,000. This is only provided as a ball park estimate, and as previously suggested it may be on the high side, but it does suggest that this lever, if made to work successfully, would likely be more cost effective than the other levers we have modelled for meeting the interim targets. However, given the interim target year is only 2 years away at present, it is doubtful that a policy targeting this channel could be operational and deliver the required success rates in time.

3.3. Wider costs and benefits

The implications of the use of these levers impacts beyond the intended beneficiaries through knock on impacts in the wider economy once behavioural changes are allowed for. The impact on the wider economy is estimated on two assumptions about the nature of the wage response to any increase in income taxation. Furthermore, within the “no wage push” case we distinguish between the impact of the policy itself (unfunded) and (in the case of the Scottish Child Payment and the housing cost policy) the impact once income tax rises are factored in that are required to pay for the policy (funded). Of course, the “wage push” case is only applicable to funded policies (since in the unfunded case there is no rise in income tax).

It is important to consider the means by which the policies can be paid for where possible so as to provide a more realistic idea of their economic impacts. In this analysis we focus solely on income tax financing.

Impact with no wage push effect

Unfunded/ Policy Only.

In terms of the direct impact of the policy, both the Scottish Child Payment rise and the rent reduction policy (as modelled) work through similar channels in that they increase the amount of disposable incomes of low income families. Lower income families tend to spend, rather than save, additional income, and this has knock on effects in the wider economy, leading to an overall positive boost to economic indicators such as GDP and employment.

There is some potential for an offsetting impact from induced changes in the amount of labour supply offered by parents who are now receiving a larger income from benefits. Whether or not this leads to a reduction in paid working hours depends on a variety of factors, such as cost of childcare, whether there are significant costs to working (e.g. travel time and cost) and the types of jobs available.

For the hours worked lever, we would also expect to see the boost to consumption due to spending by families at the lower end of the income distribution. The increase in hours worked has additional positive macroeconomic impacts as it generates an expansion in the capacity of the economy to produce goods and services, as well as consume them.

Looking at all the policies overall, the main benefits accrue to those at the lowest end of the income distribution but also spread to others due to the expansionary impact on the economy overall.

Funded policy

The need to fund the Scottish Child Payment and rent reduction policy through a rise in income tax in this case limits the extent of the stimulus to demand, and hence to economic activity. The rise in income taxation reduces the disposable incomes of

higher income groups and hence their consumption and while the consumption of lower income groups continues to be stimulated the overall impact is much reduced relative to the unfunded case. The need for fiscal neutrality limits the scale of any macroeconomic stimulus through its impact on demand.

Impact with wage push effect

Funded policy

We have already noted the adverse impact that a rise in taxes tends to exert through its impact on higher income households' consumption. However, it may also have a contractionary impact through its impact on the labour market.

Evidence shows that, over the long-term, when taxes are increased, employees often try to restore their previous levels of take-home pay.¹⁰ This push on pay tends to increase prices across the board, which reduce competitiveness and therefore exports and 'real' disposable income for all, with further implications for consumption.

Social security increases may also lead to some labour supply effects. These may only occur in some households, depending on other factors impacting on the household. For example, higher social security may enable some mothers to work as they will have enough money to pay upfront costs for childcare. For others, it may lead them to withdrawing some of their labour. For example, if parents are working multiple jobs, higher social security income may allow them to reduce their hours and spend more time at home. Any reduction in labour supply would, in aggregate, reduce GDP but more evidence is required to understand whether this would happen in Scotland in the here and now.

Further discussion

It is fair to say that there is more uncertainty with regards to the impact on the supply side of the labour market, as opposed to impacts on demand through changes in consumption. This partly reflects the evidence available and consensus reached (or not) on the impact of policies like those we model (with the exception of increasing hours) on labour supply decisions. However, in the case of the Scottish Child Payment for instance, we find that the fiscal neutrality condition nearly offsets the expansionary impact due to the increase in disposable incomes for direct beneficiaries being effectively offset by the reduction in disposable incomes of higher income households. In addition, the expected wage response where people seek to restore their pre-tax wage has the potential to lead to a contraction in the size of the economy.

Whilst it tempting to disregard the tax rises and hypothesise there might be a different way of funding the policy, in Scotland, where borrowing powers are very limited, there will most likely always be offsetting mechanisms that will dampen the

¹⁰ The evidence relates to widespread findings of a wage curve linking post-tax real wages to the unemployment rate.

positive economic impact of policies like those we model. For example, a wealth tax would still impact on current consumption and have other ramifications for people trying to replace lost income (for example, landlords could increase rents). The funding requirement unfortunately cannot be assumed away.

However, as is clear from our previous discussion, a key factor in determining the overall macroeconomic impact of fiscally neutral changes in the Scottish Child Payment or rent reductions is the likely response of wages to the associated rises in income tax. If wages do not respond at all to such changes the likely macroeconomic outcome is a modest expansion; if wages respond fully to the tax changes we find that the likely macroeconomic outcome is a contraction in economic activity. The longer-term evidence tends to support the idea that bargaining tends to focus on real net take home pay, but since the Great Recession of 2008 there is considerable evidence of wage inflexibility. We discuss this issue further below.

As already discussed, we are less clear on the scale of the direct cost of funding the support for hours worked, but feel it may be lower than that required for the other levers modelled particularly over the medium term as not all costs involved are recurring.

3.4. Implications for combining policies

Separating out each lever is useful in order to simplify and isolate the impact of different policies, and to show how effective they are in relation to each other.

However, in reality, it is most likely that more than one lever will need to be used to meet the child poverty targets. Indeed, our modelling suggests this will be essential if the Scottish Government is to do so given that the efficacy of individual levers is constrained. For example, there are constraints on the scope for altering the housing and hours worked policies, and the diminishing returns found particularly with regards to increasing the Scottish Child Payment to high levels.

Additionally, other policy changes might serve to augment the impact of policies exploiting the levers that we have modelled. For example, policies to encourage businesses to pay the living wage could help with the effectiveness of the hours worked lever in tackling poverty.

However, with any combined policy package there are still offsetting factors to bear in mind. For example, higher social security benefits could make it harder to incentivise parents to increase their hours worked. In particular, there is the potential for a large cliff edge once earnings rise to a point close to where a family might no longer be eligible for Universal Credit which currently serves as 'passport' onto the Scottish Child Payment.

Further modelling work would be required to fully understand the interactions between the levers and where these cliff edges may start to have a significant aggregate impact. These questions are important as there needs to be an understanding of how best to structure social security to balance risks around work

incentives, whilst not penalising those who, for whatever reason, cannot work. Here, appropriate use of the newly devolved disability and carer benefits would have to also be considered.

With regard to housing costs, our modelling does show that it can make an impact on poverty, albeit not to the same extent as the other levers. Policies that help reduce housing costs remain an important element of support, but the question of how they might be targeted, and how they interact with other elements of the housing support system, are important.

Our macroeconomic modelling shows that there are a variety of different economic channels that child poverty policies could impact. Whilst the expansion of labour supply may look like the 'best' option in terms of the wider economy, we know that not all people that we have 'assumed' into work would be able to work, meaning the social security system would still be required.

Although some policies have lower costs than others, the effectiveness of different levers is likely to diminish as they are used more intensively. Understanding the optimal point of cost effectiveness of different levers is therefore important for policy makers seeking to design actual policies. Further work in this area may add to the understanding of where these optimal points are located in terms of both tackling poverty and supporting the wider economy.

4. Methodology

Broadly speaking, the modelling we have used for this report relies on simulations of the impact of changes to components of household incomes and working hours. We make these household level changes, which are subsequently fed through various economic channels to finally produce new values of indicators such as poverty, GDP and employment rates. By comparing these new values to those from a base scenario (where no change has taken place) we can begin to understand the potential impact of the changes we simulate on these indicators.

Specifically, our analysis exploits two forms of simulation: one which changes individuals' net income through alterations to the tax and benefit system – a *microsimulation*; and another which estimates the wider economic effects of these changes – a *macrosimulation*. For the microsimulation component of our analysis we use the Tax and Benefit Model of the Institute for Public Policy Research, maintained by Manchester Metropolitan University. This is a tax-benefit model developed to forecast short-term changes in the UK income distribution and model the fiscal and distributional effects of tax and benefit policy or economic change. For the macrosimulation component, we use a Computable General Equilibrium (CGE) model which has been developed by the Fraser of Allander Institute to represent the Scottish Economy, including its relationship with UK economy.

Both the micro- and macro-simulation models are capable of modelling impacts of policy changes at both the UK and Scottish level. For this analysis, we focus on how the policy impacts are realised in Scotland, although we do see some fiscal 'spillover' to the UK due to the current devolution settlement.

Our modelling exercise is sequential. To analyse how certain policy channels can affect rates of child poverty, first we use the microsimulation model to generate a counterfactual income distribution after a change to the tax and benefits system, or to selected economic variables. We then feed the resulting changes in the household income distribution and the simulated change to the tax system and fiscal expenditure into the macrosimulation model in order to understand the potential wider economic effects of the policy change. Here, we provide more detail on these two components of our analysis, and the key assumptions on which it is based.

4.1. Microsimulation

The microsimulation component establishes a baseline net household income distribution using the 2016-19 (the most recently available) years of the Family Resources Survey (FRS), the official data source used for analysis on household incomes in the UK. The household income distribution in the microsimulation is therefore based on the best available information on household incomes in Scotland.

In each year, the FRS continuously surveys approximately 2,800 households in Scotland across the financial year. In order to increase the sample used for the

modelling, we pool the data from the last three waves of the FRS, to achieve a sample of 8,400 households.

The two years for which child poverty targets have been set are 2023/24 and 2030/31, meaning these become our policy years. The latest three waves of the FRS cover the period from April 2016 to March 2019, so we uprate financial values of net household incomes (including benefit components) from each respective month in 2016-19 to the April of 2023 and 2030 – the beginning of the interim and final policy years. To do this, we use the November 2020 Office of Budget Responsibility (OBR) forecasts for a range of economic indicators as far into the future as they go. Once beyond the OBR forecast horizon (2025 Q1, at the time of this analysis), we assume that the final values in the OBR forecast persist into the future.

For example, earnings, private pension income, and other unearned income and pension contributions were uprated in line with the OBR quarterly average earnings growth forecast; home insurance, and water & sewerage costs in line with the OBR Consumer Prices Index forecast; and local authority, housing association, and private rented sector rents in line with the relevant OBR eligible rent growth assumptions. To focus solely on the impacts of policy changes, we also assume the population is constant between 2018/19 and the two policy years.

Further, our base scenario represents expectations regarding tax thresholds and benefit amounts in 2023/24 and 2030/31. These expectations are based on already announced government policy and default assumptions for uprating thresholds or values – for example, we incorporate currently announced threshold increases for the Income Tax Personal Allowance, as well as an assumed rate of increase in line with the OBR CPI forecasts.

To implement a policy change we create a counterfactual tax and benefit system, or a counterfactual economic scenario. A policy change may, for example, be made to the amount or coverage of a benefit relative to our 2023/24 and 2030/31 baselines, or to individuals' earnings. Simply put, implementing policy changes is equivalent to changing assumptions in the model to calculate a new counterfactual distribution of household income. By comparing the counterfactual household income distribution to its baseline counterpart we can estimate the impact of the simulated change on incomes, rates of poverty, and government expenditure.

A key feature underpinning the micro-simulation is that we simulate non-take-up of benefits, which is an important factor in distributional outcomes. Take-up of benefits often varies across both individual and household characteristics, and so calculating whether or not a family applies for (and receives) a benefit is important for our counterfactual analysis of the baseline versus simulated income distributions.

Take-up rates are estimated as part of the model in, broadly speaking, two steps. First, the model estimates the probability each benefit unit takes-up a benefit based on demographic characteristics and amount of benefit entitlement. Second, random numbers are drawn for each benefit unit and compared against their estimated probability to decide in each case if take-up occurs. However, the simulation is aligned, or calibrated, to ensure that the aggregate number of benefit units taking up

each benefit matches the aggregate proportion seen in the latest official published benefit take-up statistics.

There are also a number of operational assumptions we have to make in simulating tax and benefit changes. For example, in each of our simulations we must assume how a particular channel for reducing child poverty can be targeted. We discuss these assumptions in detail in the next section when we outline the scenarios we simulate.

4.2. Macrosimulation

Model set-up and equilibrium

The macrosimulation proceeds in a similar manner to the microsimulation. The CGE model too has a baseline, which provides a detailed (also abstract) mathematical representation of an economy. The computational nature of the model allows us to capture complex economic interactions, for example, between different types of households, industries and labour markets.

To make this model representative of the Scottish economy, we use up-to-date data on, among other things, the household income distribution and Scottish Input Output (IO) tables – tables of the goods and services used as input and produced as output by each industry in Scotland. Examples of the outputs generated by the CGE model are:

- GDP, employment, unemployment, capital stock, population, real wages, and CPI;
- consumption across household types;
- for each industry: gross output, intermediate inputs, value-added, employment and capital stocks, and prices;
- public expenditure and tax revenues;

We can then simulate a counterfactual view of the Scottish economy under a modified tax and benefit system by simply feeding into this model the new counterfactual data from the microsimulation. Comparing this counterfactual view of the Scottish economy against its baseline shows the wider economic impact of the simulated change to the tax/benefit system. For example, increasing the generosity of a benefit might alter patterns in consumption across households, affect GDP, and/or result in higher or lower levels of employment.

Both the baseline and simulated scenarios presented in this report provide *long-run* representations of the Scottish economy.¹¹ That is, they show the equilibrium values of key economic variables that may take many years to establish. In the present application of the model, the baseline shows us the values of key economic

¹¹ The model can also identify short-run impacts and the adjustment from short- to long-run changes.

indicators assuming the Scottish economy is in equilibrium in 2023/24 and in the absence of any economic disturbance, for example, a change in benefits policy.¹²

Therefore, if we simulate a change to the tax benefit system in this year using our microsimulation methodology, the CGE model captures likely subsequent behavioural responses by households and firms and allows the economy to 'adjust' over time to a new long-run equilibrium. An illustrative example of this adjustment is the path of "capital stocks" – the stock of buildings, equipment, machinery etc. - during a simulation. Initially these capital stocks are fixed, however investment expenditures may change as a result of a change to the tax-benefit system, which would result in a change in investment and in capital stocks. This would happen in each period until a new long-run equilibrium is established in which overall investment is just sufficient to maintain existing capital stocks.

As a result, any long-run effects we report are not realised immediately in 2023/24, but rather some years after the implementation of a change to the tax/benefit system. This is important for interpretation of our results because it assumes, as with all counterfactual simulations, that all else remains constant during this adjustment – this allows us to say that all the changes we observe from the baseline are attributable solely to the policy change we have simulated.

Demand versus supply side effects

There are two main channels through which macroeconomic effects are realised in our simulations: those on the demand side and those driven by supply side changes. In two of our three simulation scenarios we consider in this report, we treat the demand impact as arising from increased government transfers to households. This increases household disposable income and hence their consumption, which in turn tends to increase firms' requirement for labour and capital.

Supply side responses often reflect the impact of changes on workers willingness to supply their labour. In our simulations, we capture these responses through a wage bargaining process – a process by which individuals (and/or their representatives) bid up their wages in response to any alterations to the tax-benefit system. These mechanisms can combine to create complex feedback loops in the model. We discuss how we present our results and how we interpret those that incorporate wage bargaining in the next subsection.

Underpinning these responses are a set of behavioural and/or economic mechanisms that give way to eventual changes in headline economic indicators like GDP, the levels of consumption or employment. For example, how increases in benefits that, in essence, increase disposable income affect consumption is determined in part by assumptions regarding its responsiveness to such changes in income. Similarly, the hiring and firing decisions of firms are determined by firms' seeking to minimise the costs of production. In general the demand for labour

¹² The "equilibrium" here attempts to incorporate real world characteristics of the economy such as imperfect competition in the labour market.

depends on output, the real wage and the cost of capital, since firms produce output using both labour and capital.

One feature of the labour market we do not explicitly capture in our model is any disaggregated individual responses to changes in work incentives. We do not model the fact that, given an increase in income in the form of increased benefits, parents could choose to reduce their participation in the labour market. Conversely, they could choose to increase their participation if a transfer of this type removes a financial constraint – such as childcare – that would enable them to do so.

In principle, however, we can use evidence on the responsiveness of individuals to tax and benefit changes to simulate changes to the overall labour supply within the CGE model. When doing so, if we are interested in the changes among sub-groups of the labour market (for example, mothers), these are weighted by the population share of the relevant group to create a change in the overall labour supply.

This latter effect is particularly salient given that two of the scenarios we simulate centre on increasing non-labour income. In these scenarios in which there might be a large effect on work-incentives, we therefore augment our model with additional 'shocks' that emulate the potential aggregate effects of any individual responses.

Interpreting simulation results

In order to in some way isolate the role of different channels in our simulations, we analyse each scenario in two broad ways:

- i. Analysing the policy effect in isolation and with associated changes in income tax rates, under an assumption of no wage push effect, so focussing on demand-side responses.
- ii. Adding to 1 any additional supply-side responses that might be induced by changes to the tax-benefit system, including wage push effects in response to the rise in taxation and any additional responses of labour supply to increased benefits.

Whether or not we analyse the effects of a scenario in both steps depends on the relevance of each channel to the policy change we have simulated. For example, if there is no reason to believe there would be additional supply-side responses as a result of the policy we simulate, we do not need to focus on 2. In particular, one of our simulations involves altering the working patterns of parents in poverty. This is a direct change to labour supply, and so we do not break our analysis separately into two parts, since in this case the only demand changes are those induced by the shock to the supply side. However, the two other scenarios we simulate – described in more detail in the next section – involved altering households' disposable income, and so are suited to such a "decomposition".

In practice, for the scenarios that alter household disposable income we isolate the effects of the simulated policy changes in this way by comparing results across two broad specifications:

- i. Fixing (nominal) wages (which makes the supply side of the economy entirely passive, so that only demand matters), and allowing for the direct policy

impact without considering how it is funded; considering the impact of fiscal neutrality.

- ii. Imposing the condition that changes to the tax-benefit system are fiscally neutral while allowing for supply-side responses to these changes, including wage push effects. This allows us to incorporate any additional supply-side responses, for example, to aggregate labour supply.

It is important to stress that it is not realistic to analyse a policy change in Scotland, where the government must run a balanced budget, without considering how it will be funded. Assuming fiscal neutrality is therefore an important condition and should be viewed as the “default” option, considering as far as possible potential economic responses to a policy change. The non-fiscally neutral scenario simply provides a useful benchmark with which we can decompose the effects of a simulation.

The case of fiscal neutrality involves balancing the cost of the policy with an increase in tax revenues. Given they are devolved and generate substantial revenue, we focus on alterations to income tax rates and seek to cover the *net fiscal cost* to the Scottish Government. That is, the cost after considering any direct savings from the changes we simulate. Where there are savings returned to the UK Government, we simulate scenarios in which they are (a) retained by the UK Government; and (b) passed back to the Scottish Government.

If wages are inflexible or sticky – and so do not adjust to changes in income tax – then the adverse supply effects otherwise associated with fiscally neutral policy changes will not apply. For example, there is evidence, particularly since the financial crisis of 2007/8, of the stickiness of wages which suggests that, in reality, they might not adjust (at least to the extent our model allows when we incorporate the wage push effect) to the changes in income tax we model. There is also evidence that the rich do not respond to tax rises in the conventional way, suggesting that their response may not give rise to contractions in economic activity.¹³ For illustration, in Table B1 of the Annexe to Appendix 2 we report the results of a range of alternative assumptions about the extent to which wages respond to the changes in income tax rates (for the Scottish Child Payment case), providing results that are intermediate to the results we report here.

The condition of fiscal neutrality acts to stimulate supply side responses as it directly affects real take-home pay, when this is the subject of wage bargaining. This gives rise to a chain reaction of economic effects that would not be apparent in the absence of any wage push effect. As we suggest above, in our model this chain reaction starts with a supply-side response in the form of wage-bargaining – the bidding up of wages by employees/unions who are faced with decreased take-home pay after increases to their income tax. Any increases in pay achieved through this process are partly passed on to consumers through increased prices, and decreases in real (adjusted for price changes) wages and consumption. These, in turn, have knock-on macroeconomic effects.

¹³See, for example, Hope and Limberg (2020) and Picketty et al (2014).

Furthermore, where there are substantial changes in non-labour income resulting from our simulations, we draw on evidence as to the potential direction and magnitude of its effect on labour supply and attempt to capture this through exogenous changes to the labour force.

Although we use this structure for the sake of clarity, it highlights both the rich nature of the economic interactions that can result from changes to the tax and benefit system, as well as the complexity in modelling them.

5. Levers

Overview

We focus on three channels through which progress toward meeting child poverty targets might be made:

1. Increases to the Scottish Child payment
2. Rent reductions across all tenure types for parents in poverty
3. Support for in-poverty parents to move into or increase their hours of work

In simulating these three channels we do not hope to identify and cost an *actual* policy that be used to meet the interim (2023/24) and long-term (2030/31) child poverty targets. Instead, we explicitly focus on hypothetical examples of how these levers might be used to meet the targets, and in each case highlight the magnitude of the government investment required and, subsequently, its potential wider economic effects. In practice, a combination of policies targeting all three channels would be required to make realistic progress toward reducing child poverty, not least because of the variety of circumstances that keep parents in poverty.

The costs we calculate are also not necessarily realistic, and should be viewed with two features of the relevant simulation in mind: (1) how it could be implemented in practice; and (2) its effects on any incentives we do not model here.

Our analysis of the resulting macroeconomic effects is then meant to highlight the potential wider economic effects of changes to the tax and benefit system that are often overlooked in discussions of how the child poverty targets can be met; for example, on the labour market and economic activity. They are not meant to provide precise estimates or predictions of the economic effect of the changes we simulate, however they do provide an illustration of the direction and relative strength of different economic forces and the impact this can have on outcomes such as GDP.

Scenario-specific assumptions

a. Increases to the Scottish Child payment

The Scottish Child Payment was designed by the Scottish Government to help low-income parents with the costs of supporting their family. It is a weekly payment of £10 per child below the age of 16 (on full roll out). Although receiving the Scottish Child Payment may affect some local council grants (for example the Scottish Welfare Fund), it does not interact with any other UK or Scottish Government

benefits that parents or household members might receive. It is similar to the child element in Universal Credit but it does not have a limit on the number of children who can receive the payment. This makes it particularly effective for tackling child poverty, which is higher for larger families. It also means that scenarios targeting the Scottish Child Payment are, in a sense, the most 'realistic' in terms of implementability in comparison to those that follow targeting housing costs and employment which are more hypothetical.

The Scottish Child Payment represents a direct transfer between the Scottish Government and households. It is also a policy instrument over which the Scottish Government has direct control. We therefore explicitly simulate scenarios in which the interim and final child poverty targets are met through this channel, and highlight the magnitude of the government investment required. With the change in the Scottish Child Payment, we then use the microsimulation model to solve for the changes to income tax bands that will raise enough revenue to offset the net cost of this investment.

Where we model a Scottish Child Payment of £40 per week, this amount is set in 2020/21 (the current financial year) and is then updated in line with the Consumer Price Index to each of our chosen policy years, 2023/24 and 2030/31.

Where we model an increase in Income Tax rates to pay for the higher Scottish Child Payment, this will reduce net incomes slightly. This in turn will create a small increase in Universal Credit entitlement, and thereby a small increase in entitlement to the Scottish Child Payment. Where we report results for the 'fiscally neutral' case, these interactions are taken into account.

b. Housing cost reductions

Housing costs represent a significant portion of families' monthly outgoings. The Scottish and UK Governments have implemented a number of benefits to help reduce the financial strain of housing costs on low income families.

We simulate a scenario in which housing costs are further reduced to zero for parents in poverty in all types of tenure. Unlike the case of the Scottish Child Payment, this scenario does not exploit a direct, unconstrained (to the extent that it can be, in theory, arbitrarily funded through taxation) transfer between government and households. Rather, the amount of benefit a household can derive from such a policy is capped at the net amount of rent they pay, a sum that, for many, is already lowered significantly by existing housing schemes/benefits. So although it is a conceptually similar policy to increasing the Scottish Child Payment in that it involves, albeit indirectly, a cash transfer to households, its magnitude is constrained.

Housing costs are a component of the after housing cost (AHC) measure of income, which was the measure used to set the child poverty targets in the Child Poverty (Scotland) Act. Reducing housing costs, through rents, therefore represents a direct route towards meeting the targets. Housing costs might not necessarily be the largest living cost faced by all parents in poverty – for example, some could be owner occupiers with very little in the way of housing costs. It could be more effective

to reduce the financial burden of other obligations such as, for example, energy costs or childcare. However, given that they are a direct component of AHC poverty, and that they can be directly impacted by Scottish Government policy, we focus on reducing rent payments here.

In modelling reductions to rents, we sought to show what child poverty rates might be if all parents in poverty had no rent to pay. In theory this could be via a) increasing social security support to cover full rent or b) intervening in some other way to reduce rents at source – for example a rent subsidy or an increase in social housing provision.

In effect, we have modelled something akin to a rent subsidy that relieves parents in poverty of the requirement to pay rent. Our simulations started by looking at the maximum possible poverty impact of reducing rents by setting them to zero for families with children in poverty, with the potential to then limit the reduction if this exceeded the target. This, in theory, would allow us to arrive at the rent cut that would meet the targets.

The changes to income tax bands required to make the policy fiscally neutral are again calculated once the net cost of offsetting the reduction to the Scottish Government is calculated.

Rent levels interact with existing benefits, however, meaning that reducing them generates some savings to the UK government. We therefore present results based on two assumptions. First, we assume that the UK Government retains these savings, and so the full net cost (net in relation to small savings on benefits to the Scottish Government) of the policy has to be met through increases to income tax – we call this the full cost version of this scenario. Second, we provide a set of results under the assumption that these savings are passed back to the Scottish Government in a settlement with the Treasury, meaning that the cost of the policy is halved – we call this the net cost scenario.

c. Support for in-poverty parents to move into or increase their hours of work

Our final simulation directly changed the working patterns of parents in poverty. This involves increasing the number of hours worked per week by in-poverty parents who are in part-time employment at their current hourly wage, and moving all of those who are not in paid employment into part-time work on the minimum wage.

Poverty is of course directly determined by income. Some children who are in poverty are in working households, with at least one parent in work. For single-parent households this means the only parent being in work. There is also a proportion of children in poverty in Scotland who are in workless households, with their parents being out of work. In the case of single-parenthood, this would mean the only parent in the household being out of work.

As we alluded to in the previous subsection, this simulation could be seen as the outcome of policies that alleviate constraints which keep parents out of work, or reduce their hours, such as childcare costs. It could also be the outcome of active

labour market programmes or training schemes aimed at helping parents get into work or into jobs with higher hours.

However, not all of the working decisions we observe in the data are necessarily constrained by factors that can be overcome by policy. Parents could be out of work due to a long term health condition or have very young children that cannot be placed in the care of others. It might even be the case – as we discuss in the results from our simulation of increasing the Scottish Child Payment – that some parents wish to work less than they currently do, but choose not to in order to meet the costs of supporting their family financially.

Simulating changes to working patterns in the universal (among in-poverty parents) way we do here does not take these factors into account. Rather, it highlights just how much can be achieved in the hypothetical scenario of increasing the employment rate and hours worked of these parents.

We do adopt a similar approach to our Scottish Child Payment simulations here in that we attempt to increase employment and hours of work until the interim and final child poverty targets are met, with the constraint that hours cannot be increased to more than 35 a week. However, we do not impose fiscal neutrality at any stage, primarily because we cannot accurately attribute it a cost.

In Section 2 of this report, we discussed an evaluation of an employment support programme that ran in the first decade of the 2000s in Scotland. This evaluation provides an idea of the potential costs of such a programme were it to be run again at the scale required to meet the interim targets. Many of the costs of employment support programmes are associated with one-off payments (for example, retraining costs before someone re-enters work) and therefore their overall cost will vary from year to year. This again makes it difficult to model a ‘fiscally neutral’ policy.

6. Results

In this section, we look in detail at the results of the micro and macro simulations of the individual levers and compare them with each other.

6.1. Individual lever examination

a. Increases to the Scottish Child Payment

Given the Scottish Child Payment is an unconditional cash transfer, we simulated changes to the Scottish Child Payment that explicitly met the interim 2023/24 and final 2030/31 child poverty targets of 18% and 10%.

The per week per child payments that meet these targets were, again, £40 and £165 per week per child– respective increases of £30 and £155 from the baseline. These came with an overall cost of £600 million and £3 billion in each year. To make the policy fiscally neutral in 2023/24, all income tax rates had to be increased by 1 percentage point, whereas in 2030/31, with a much larger increase in the Scottish Child Payment, the corresponding increase required was 4 percentage points.

When the income tax rates were not raised to fund the changes to the Scottish Child Payment, meeting the intermediate and final targets meant that child poverty was reduced by 6 percentage points and 16 percentage points respectively relative to the baseline in each year, equivalent to moving roughly 60,000 and 150,000 children out of poverty respectively. However, when income tax was raised only marginally fewer children were moved out of poverty in 2023/24, and 6,000 fewer were moved in 2030/31. This is because the increase pushed some households under the poverty line.

Table 6.1 – Changes to child poverty rates under different Scottish Child Payment simulations

	Child poverty rate	Change	Children in poverty	Change
2023/24				
Not fiscally neutral/Unfunded	18%	-6	170,000	60,000
Fiscally neutral - full cost raised in income tax	18%	-6	170,000	60,000
2030/31				
Not fiscally neutral/Unfunded	10%	-16	100,000	150,000
Fiscally neutral - full cost raised in income tax	11%	-15	110,000	145,000

Note: Rates and numbers are rounded to whole percentage points and the nearest 10,000 respectively. As a result, some columns might not add up as expected.

Impact across the income distribution

Chart 6.1 shows the effect on children's position in the household income distribution after increasing the Scottish Child Payment to £40 in 2023/24. The bars represent the number of children in £2,000 bands of disposable household income. The portion of each bar that is grey represents the proportion of children in each band who were unaffected by the policy, whereas the blue and red bars show the proportion who were in families that moved up or down the income distribution respectively. The black and white bars show the height of the baseline distribution, so where these are not visible the number of people in an income band has increased.

By construction, in panel (a) there are no downward moves since the increase to the Scottish Child Payment was not funded through increases to income tax; the policy is not funded by the Scottish Government in this case.

In panel (b), however, there are some whose position was altered by the increase in income tax (1 percentage point) that was required to make the policy fiscally neutral. This is more so the case for those on relatively higher annual incomes, and highlights the trade-off when funding a large increase in a benefit like the Scottish Child Payment by increasing income tax – although many people are moved up the income distribution, and some even out of poverty, there are also many who are made worse off financially.

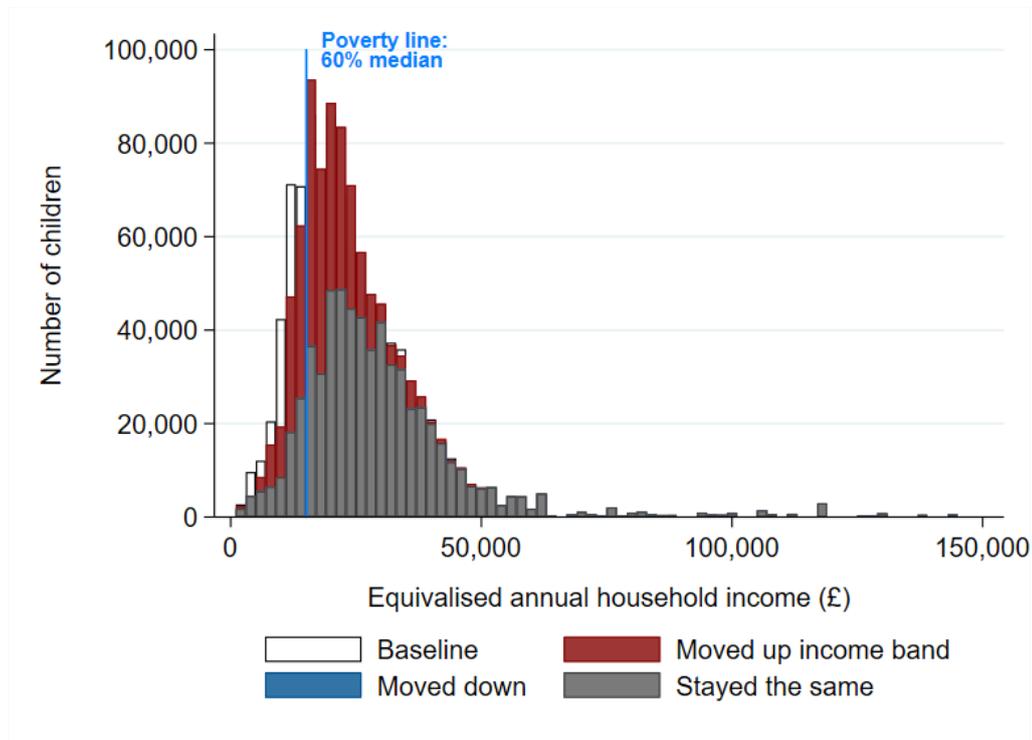
Chart 6.3 shows that, unsurprisingly, this effect is much larger after increasing the Scottish Child Payment to £165 per child per week to meet the final 2030/31 target. There is a 4 percentage point increase in income tax rates required to make this policy fiscally neutral, meaning a large loss in income for many individuals across the income distribution (panel (b)).

Finally, in Charts 6.3 and 6.4 we show the children along the household income distribution who were affected by the changes to the Scottish Child Payment who were in households with a single parent or a parent who has a disability or work-limiting health condition according to the Equality Act (2010).¹⁴ For illustrative purposes, both graphs show the scenario in which income taxes were raised to offset the policy cost. Generally, more children in single parent families are affected more by the policy change than those in families with a parent with a disability or work-limiting health condition. This is because single parents make up 15% of working age parents, whereas those, for example, claiming DLA make up only 8%.

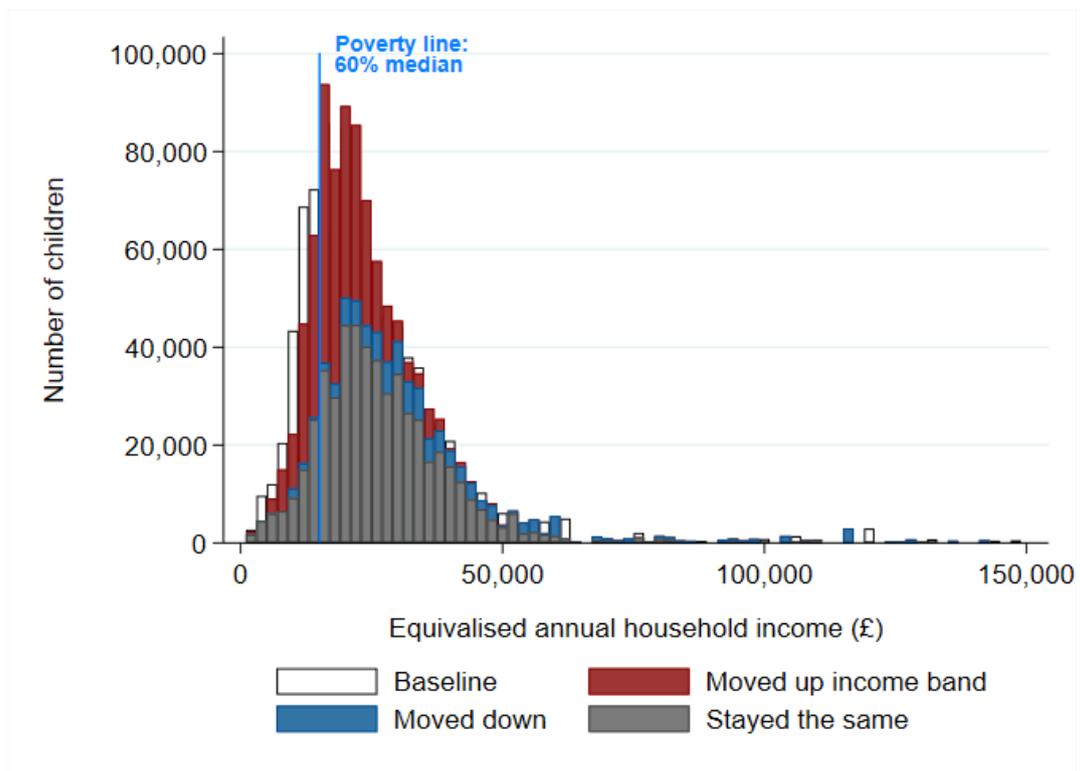
In both Chart 6.3 and 6.4 there are some children in families whose income is reduced as a result of the income tax increase required for fiscal neutrality. However, this is generally the case for a very small proportion of each income band. When considering the unfunded scenario in which income taxes are not raised, there are no such reductions.

¹⁴ We use a slightly different definition of "household" here in that we define them as "benefit units" – a single adult or married/co-habiting couple with dependent children. For example, if a child is in a benefit unit with parent/s who do not have a disability or long-term health condition, they are not considered in our definition of being in such a household even if another member of the family living with them does have a disability or long-term health condition.

Chart 6.1 – The effect on children’s position in the household income distribution after increasing the Scottish Child Payment to meet the intermediate 2023/24 target

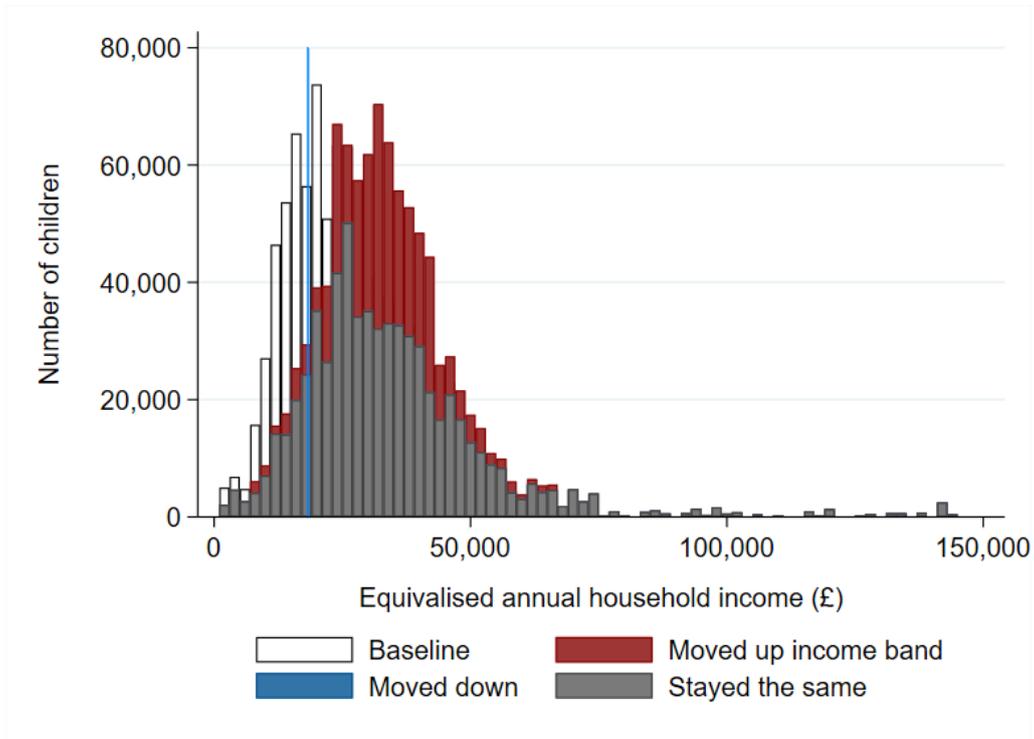


(a) Unfunded (not fiscally neutral)

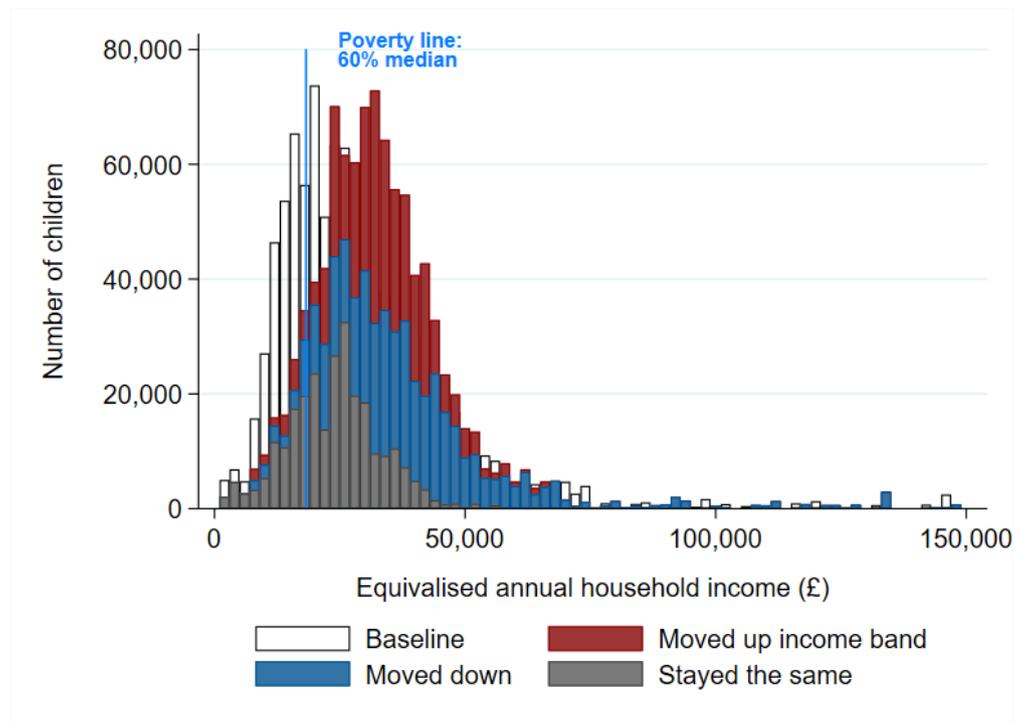


(b) Fiscally neutral

Chart 6.2 – The effect on children’s position in the household income distribution after increasing the Scottish Child Payment to meet the intermediate 2020/31 target

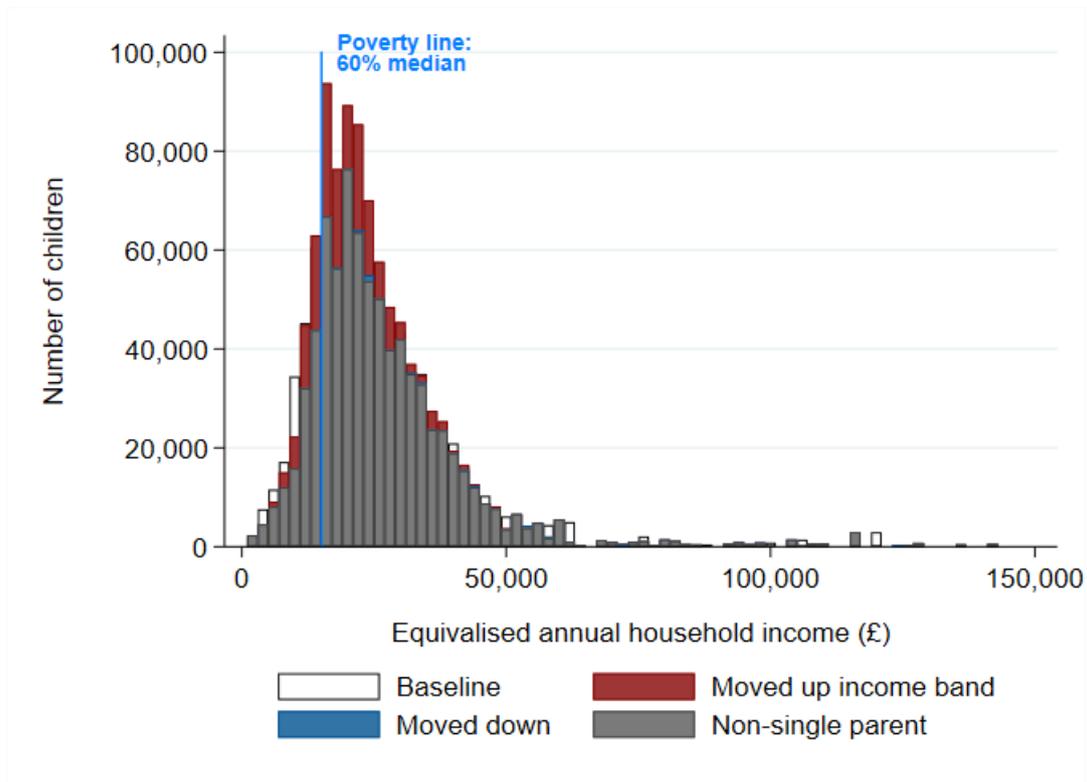


(a) Unfunded

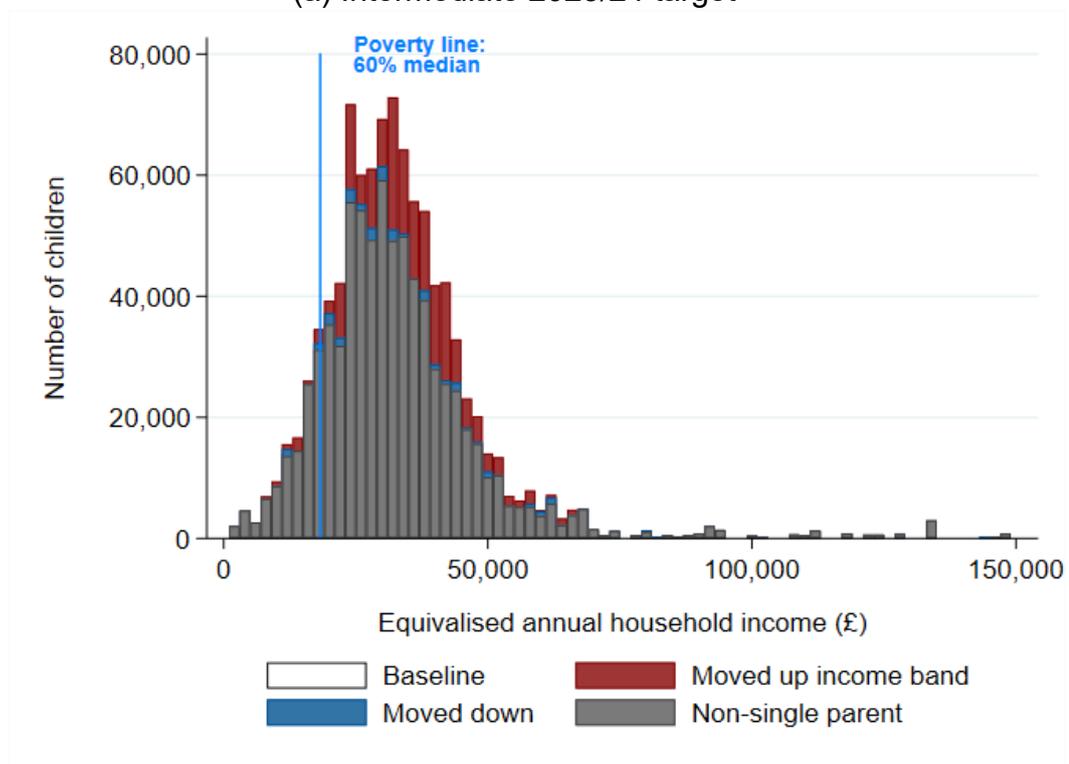


(b) Fiscally neutral

Chart 6.3 – The effect on the position of children in single-parent households in the income distribution after increasing the Scottish Child Payment to meet the intermediate 2023/24 and final 2030/31 targets, imposing fiscal neutrality

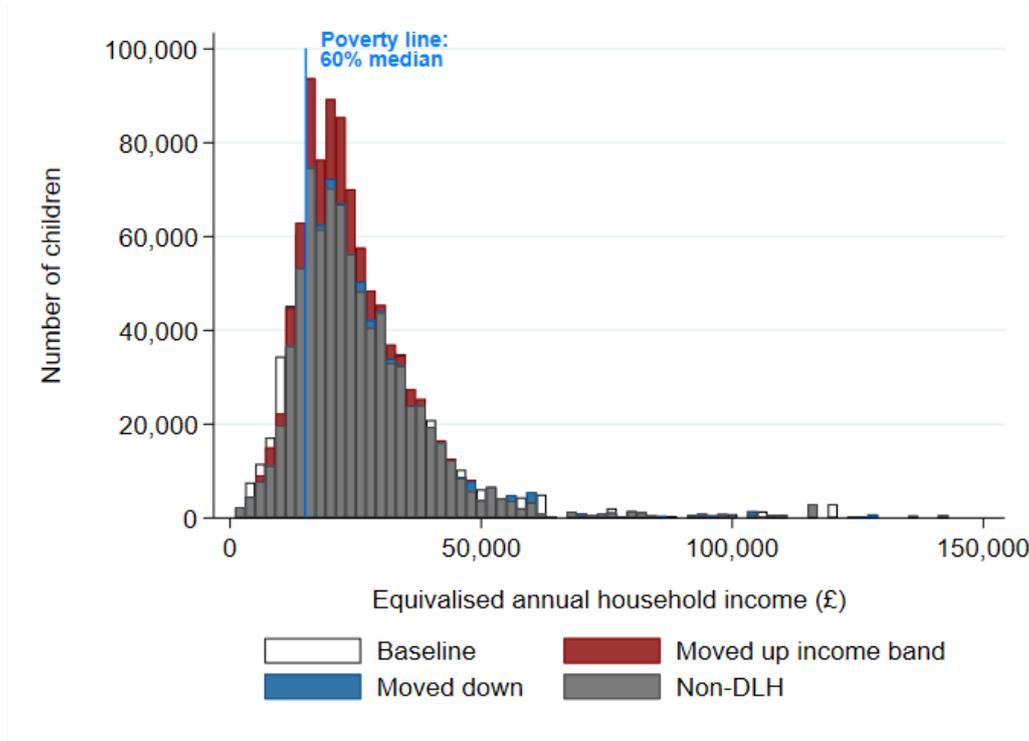


(a) Intermediate 2023/24 target

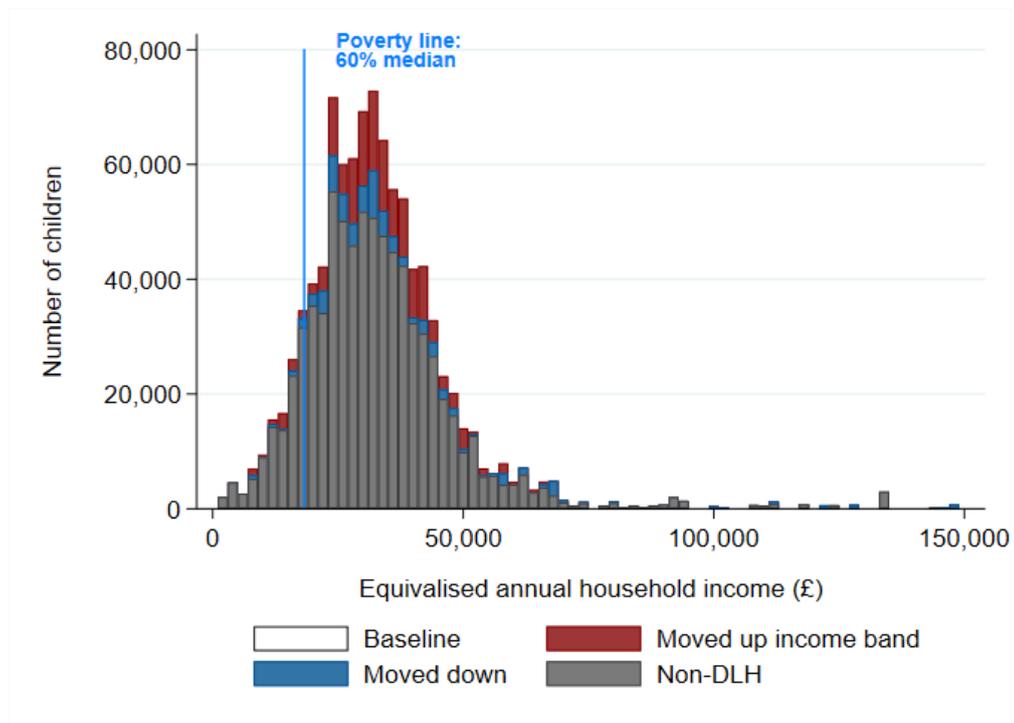


(b) Final 2030/31 target

Chart 6.4 – The effect on the position of children in households with a parent with a disability or long term health condition in the income distribution after increasing the Scottish Child Payment to meet the intermediate 2023/24 and final 2030/31 targets, imposing fiscal neutrality



(a) Intermediate 2023/24 target



(b) Final 2030/31 target

Wider macroeconomic effects

Table 6.2 below shows the long-term macroeconomic effects of meeting the 2023/24 and 2030/31 child poverty targets through increasing the Scottish Child Payment in two of our three cases: columns (1) and (2) show the policy-only effects, abstracting from any supply-side responses, and columns (3) and (4) show the effects of the policy when we simulated funding the increase to the Scottish Child Payment through income tax revenues and allowing labour to respond to the increase in taxes by attempting to restore their real take home wage. These two columns therefore include the supply side response to the rise in taxes, without any direct impact on labour supply.

All figures are relative to the baseline, meaning an effect size of x% corresponds to an x% change in the relevant economic variable in comparison to the baseline case (the exception is the unemployment rate, where percentage point changes are reported).

No wage push effect

Policy only impacts/unfunded case.

Focussing on columns (1) and (2) shows that, unsurprisingly, the increase in household income leads to increases in consumption across the income distribution. The magnitude of the increase is larger among the bottom two quintiles (the bottom 40%), given that take-up of the benefit is concentrated among low-income households. This is true in both the intermediate and final years, although the percentage change in consumption is between five and six times higher for these lower-income households in 30/31. This is because the microsimulation resulted in an increase of £165 per child per week – a large increase in monthly income that amounts to, in the non-fiscally neutral case, a cash injection of £3.03 billion.

As a result of this transfer of income from the government to households, GDP increases in the intermediate and final years by 0.25% and 1.13% respectively. There is a similar pattern in consumption and investment in the two years, and employment rises by 0.22% and 0.99% respectively. The unemployment rate falls by 0.20 and 0.93 percentage points respectively for the interim and final targets. Overall, this transfer results in an unambiguously positive effect on economic activity. Of course, the simulation captures only the demand-side effects of a policy that is *unfunded* by the Scottish Government.

Fiscally neutral impacts/funded case.

We do not report the full results here since the macroeconomic impacts in this case prove to be negligible (they are reported as the last two columns of Table 1 in Appendix 2.) In effect, the tax-induced reduction in the disposable income of higher

income groups generates a reduction in consumption that nearly offsets the stimulus to the consumption of lower income households.¹⁵

Fiscal neutrality and supply-side responses through wage bargaining

Columns (3) and (4) of Table 6.2 focus on the impact of the policy once we require that it is fully funded through increases in income tax, which: significantly adversely impacts the consumption of higher income groups that virtually offsets the overall stimulus to demand, as we have already seen, and, furthermore, in this case induces an adverse supply-side response through the wage-bargaining process as workers attempt to restore their real take home wage.

Raising revenue through income tax in fact results in a *reduction* in consumption in all but the bottom two quintiles of the income distribution. This is because funding the increases to the child payment that meet the intermediate and final targets requires increases of roughly £600 million and £3 billion in income tax, much of which is raised among higher-earning households.

¹⁵ There is a modest stimulus to economic activity, but a very small decline in employment: the consumption of higher income households tends to be more labour intensive (more services, less energy consumption).

Table 6.2 - The long-run macroeconomic impacts of meeting the intermediate and final child poverty targets through increases to the Scottish Child Payment.

	<u>Policy only</u>		<u>Fiscally neutral policy (Including wage-push response)</u>	
	(1)	(2)	(3)	(4)
	Intermediat e (23/24)	Final (30/31)	Intermediat e (23/24)	Final (30/31)
GDP	0.25%	1.13%	-0.39%	-1.99%
Consumption	0.61%	2.79%	-0.20%	-1.04%
Investment	0.29%	1.31%	-0.33%	-1.74%
Total Exports	0.00%	0.00%	-0.47%	-2.42%
Total Imports	0.34%	1.56%	-0.08%	-0.40%
Nominal Gross Wage	0.00%	0.00%	0.54%	2.80%
Real Take Home Wage	0.00%	0.00%	-0.75%	-3.37%
CPI	0.00%	0.00%	0.17%	0.88%
Real cost of capital	0.00%	0.00%	0.13%	0.70%
Unemployment Rate (percentage point difference)	-0.20%	-0.93%	0.42%	2.12%
Employment	0.22%	0.99%	-0.44%	-2.26%
Total household tax	0.24%	1.09%	3.20%	14.92%
Income Tax	0.22%	0.99%	6.41%	29.89%
Transfers to households from Gov.	8.36%	37.91 %	8.36%	37.91%
Real Gov. Consumption	0.00%	0.00%	0.00%	0.00%
		11.11		
(lowest quintile) Consumption	2.20%	%	2.01%	10.15%
2 Consumption	1.57%	7.04%	1.12%	4.84%
3 Consumption	0.46%	1.74%	-0.11%	-0.99%
4 Consumption	0.22%	0.97%	-0.57%	-2.73%
(highest quintile) Consumption	0.16%	0.70%	-1.14%	-5.39%

Note: "Gov." refers to Scottish Government.

There is also a reduction in the real take-home wage in both years, driven by the changes to income taxes and increases in prices; workers' attempts to restore their real wage are frustrated by the induced increase in the unemployment rate, which inhibits their bargaining power. Firms, in part, pass increases in wage costs realised through bargaining to the prices of their goods and services, reducing competitiveness and adversely impacting net trade flows. They also hire less staff – employment falls as a result of meeting both targets and the unemployment rate increases, particularly in the case of meeting the final child poverty target in 30/31.

Altogether, the result is a significant decline in GDP, particularly in meeting the final targets in 30/31, of almost 2.0%, driven by changes in consumption, and the wider economic effects of wage bargaining responses.

There is clearly a considerable range of potential macroeconomic outcomes, depending on our assumptions about funding and the nature of wage determination. Most would accept that the “unfunded” or “policy only” results are not feasible in the Scottish context given the current fiscal framework. Accordingly, the results of our analysis so far vary between a negligible macroeconomic outcome in the absence of wage push to a significant contraction in economic activity (of nearly 2% of GDP) to meet the final target. However, the latter case assumes that workers’ attempt to fully restore their post-tax real wage. If workers respond only partially to the tax changes (for example, because of generally weak bargaining power), the scale of the adverse changes are much reduced (we present some sensitivity analysis in Table B1 in Appendix 2). Analysing whether policy might influence these reactions is beyond the scope of the present analysis.

Fiscal neutrality, wage bargaining, and additional labour supply responses

As we discussed in Section 5, an important aspect of labour not automatically captured in our model is changes to the participation decisions of parents based on the Scottish Child Payment increasing their non-work income. Our simulated change to the Scottish Child payment represents an unconditional upward shift in parents “budget constraint” – their total household resources. Importantly, this change does not directly affect their wage.¹⁶ Conventional economic theory would suggest parents would be incentivised to respond to this unconditional lump-sum transfer, by choosing to work less because they are no longer required to work the same number of hours to meet the costs of supporting their family.

However, this abstracts from the fact that parents can substitute their working hours for childcare if there is a net financial benefit to doing so – something that is most likely to occur in financially constrained low-income households. As a result, a transfer like the Scottish Child Payment might incentivize parents to work more if childcare costs were constraining their ability to work.

To incorporate such a response into our model, we implement a ‘shock’ to aggregate labour supply that might be illustrative of the overall changes in working patterns that could be induced by the changes to the Scottish Child Payment we have simulated. To do so, we draw on evidence regarding the responsiveness of individuals’ labour supply to changes in taxes and/or benefits.

There are limited examples of both the implementation and effects of a policy like the Scottish Child Payment. This is particularly true given the magnitude of the policy changes we simulate – for a family with two children our policy changes provided them with an additional £240 per month in 23/23 and £620 per month in 30/31. Both of these are large sums of money, particularly when compared to the average (unequalised) monthly income of an in-poverty family in Scotland of £750.

Although there might not be an identical policy in terms of design or magnitude, there is evidence from the implementation of a similar universal child benefit in Poland that increasing the Scottish Child Payment might impact the participation decision of

¹⁶ Although there is an eventual effect on the real take-home wage rate after imposing fiscal neutrality and allowing for supply side responses.

mothers (or primary carers). Magda et al (2018, 2020) find between a 2.1-2.5% reduction in the participation of mothers, whether single or partnered, after the introduction of the monthly benefit which was equivalent to roughly £95 per month per child for eligible families – an amount somewhere in the middle of our simulations to meet the intermediate and final child poverty target.

Similarly, in Canada Schirle (2015) find that the introduction of a Universal Child Care Benefit (UCCB) in Canada of \$100 per month per child under the age of 6 had a negative impact on both the hours and participation rates of married mothers.¹⁷ In particular, they found a reduction of 3.2 percentage points in participation and a reduction of 1.9 hours in median weekly hours worked among lower-educated mothers – who are more likely to be in low paying jobs. They also found reductions in hours among highly-educated mothers. Our model does not capture the potential varying labour supply response along socio-economic characteristics, and simulates aggregate changes. However it is important to note that such differences would be key in determining how the policy impacts different households.

We use this evidence to simulate the aggregate reduction in labour force participation that the available evidence suggests is the most likely outcome. Given that this exercise is illustrative, we abstract from changes at the intensive margin – i.e. changes in the *number* of hours – and focus on changes in the extensive margin – i.e. changes in participation the available estimates of which appear more robust. Taking the estimate of a 2.5% reduction in labour force participation of mothers from Magda et al (2018, 2020), and multiplying this by the share of labour force who are mothers, we arrive at an aggregate reduction in the labour force of 0.42%.

Given the limited available evidence from similar schemes that have been implemented elsewhere – often in quite different cultural and institutional settings – we would emphasise that the results should be regarded as purely illustrative. While there is little range in available estimates, the presence of countervailing forces at work leads us to suggest that it would be reasonable to consider the case of zero overall response of female labour supply as an alternative benchmark case. Therefore we conclude that there are a range of possible SCP-induced supply effects from 0.0% to -2.5%.

For illustration, in table 6.3 we show the impact of a 2.5% reduction in labour participation of mothers. Table 6.2 already captures the other limiting assumption of a zero labour market supply effect.

¹⁷ The policy began in 2006. The additional income from the UCCB is taxable. The lower-income spouse in a family claims the benefit in addition to their income, and so final amount of benefit families receive depends on the tax rate applied to the income of this spouse.

Table 6.3 – Illustrative long-run macroeconomic effects of meeting the intermediate and final child poverty targets through increases to the Scottish Child Payment, incorporating additional labour supply response

	(1) Intermediate (23/24)	(2) Final (30/31)
GDP	-0.70%	-2.28%
Consumption	-0.36%	-1.19%
Investment	-0.62%	-2.01%
Total Exports	-0.84%	-2.77%
Total Imports	-0.14%	-0.46%
Nominal Gross Wage	0.96%	3.22%
Real Take Home Wage	-0.62%	-3.24%
CPI	0.30%	1.01%
Real cost of capital	0.24%	0.80%
Unemployment Rate (percentage point difference)	0.34%	2.03%
Employment	-0.78%	-2.58%
Total household Tax	3.66%	15.37%
Income Tax	7.34%	30.78%
Transfers to household from Gov.	8.36%	37.91%
Real Gov. Consumption	0.00%	0.00%
(lowest quintile) Consumption	1.91%	10.04%
2 Consumption	0.98%	4.70%
3 Consumption	-0.24%	-1.11%
4 Consumption	-0.71%	-2.86%
(highest quintile) Consumption	-1.36%	-5.60%

Note: "Gov." refers to the Scottish Government

Table 6.3 shows the additional economic impact of the 0.42% reduction in total labour force response to increases in the Scottish Child Payment to meet the 2023/24 and 2030/31 child poverty targets. Intuitively, to produce these results we augment the simulation in columns (3) and (4) of Table 6.2 with a reduction in the overall labour force in the model. This generates a long-run equilibrium that incorporates the labour supply shock in addition to the combination of demand and supply shocks that generate the results of columns (3) and (4) of Table 6.2.

These additional shocks almost double the negative impact on GDP shown in the case of meeting the intermediate target, and increase the impact by around 0.3 of a percentage point in meeting the final target. This is driven by much larger declines in consumption and investment induced by the contraction in labour supply. The upward pressure on prices is enhanced in response to the contraction in labour supply, however the fall in real wages is somewhat muted as a consequence. Both of these factors lead to a greater loss of competitiveness and of exports.

Again, given that these incorporate wage-bargaining responses and subsequent economic effects, the results in Table 6.3 can be viewed as being rather pessimistic. If, given the presence of countervailing effects, we consider a zero labour supply response to the rise in the SCP as reasonable, then the results reported in Table 6.2 provide the overall estimate of the macroeconomic effects. These vary, as we have already noted, from being negligible (but positive) to being associated with a non-trivial decline in economic activity that varies directly with the strength of the wage response to the rise in income tax rates.

There is, therefore, considerable uncertainty surrounding the overall macroeconomic impacts, depending on the strength of the overall labour supply impact and the responsiveness of wages to the rise in income tax.

b. Housing cost reductions

Our simulation removed all rents for parents in poverty. In practice, we treat this removal of rents as an increase in housing benefits that reduces rents to zero.

The corresponding overall costs gross cost in 2023/24 and 2030/31 were £600 and £700 million respectively. However, reducing rents in this way has a direct impact on the tax revenue spent on rent-related benefits – since rents are essentially abolished in our simulations, government expenditure on benefits tied to rent are also reduced.

As a result, in this scenario we model fiscal neutrality in two scenarios:

- (1) the Scottish Government raising funds equivalent to the *full cost* of the rent reduction; and
- (2) the Scottish Government negotiating with the Treasury to ensure that any savings generated as rents fall become part of their revenue, so that only the *net cost* of the rent reduction has to be met through adjustment in income taxes.

In (1), the increase in income tax bands required for neutrality is 1 percentage point in 2023/24 and 1 in 30/31. In (2), given the savings in housing benefits are passed back to the Scottish Government the net cost of the policy is £300m in 2023/24 and £300m in 2030/31, and the increase in income tax rates in both years is smaller at 0.5 percentage points.¹⁸

Both are possibilities, but scenario (2) would require negotiation with the UK Government as part of fiscal framework negotiations, and is therefore uncertain. We therefore provide results for both scenarios, and interpret the simulations as representing bounds within which effects might fall under various settlements between the two Governments.

The reductions in rent did not result in child poverty being reduced to the target rates in either the intermediate or final years. Irrespective of whether and by how much income taxes were raised to fund the reduction, child poverty was reduced to 21% in

¹⁸ In fact, these changes make small fiscal gains for the Scottish government of £20 million and £42 million in 2023/24 and 2030/31 respectively. However, this combination was the closest to fiscally neutral our microsimulation model could achieve.

2023/24 and 24% in 2030/31 – changes of 3 and 2 percentage points respectively from what would have occurred had the rent reductions not taken place.

Raising income taxes had very little effect on child poverty rates at the margin because: (a) the rent subsidy is concentrated among those in poverty; and (b) any increase in tax experienced by families at the lower end of the income distribution does not offset the increase they receive from removing their housing costs.

Table 6.4– Changes to child poverty rates under different rent reduction simulations

	Child poverty rate	Change	Children in poverty	Change
2023/24				
Not fiscally neutral/Unfunded	21%	-3	200,000	-30,000
(1) Fiscally neutral -full cost raised	21%	-3	200,000	-30,000
(2) Fiscally neutral – net cost raised	21%	-3	200,000	-30,000
2030/31				
Not fiscally neutral/Unfunded	24%	-2	240,000	-20,000
(1) Fiscally neutral -full cost raised	24%	-2	240,000	-20,000
(2) Fiscally neutral – net cost raised	24%	-2	240,000	-20,000

Note: Rates and numbers are rounded to whole percentage points and the nearest 10,000 respectively. As a result, some columns might not add up as expected.

Impact across the income distribution

Charts 6.5-6.8 show analogous distributions of household income as in Charts 6.1-6.4, this time after simulating reductions to rents for parents in poverty.

First, Charts 6.5 and 6.6 show that in both policy years and in both the unfunded and fiscally neutral cases, the effects of eradicating rents on children’s moves along the income distribution is smaller than when increasing the Scottish Child.

As we alluded to earlier in the report, this is because the extent to which income can be transferred to households through rent reductions is limited. This is also why neither of the target child poverty rates could be met. Although a sizeable number of children move along the income distribution in Charts 6.5 and 6.6, the extent of the

“churn” is muted in comparison to the scenarios in which the Scottish Child Payment was increased to explicitly meet the targets.

Similarly, Panels (b) and (c) in each of these charts show that individuals higher up the income distribution are much less likely to have their income reduced as a result of this simulated housing policy – a direct effect of the fact this natural limit to the “benefit” also caps its cost.

When making comparisons between these distributions and those from the Scottish Child Payment scenarios, it is useful to keep this trade-off in mind: the higher the cash transfer, the more money has to be raised to fund the policy, or the more investment has to be re-directed from elsewhere. So whilst increasing the Scottish Child Payment met both targets, it also resulted in large losses in income for some individuals, and even pushed a number of them below the poverty line.

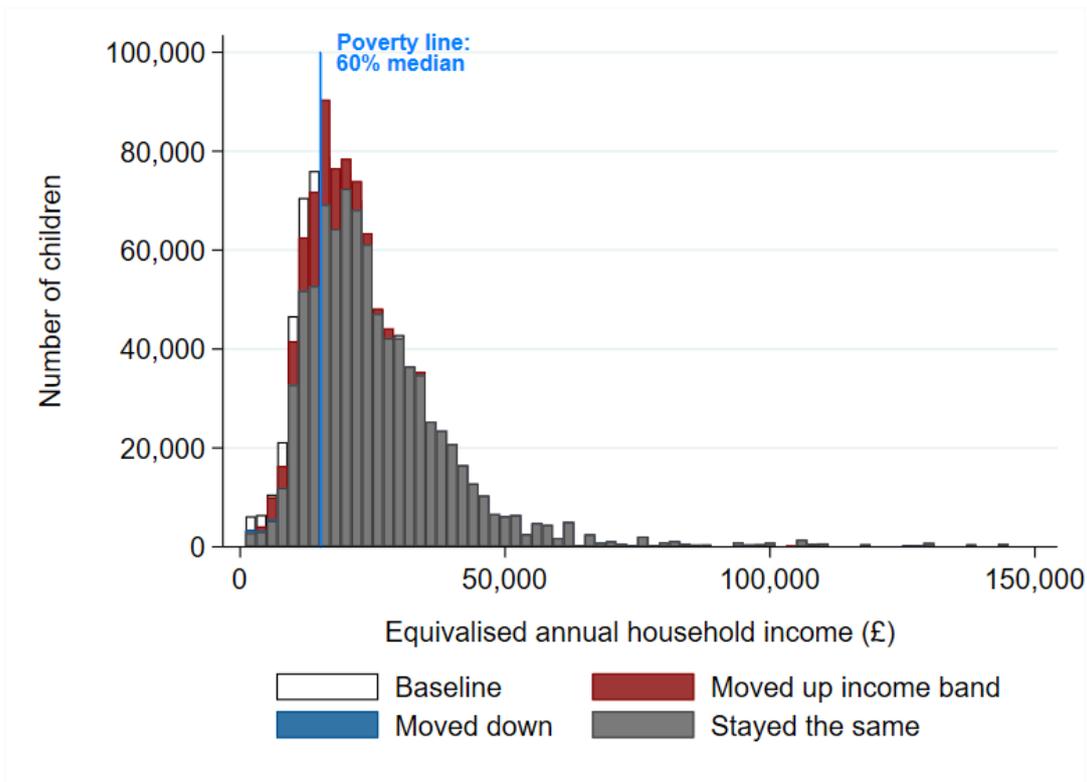
When comparing Panels (b) and (c) with each other within Figures 6.6 and 6.7, there are fewer moves down the income distribution in the latter (blue sections of bars). This is because the tax raised in this scenario is half of that in the former, meaning the loss in income for many families resulting from the tax change is smaller.

Finally, Charts 6.7 and 6.8 plot the proportion of children in single-parent households or households with at least one adult with a disability or long-term health condition who moved across the income distribution when the *full cost* of the policy was raised by the Scottish Government through income tax changes. We focus on the full-cost scenario here for brevity and because, as the graphs show, there are already very few movements down the income distribution for children in these types of families.

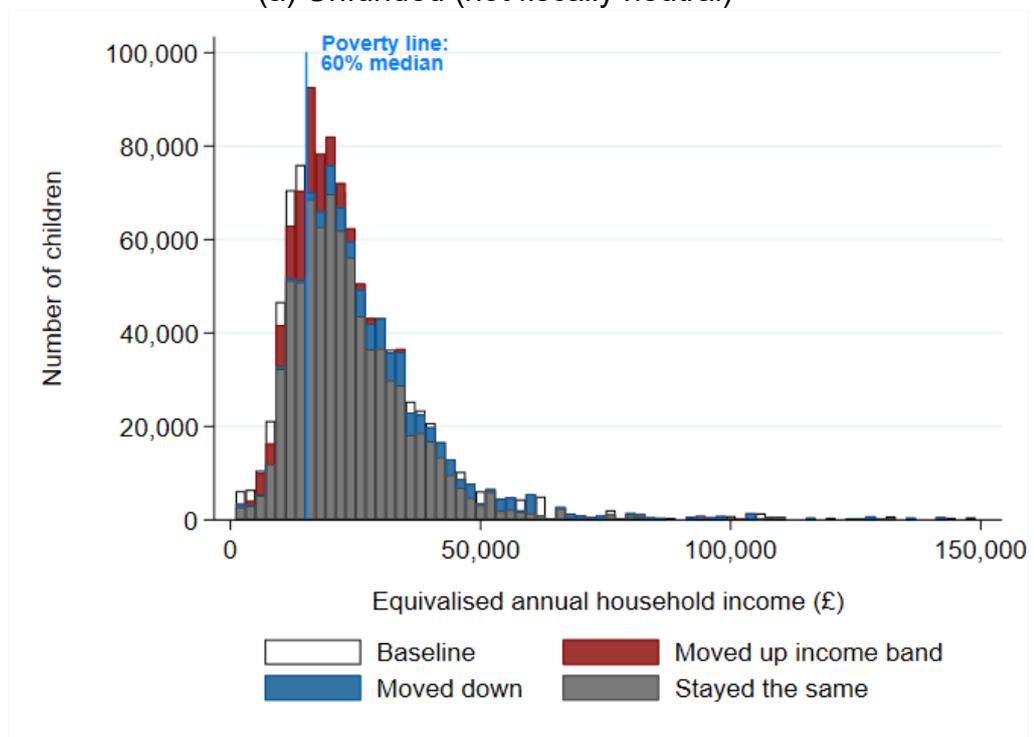
Similarly, to all the results in the scenario – and for the same reasons - in Charts 6.8 and 6.9 the effect on children in these higher poverty risk families¹⁹ are less pronounced than in the case of increasing the Scottish Child Payment. When only the net cost of the policy is raised, there are even fewer.

¹⁹ Children in single parent households and children in families where there is a disability were termed ‘priority families’ in the Scottish Government’s 2018 ‘Tackling Child Poverty Delivery Plan’ due to their higher risk of poverty compared to the general population.

Chart 6.5 – The effect on children’s position in the household income distribution after removing rents for parents in poverty in 2023/24

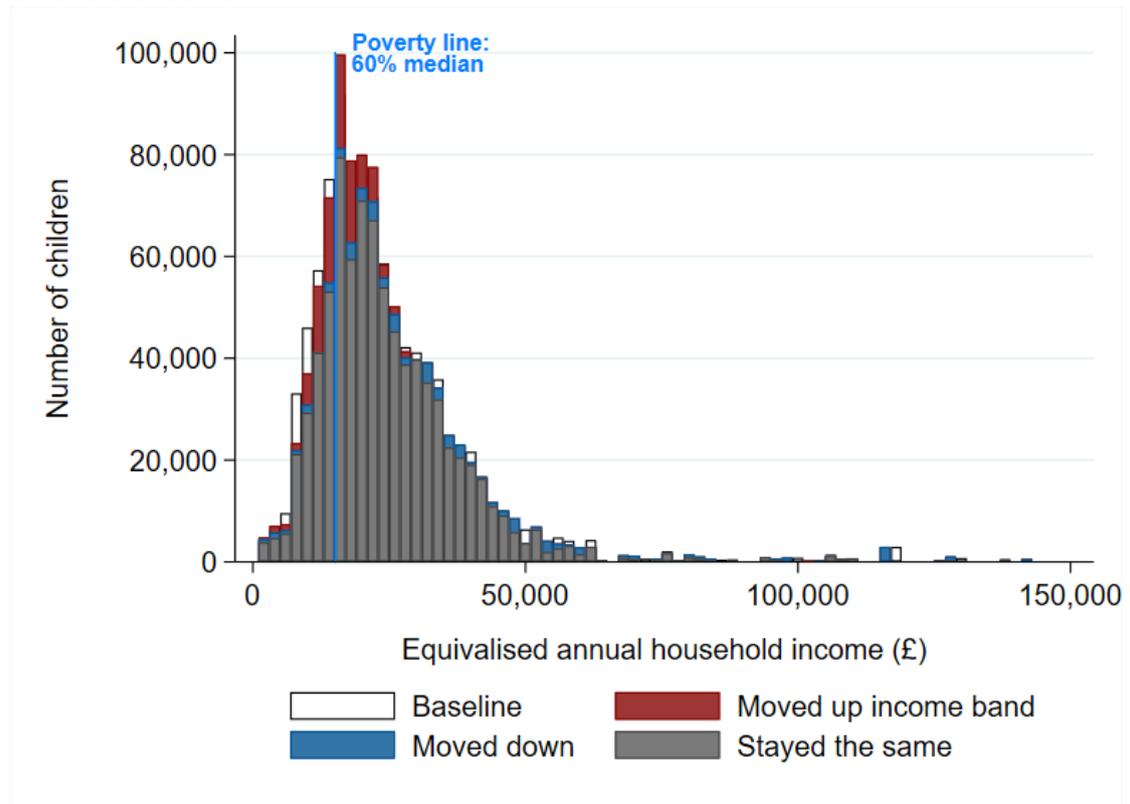


(a) Unfunded (not fiscally neutral)



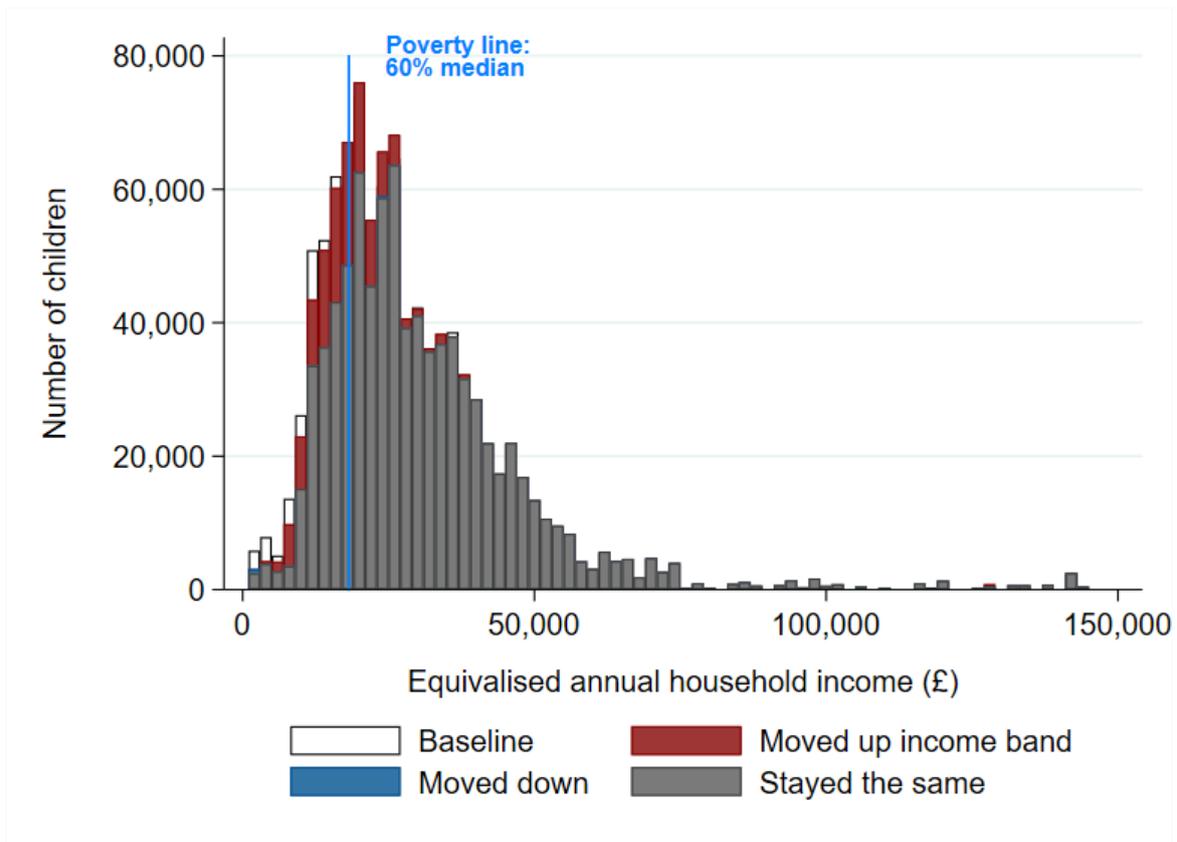
(b) fiscally neutral – full cost raised

Chart 6.5 Cont.

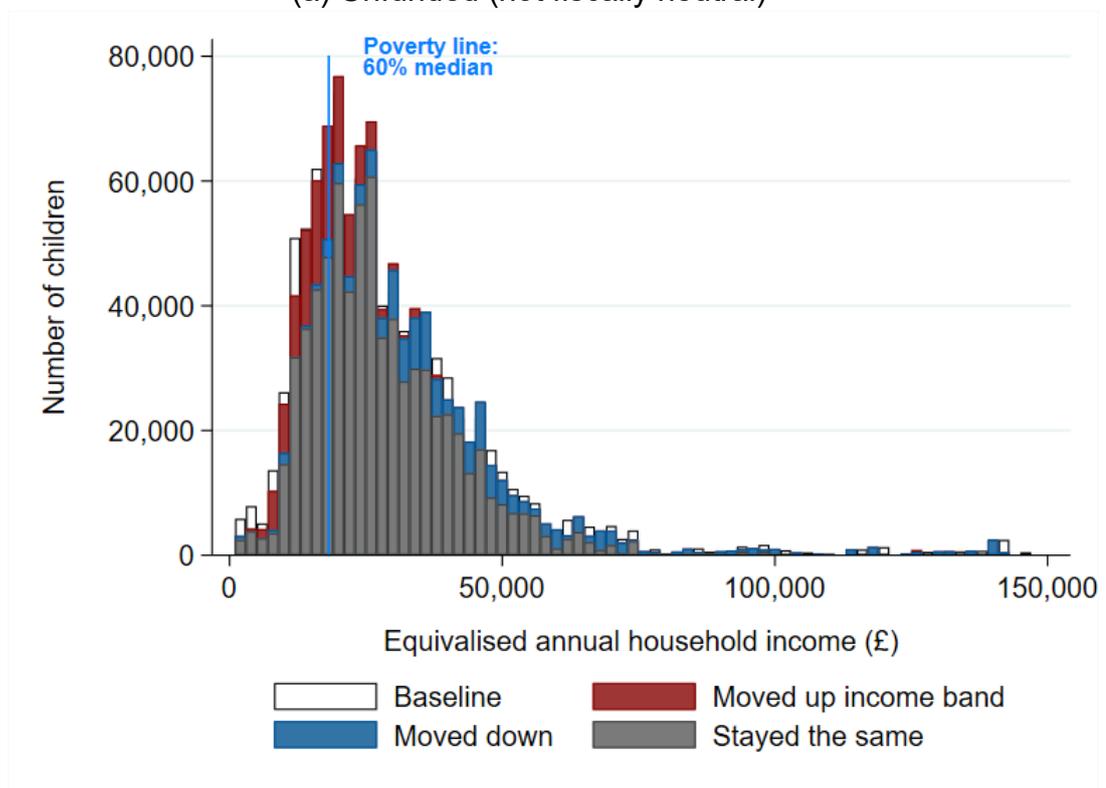


(c) Fiscally neutral – net cost raised

Chart 6.6 – The effect on children’s position in the household income distribution after removing rents for parents in poverty in 2030/31

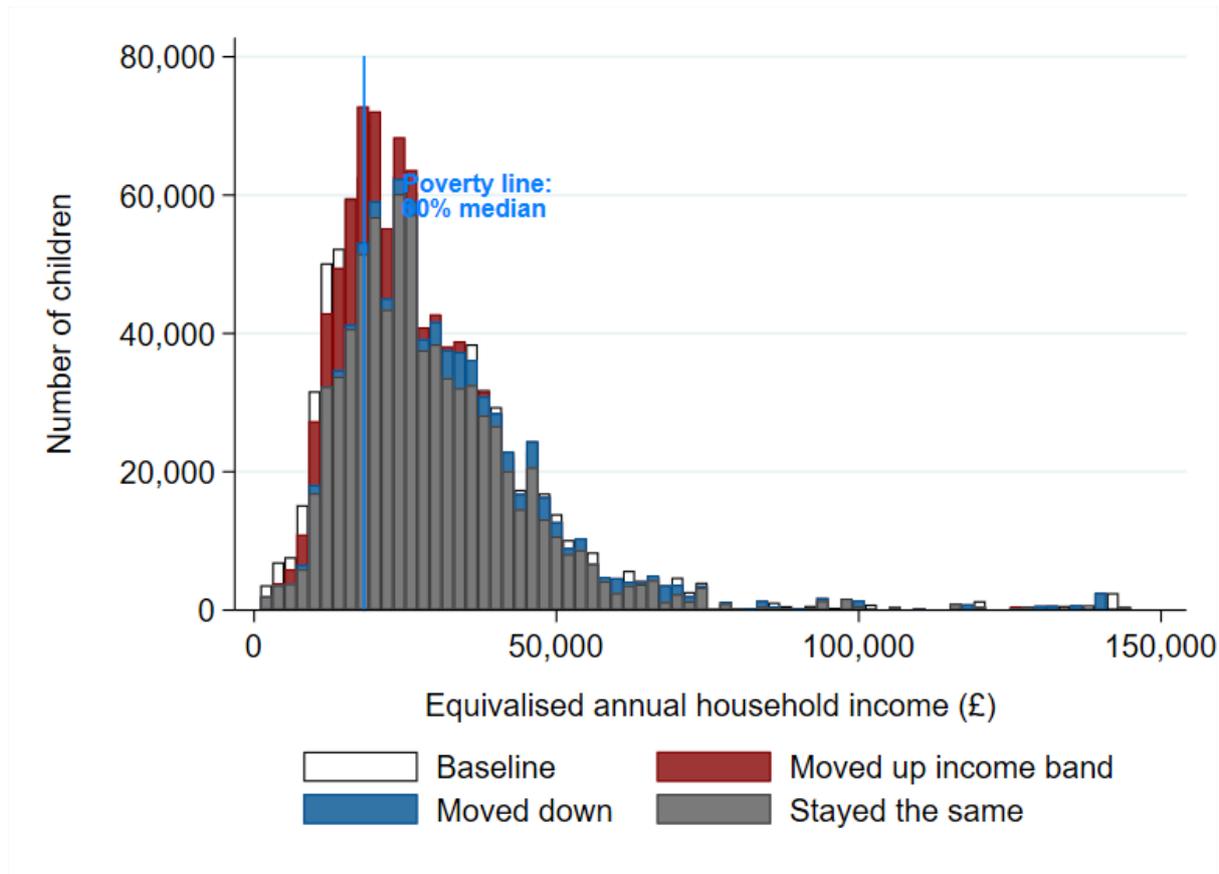


(a) Unfunded (not fiscally neutral)



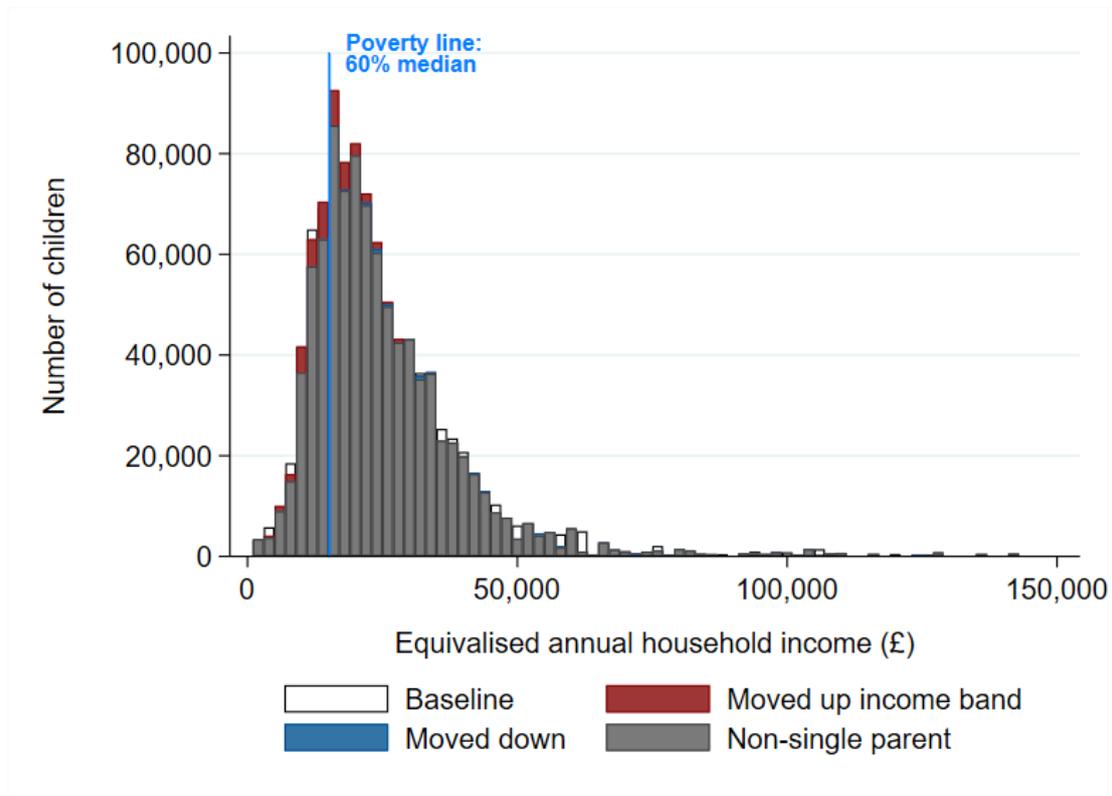
(b) fiscally neutral – full cost raised

Chart 6.6 Cont.

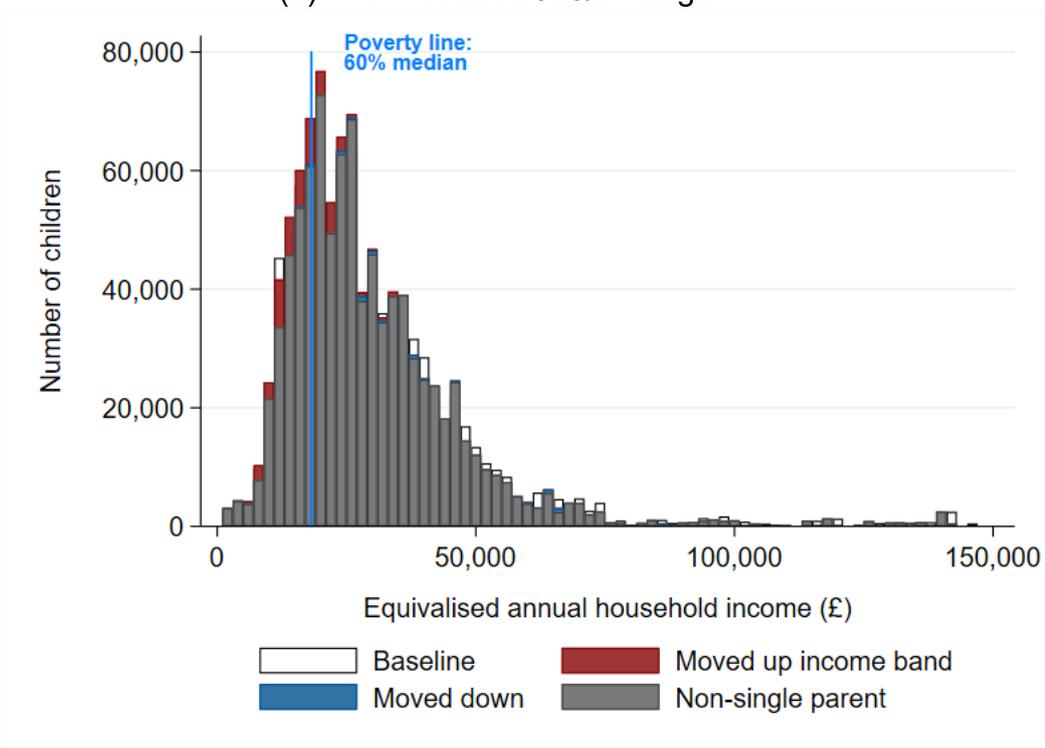


(c) Fiscally neutral – net cost raised

Chart 6.7 – The effect on the position of children in single-parent households in the household income distribution after removing rents for parents/children in poverty, imposing fiscal neutrality with full cost raised

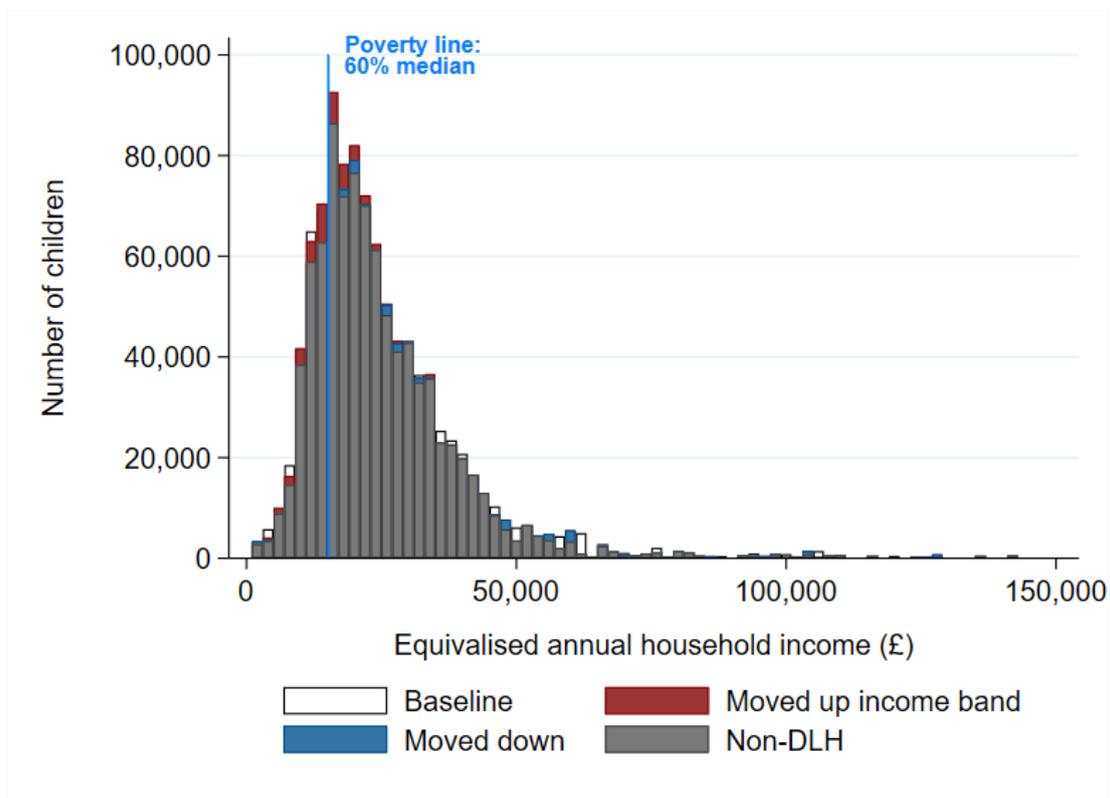


(a) Intermediate 2023/24 target

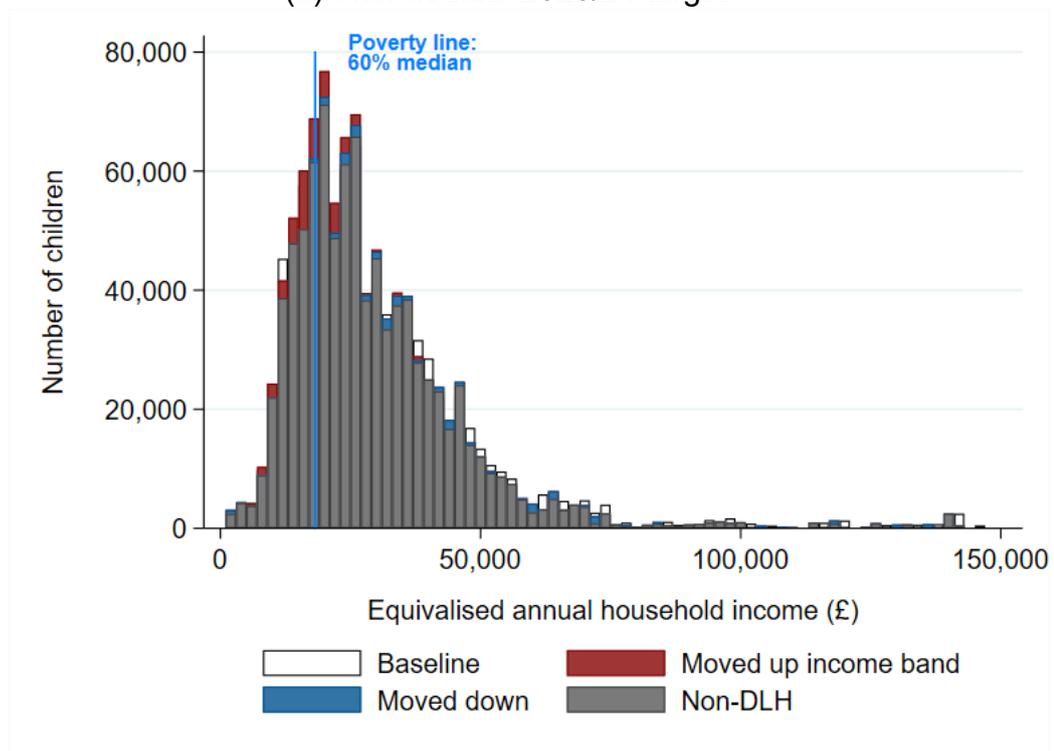


(b) Final 2030/31 target

Chart 6.8 – The effect on the position of children in households with a parent with a disability or long term health condition in the household income distribution after removing rents for parents/children in poverty, imposing fiscal neutrality with full cost raised



(a) Intermediate 2023/24 target



(b) Final 2030/31 target

Wider macroeconomic effects

No wage push effect

Policy only (unfunded). The first two columns of Table 6.5 below show the long-term, policy-only (unfunded) macroeconomic effects attempting to reduce child poverty in 2023/24 and 2030/31 through rent reductions (or increases in housing benefit). Columns (1) and (2) focus on the effects of the policy in isolation, with no rise in income taxation to fund the change. Again, throughout all figures are relative to the baseline.

Given the similarity of this simulation to the Scottish Child Payment scenarios, in that it operates through a stimulus to disposable income, the effects are all qualitatively similar although different in magnitude. Focussing on columns (1) and (2), shows that, unsurprisingly, cutting rents results in a modest boost to the overall economy. In both 2023/24 and 30/31, GDP increases by around a quarter of a percent. Again, if we focus on the impact of the policy before enforcing fiscal neutrality, this implies an injection of new spending through an increase in households' disposable income, and this increase drives an expansion in consumption across the household income distribution. As in the case of increasing disposable income through the Scottish Child Payment, the increase in consumption is more marked among lower-earning households, however. The increase in consumption also induces increases in investment and imports.

The macroeconomic effects associated with attempting to meet the 2030/31 target for child poverty are greater, since the scale of the (implicit) transfer to households is greater, further increasing all households' consumption. However, for both simulations the macroeconomic effects are notably smaller than the corresponding values when simulating increases to the Scottish Child Payment (Table 6.2). This reflects the fact that the effective net transfers to households are smaller than in the case of the Scottish Child Payment, where we explicitly increase the benefit to meet the targets.

Fiscally neutral. Again we do not report the results of the fiscally neutral case here since the macroeconomic impacts are again negligible (Columns 3 and 4 of Table 4 in Appendix 2 report the full results: in both cases GDP increases by 0.01%). This reflects the fact that the reductions in consumption induced by the tax rise virtually offset the increases generated by the rent subsidy.

Fiscal neutrality and supply-side responses through wage bargaining

Columns (3) and (4) of Table 6.5 introduce the income tax rise that is required to fund the change and the supply-side responses that occur as a consequence through wage bargaining.

Again, the rise in income taxation effectively renders the overall stimulus to consumption to be negligible. However, in this case the tax rise also puts upward pressure on nominal wages and prices as workers attempt to recoup the loss of take home pay that they experience. In both the intermediate and final target years, this reduces competitiveness and so exports, and there is now a modest contraction in consumption and investment. The real wage also falls as a result, though not by as much as would be the case in the absence of the bargaining response (the nominal wage rises in this case), the overall effect being a contraction in GDP in both years.

Again, as in columns (1) and (2), the effects are all smaller than in the case of increasing the Scottish Child Payment because reducing rents (or increasing housing benefits) requires a much smaller alteration to the income tax schedule.

Table 6.5 - The long-run macroeconomic effects of reducing rent for parents in poverty to attempt to meet the intermediate and final child poverty targets, fiscal neutrality with full cost raised

	<u>Policy only</u>		<u>Fiscally neutral policy</u> <u>(Including wage-push response)</u>	
	(1) Intermediate (23/24)	(2) Final (30/31)	(3) Intermediate (23/24)	(4) Final (30/31)
GDP	0.24%	0.25%	-0.37%	-0.40%
Consumption	0.60%	0.63%	-0.20%	-0.21%
Investment	0.28%	0.29%	-0.32%	-0.34%
Total Exports	0.00%	0.00%	-0.46%	-0.48%
Total Imports	0.33%	0.35%	-0.08%	-0.08%
Nominal Gross Wage	0.00%	0.00%	0.52%	0.55%
Real Take Home Wage	0.00%	0.00%	-0.73%	-0.77%
CPI	0.00%	0.00%	0.16%	0.17%
Real cost of capital	0.00%	0.00%	0.13%	0.14%
Unemployment Rate (percentage point difference)	-0.20%	-0.21%	0.40%	0.43%
Employment	0.21%	0.22%	-0.43%	-0.45%
Total HH Tax	0.23%	0.24%	3.10%	3.28%
Income Tax	0.21%	0.22%	6.21%	6.56%
Transfers to HH from Gov.	8.07%	8.49%	8.07%	8.49%
Real Scottish Government				
Consumption	0.00%	0.00%	0.00%	0.00%
(lowest quintile) Consumption	3.01%	3.48%	2.85%	3.32%
2 Consumption	1.41%	1.16%	0.97%	0.70%
3 Consumption	0.20%	0.23%	-0.37%	-0.36%
4 Consumption	0.14%	0.15%	-0.63%	-0.67%
(highest quintile) Consumption	0.15%	0.17%	-1.12%	-1.17%

Note: "Gov." refers to the Scottish Government

For all columns of Table 6.5, Table 6.6 provides results for the scenario in which the Scottish Government would only have to fund the net cost of the reduction to rents after the UK Government had passed savings back to them. Generally, all results are qualitatively similar but smaller in magnitude. In the fiscally neutral scenarios, the overall effects on GDP, consumption, and employment are in fact extremely close to zero. This is because in that scenario, the scale of Government investment would be smaller, and at the same time less income tax would have to be raised. This means supply-side responses to these changes are less pronounced. Appendix 2 also

discusses potential supply-side economic effects of a policy aimed at abolishing rents.²⁰

Table 6.6 - The long-run macroeconomic effects of reducing rent for parents in poverty to attempt to meet the intermediate and final child poverty targets, fiscal neutrality with net cost raised

	<u>Policy only</u>		<u>Fiscally neutral policy (Including wage-push response)</u>	
	Intermediate (23/24)	Final (30/31)	Intermediate (23/24)	Final (30/31)
GDP	0.12%	0.14%	0.01%	0.00%
Consumption	0.30%	0.34%	0.00%	0.00%
Investment	0.14%	0.16%	0.02%	0.02%
Total Exports	0.00%	0.00%	0.00%	0.00%
Total Imports	0.17%	0.19%	0.00%	0.00%
Nominal Gross Wage	0.00%	0.00%	0.00%	0.00%
Real Take Home Wage	0.00%	0.00%	-0.46%	-0.52%
CPI	0.00%	0.00%	0.00%	0.00%
Real cost of capital	0.00%	0.00%	0.00%	0.00%
Unemployment Rate (percentage point difference)	-0.10%	-0.11%	0.00%	0.01%
Employment	0.11%	0.12%	0.00%	-0.01%
Total HH Tax	0.12%	0.13%	1.29%	1.46%
Income Tax	0.11%	0.12%	2.57%	2.92%
Transfers to HH from Gov.	4.10%	4.62%	4.10%	4.62%
Real Scottish Government Consumption	0.00%	0.00%	0.00%	0.00%
(lowest quintile) Consumption	1.53%	1.90%	1.52%	1.88%
2 Consumption	0.71%	0.63%	0.58%	0.48%
3 Consumption	0.10%	0.13%	-0.11%	-0.11%
4 Consumption	0.07%	0.08%	-0.23%	-0.26%
(highest quintile) Consumption	0.08%	0.09%	-0.43%	-0.49%

Note: "Gov." refers to the Scottish Government

The range of results for the rent reduction policy is narrower than for the Scottish Child Payment. If we confine our attention to the fiscally neutral cases, the results

²⁰ As with the Scottish Child Payment simulations, Table 4 in Appendix 2 provides results without a wage-push response. The overall effects on GDP in this case are even closer to zero here since, the transfer to households implied by the rent reduction is smaller than that in the case of increasing the Scottish Child Payment.

vary from negligible (with a very small stimulus to GDP) to a -0.4% contraction in GDP depending on the strength of the wage push effect.

c. Support for in-poverty parents to move into or increase their hours of work

To meet the 2023/24 child poverty target of 18%, we increased the number of hours worked by parents in poverty to 20 for those working fewer. For those who were not in work, we moved them into employment in minimum-wage jobs working 20 hours. These changes covered all parents in poverty, irrespective of their health or the age of their child. As Table 6.7 shows, the actual child poverty rate we achieved in 2023/24 was roughly 19%, slightly above the target of 18%. This is primarily due to variation in our results caused by the algorithm the microsimulation model uses to simulate hours increases. As a result, because this difference is partly caused by uncertainty in our modelling, we assume the 2023/25 target was met. We provide more detail on the microsimulation model and this result in Appendix 1.

It was not possible to meet the 2030/31 target of 10% through a similar process, even after moving all parents in poverty to working 35 hours per week. This only reduced the rate of child poverty to 19% - 9 percentage points higher than the target rate.

Table 6.7 – Changes to child poverty rates under different simulations increasing hours

	Child poverty rate	Change	Children in poverty	Change
2023/34	19%	-6	190,000	50,000
2030/31	19%	-8	180,000	70,000

Note: Rates and numbers are rounded to whole percentage points and the nearest 10,000 respectively. As a result, some columns might not add up as expected.

The impact on household incomes

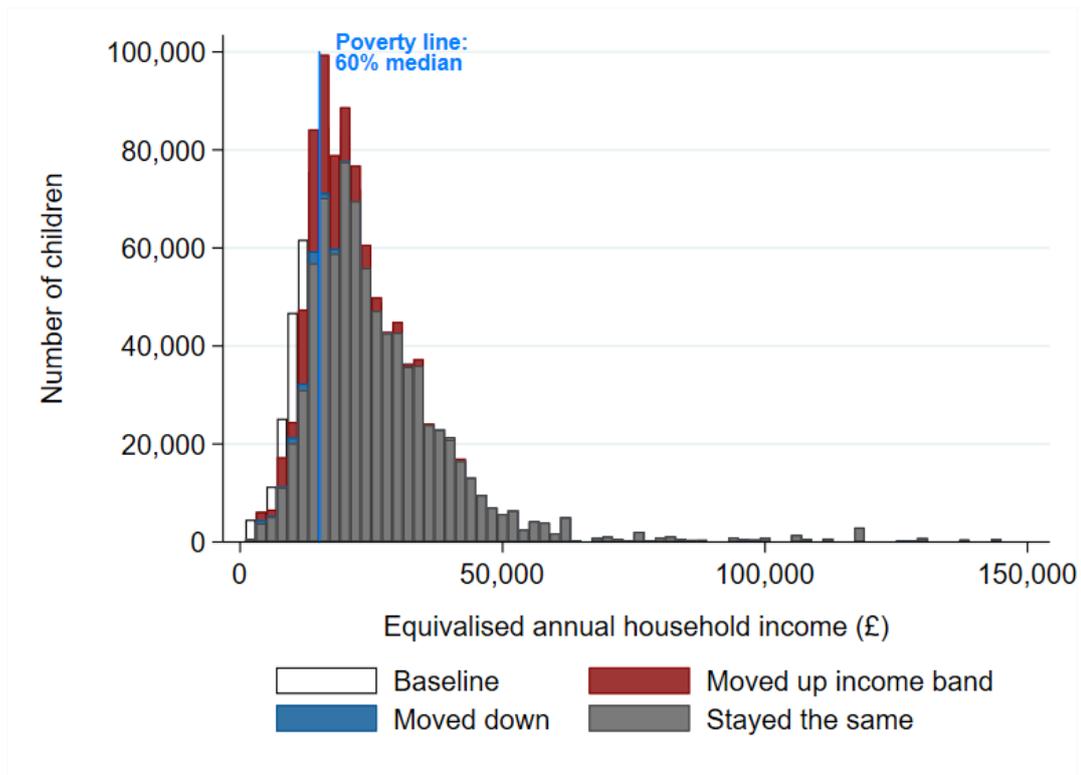
Chart 6.9 shows the effect of increasing the hours of work for parents in poverty on children’s position in the income distribution. Unlike the previous two simulations, we do not have a fiscally neutral scenario here, so Chart 6.10 combines results for the intermediate and final target years. In both years, and perhaps unsurprisingly, a sizeable portion of the children in families in poverty move up the income distribution.

Charts 6.10 and 6.11 then show the effect on children who live in a single-parent household and household with at least one parent with a disability or long-term health condition, respectively. In both cases, and in both years, increasing the hours of work of these two groups of parents results in a portion of them being moved up the income distribution, particularly around the poverty line. This is because the simulation has its largest effect on households with a pre-policy income around the poverty line (Chart 6.9).

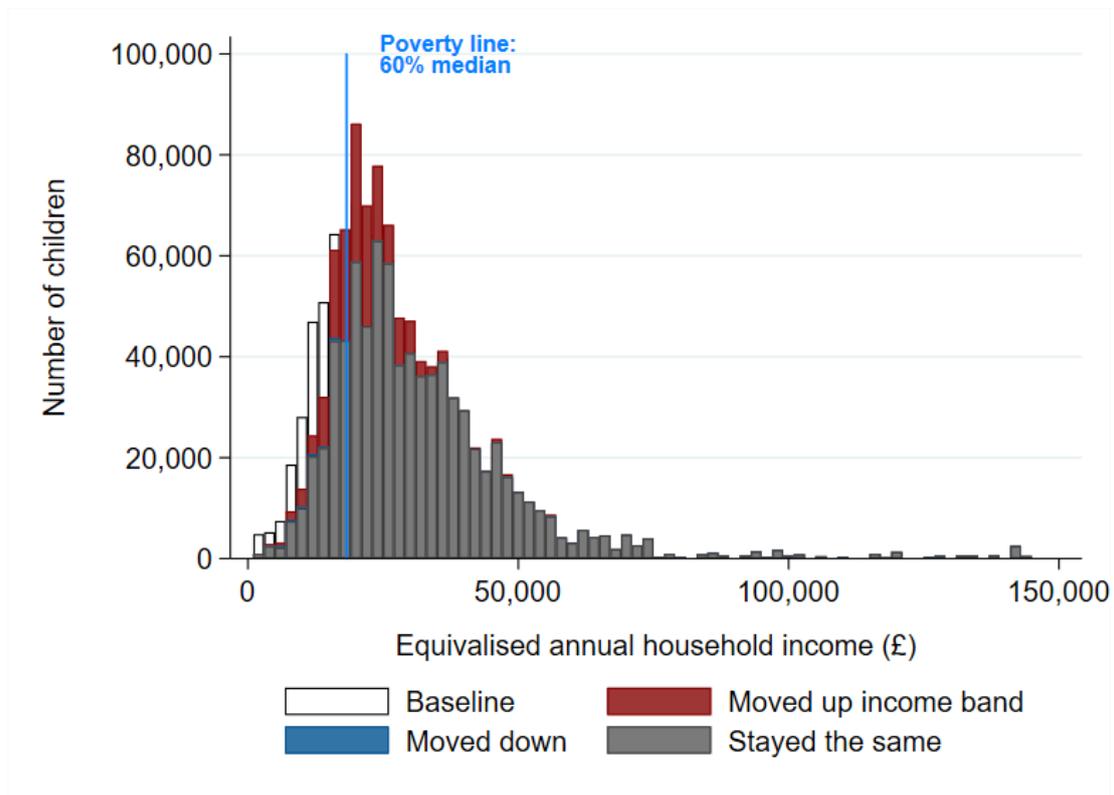
Comparing the charts in this section to their analogues in our reducing rents simulations, there are generally more upward movements here. Of course, because a household's income only decreases here as a result of changes to their income tax liability or benefit eligibility, there are far fewer – almost no - downward movements. This is also shown in the fact increasing hours of work in the way we simulate makes more headway toward the poverty targets than when reducing rents.

For the same reasons we outline when interpreting the results of the preceding two simulations however, the movements up and down the income distribution are far less pronounced here than in the case of increasing the Scottish Child Payment, particularly in the case of the final target in 2030/31. Increasing income through hours of work is constrained by the full-time threshold, which we have assumed here is 35 hours in 2030/31. Like reducing rents, then, the scope for increasing income through any labour market related channel is limited in comparison.

Chart 6.9 – The effect on children’s position in the household income distribution after increasing hours of work for parents in poverty

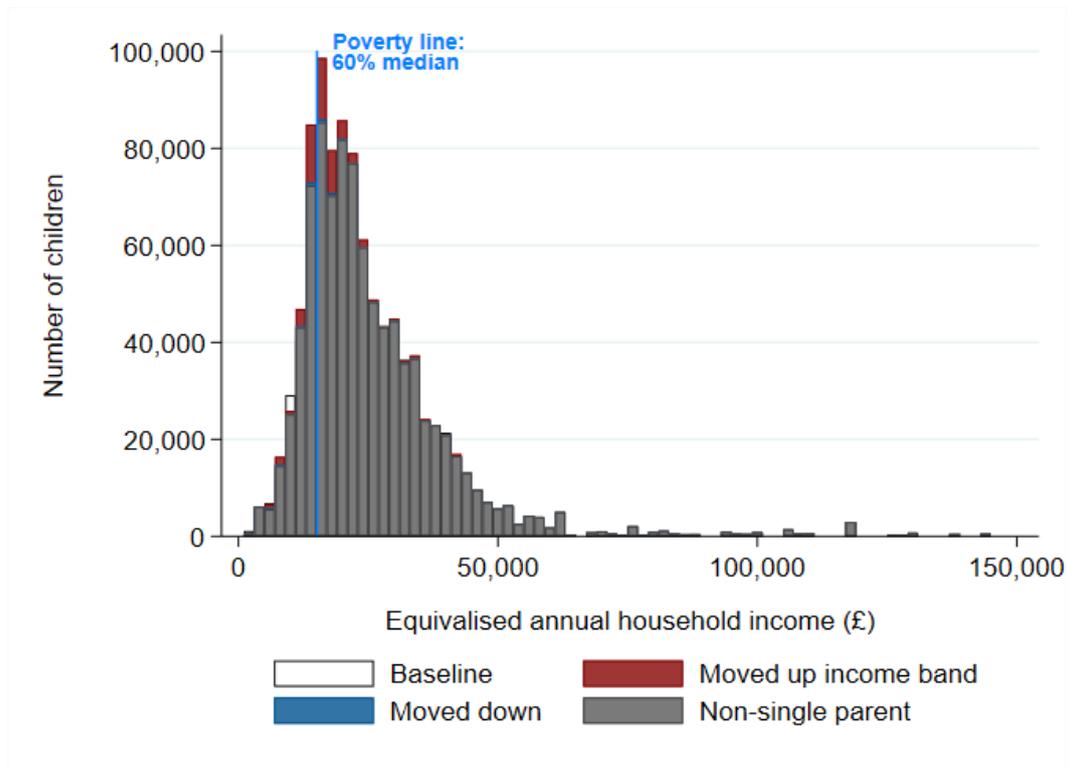


(a) Intermediate 2023/24 target; 20 hours per week

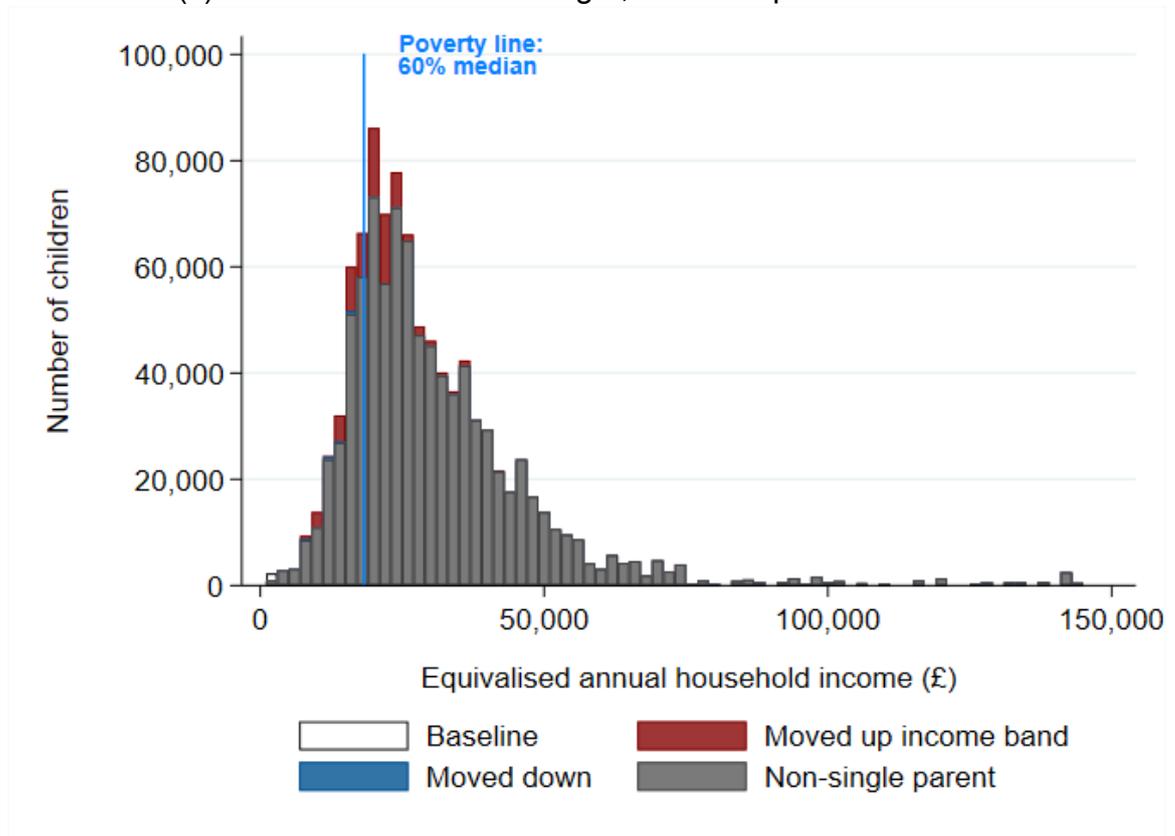


(b) Final 2030/31 target; 35 hours per week

Chart 6.10 – The effect on the position of children in single-parent households in the income distribution after increasing hours of work for parents in poverty

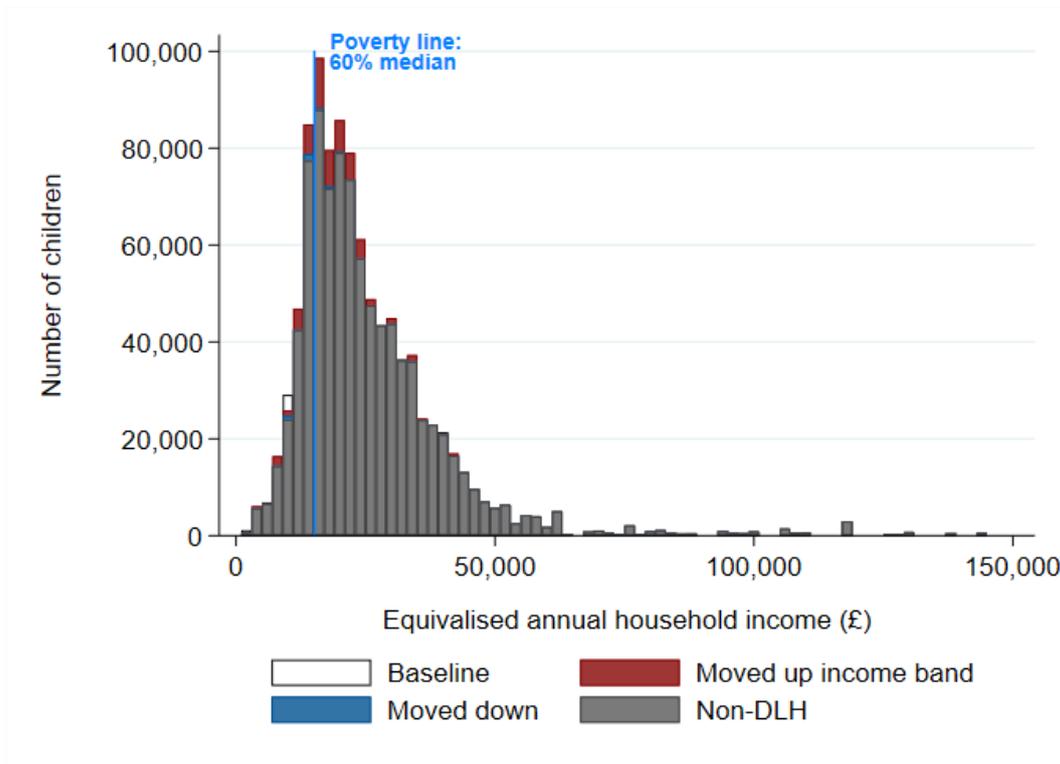


(c) Intermediate 2023/24 target; 20 hours per week

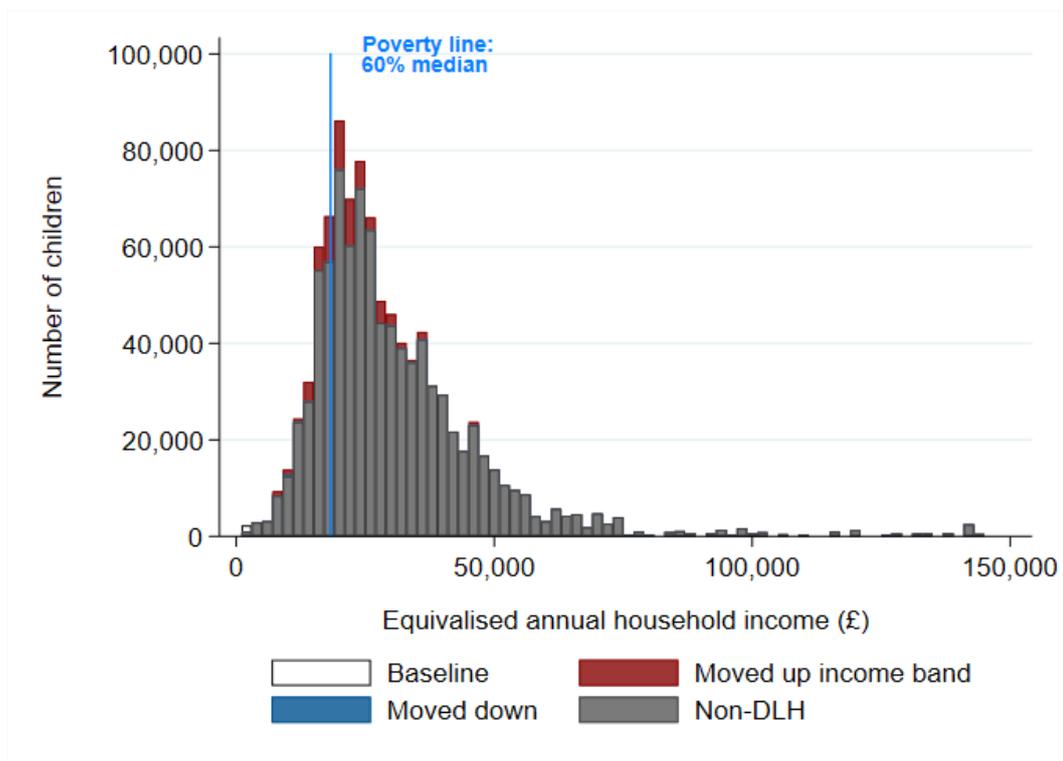


(d) Final 2030/31 target; 35 hours per week

Chart 6.11 – The effect on the position of children in households with a parent with a disability of long-term health condition in the income distribution after increasing hours of work for parents in poverty



(c) Intermediate 2023/24 target; 20 hours per week



(b) Final 2030/31 target; 35 hours per week

Wider macroeconomic effects

In terms of the macroeconomy, this simulation introduces shifts in the overall labour supply – both at the intensive and extensive margins – for those in the lower end of the income distribution. These labour supply changes result in overall increases of 2.2% and 4.4% in aggregate labour supply in 2023/24 and 2030/31 respectively.

The macroeconomic effects of this increase in labour supply cannot be decomposed in a similar manner to the results from our previous simulations. This is because this policy influences demand *through* its impact on labour supply/ wage bargaining; there is no pure demand effect – only one induced by the shock to the supply side. As we outlined in Section 5, we also do not impose fiscal neutrality in this case, since we do not have accurate data on associated costs. We therefore break the results of this section down differently to those in previous sections.

First, we present our analysis of the impact of a pure stimulus to aggregate labour supply implied by the microsimulations. However, this does not capture the distributional effects that we know to be present; it is, in fact, only the labour supply of lower income households that is stimulated. Accordingly, we also adjust these results by compelling the increment to labour income to be shared among households in the manner implied by the microsimulation, in an attempt to capture the concentration of labour supply changes among lower income households. As we shall see the impact of this adjustment on the aggregate results is trivial, but the distributional impacts are more in line with our expectations given the actual composition of the change in aggregate labour supply.

The effects of an aggregate labour supply change

Table 6.8 shows the macroeconomic effects of the simulated changes to the working hours of parents in poverty. Columns (1) and (2) focus on these effects when only the respective 2.2% and 4.4% changes to aggregate labour supply are incorporated in each year. In both years, there is an overall increase in GDP. This increase is double the size in 2030/31 since the number of hours parents in poverty are working in these simulations is much higher – the overall labour supply change is also twice the size. Unsurprisingly, there are also large increases in employment, however the unemployment rate increases slightly due to the exogenous rise in labour supply.²¹

The stimulus to the supply side induces increases in competitiveness and exports, driving up economic activity and profitability so that consumption and investment also increase. Unlike in the case of increasing the Scottish Child Payment or abolishing rents, there is downward pressure on nominal wages and prices in both target years because the changes here are driven by a stimulus to supply (not demand). The increase in labour supply pushes down wages and prices, improving competitiveness in this case.

²¹ Although we micro-simulate explicitly moving parents in poverty into employment or onto working more hours, these changes are introduced into the macroeconomic model as an increase in labour supply/participation. Actual employment is then determined endogenously and, in general, not all of the labour supply offered at the initial real wage will be employed. Furthermore, as the real wage falls this may limit participation.

Table 6.8 – Long-run macroeconomic effects of increasing hours of work to for parents in poverty to attempt to meet the intermediate and final child poverty targets

	<u>Aggregate labour supply</u>		<u>Adjusted labour supply</u>	
	(1)	(2)	(3)	(4)
	Intermediate (23/24)	Final* (30/31)	Intermediate (23/24)	Final* (30/31)
GDP	1.64%	3.20%	1.65%	3.21%
Consumption	0.84%	1.63%	0.83%	1.62%
Investment	1.54%	3.00%	1.56%	3.03%
Total Exports	1.96%	3.82%	1.96%	3.83%
Total Imports	0.31%	0.61%	0.31%	0.60%
Nominal Gross Wage	-2.17%	-4.17%	-2.18%	-4.18%
Real Take Home Wage	-0.72%	-1.39%	-0.73%	-1.41%
CPI	-0.69%	-1.34%	-0.70%	-1.34%
Real cost of capital	-0.55%	-1.07%	-0.55%	-1.07%
Unemployment Rate (percentage point difference)	0.39%	0.79%	0.40%	0.80%
Employment	1.81%	3.54%	1.80%	3.53%
Total HH Tax	-2.39%	-4.60%	-2.36%	-4.58%
Income Tax	-4.83%	-9.30%	-4.77%	-9.25%
Transfers to HH from Gov.	0.00%	0.00%	0.00%	0.00%
Real Scottish Government				
Consumption	0.00%	0.00%	0.00%	0.00%
(lowest quintile) Consumption	0.53%	1.03%	2.39%	2.74%
2 Consumption	0.71%	1.39%	1.67%	2.50%
3 Consumption	0.68%	1.33%	0.85%	1.73%
4 Consumption	0.75%	1.45%	0.49%	1.07%
(highest quintile) Consumption	1.14%	2.22%	0.28%	1.30%

Note: * the final target was not in met. "Gov." refers to the Scottish Government.

There are also increases in consumption across all household income quintiles in columns (1) and (2), however they are larger at the upper end of the income distribution. This is because higher-income households derive a larger benefit from the aggregate change to labour supply. In our microsimulation, however, changes to hours and income were concentrated in the lower income quintiles.

Incorporating the new distribution of household income

In columns (3) and (4) of Table 6.8, we therefore introduce an adjustment to the simulation that directly incorporates the pattern of the distribution in the increase in earnings resulting from the changes in individual labour supply in our microsimulations. Given that it was in-poverty parents who we moved into work or for whom we increased hours, this increase in income occurs primarily in the bottom of the income distribution.

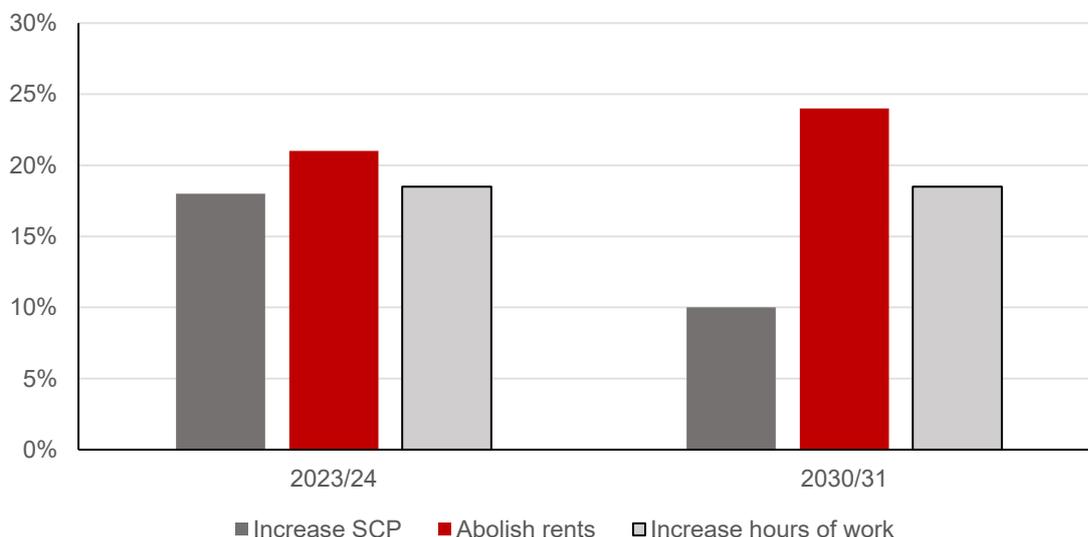
Overall, there is very little difference in the headline macroeconomic variables across the two specifications. In both years, GDP increases significantly, as does investment, and consumption declines marginally relative to the results in columns (1) and (2). This reason for this slight decline in consumption can be seen in the adjusted consumption patterns across the household income distribution – in columns (3) and (4) the increase in consumption is now more skewed towards low-earning households, with consumption in high-earning households being greatly reduced relative to columns (1) and (2). As we have seen in previous simulations, the shift in the composition to lower income households effectively results in more capital-intensive production.

6.2 Comparing the impact of scenarios

We conclude our discussion of the results with a brief comparison of the central outcomes. Given the dual components of our simulations, and the various results from the macro-simulations, this allows us to focus on some key takeaways.

Chart 6.12 shows the lowest achieved child poverty rate in each of our scenarios, with the lower-limit being the target of 18% and 10% in each respective year. These are the child poverty rates after simulating our fiscally neutral scenarios.

Chart 6.12 – Child poverty rates after each ‘final’ simulation in the intermediate (23/24) and final (30/31) target years



The chart shows that increasing the Scottish Child Payment and increasing hours of work were able to meet the intermediate target, and only the former could meet the final target.²² In fact, the other two simulations – abolishing rents and increasing

²² We note again here that the actual child poverty rate achieved in 2023/24 by increasing hours was 18.8%. See the results of these simulations and Appendix 1 for more detail on why we treat this as meeting the target.

hours of work – could not come close to making serious progress towards the 10% target for 2030/31.

An important point to note here is that when we simulate reductions to rents, the achieved poverty rate in 2030/31 is *higher* than that achieved in 2023/24. This can be seen by comparing the two red bars in Chart 6.15. This is because the baseline child poverty rate in 2030/31 is higher than in 2023/24, not because the policy increases the rate of poverty.

Although increasing the Scottish Child Payment is the most effective channel through which child poverty can be affected, we highlighted in our results that doing so comes with a huge expenditure requirement which, if not re-allocated from another area, would most likely have to be offset by generating new government revenues. We also discussed in previous sections of this report the various circumstances that affect household income and parents' working choices. Together, these factors suggest that implementing a *combination* of policies that target each of these channels would be most effective, as opposed to one operating through a single lever.

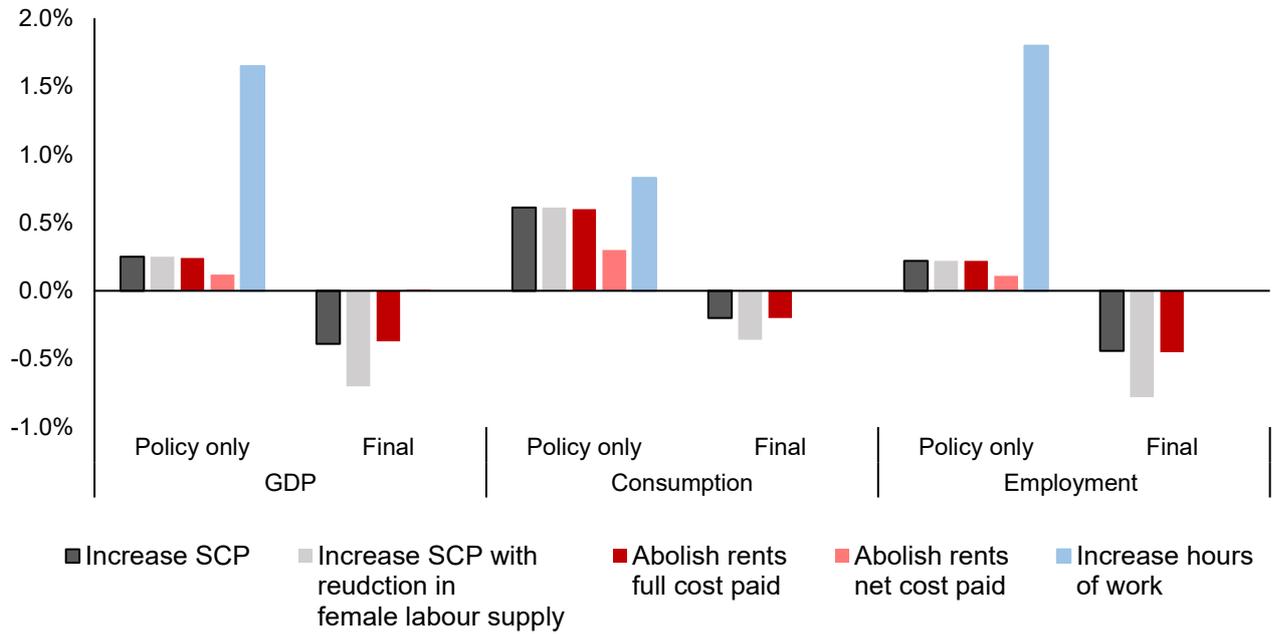
Chart 6.13 combines the long-term macroeconomic effects from our three macro-simulations across the two targets. As broad indicators of economic health, we focus on GDP, consumption, and employment here to discuss key takeaways from our macroeconomic analysis. We show results for two SCP scenarios, with and without an additional labour supply response; and two rent reduction scenarios, in which either the full or net costs of the policy are funded. For the reasons we outlined in discussing its results, we have no 'final' scenario for our simulation of increasing the hours of work of parents in poverty.

For example, in the first column of panel (a) the two bars showing the macroeconomic effects of simulating increases to the Scottish Child Payment represent the impacts on GDP after we impose fiscal neutrality and allow for a wage-push effect. However, the light grey bar represent results from the simulation incorporating subsequent labour supply responses.

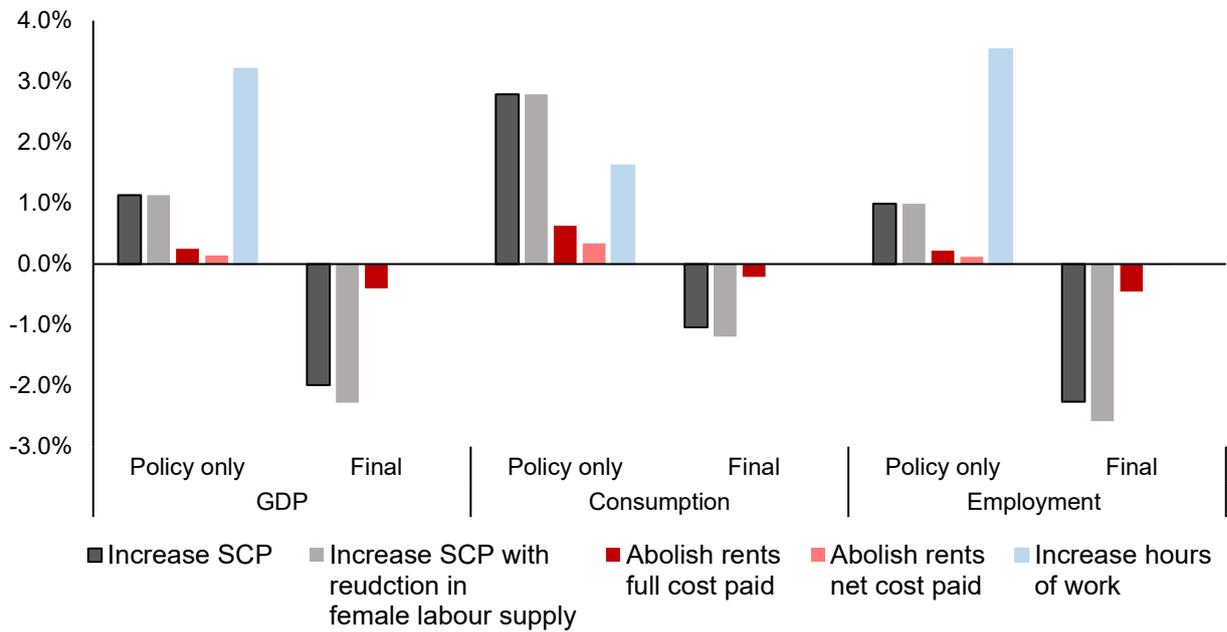
In the same panel and column, the red and pink bars represent the simulated effects of abolishing rents after imposing fiscal neutrality and allowing a wage push effect. However, the simulations represented by the pink bar assumed that only the net cost of the rent-reduction policy were funded by the Scottish Government. Across both panels and columns, it might appear that the pink bar is missing from the "final" results. However, it is simply the case that the effect on, for example, GDP in these cases is negligible.

As we have highlighted throughout, the effect on GDP and employment in the final scenarios for increases to the Scottish Child Payment and reductions in rents may be somewhat pessimistic if wages are in fact inflexible (See Appendix 2).

Chart 6.13 – The effects of each policy simulation on GDP, consumption, and employment in the intermediate and final target years



(a) Intermediate target year; 2023/24



(b) Final target year; 2030/31

There are a number of features of macroeconomic results that are worth noting:

1. All have a positive 'policy only' impact with no wage push effect, which is larger for all outcomes in the final target year, 2030/31. Our simulation increasing hours generally has the largest overall policy only effect.
2. Although not shown explicitly in the charts, we know that the macroeconomic impacts of fiscally neutral changes in the Scottish Child Payment and rent reductions are negligible (but positive) if wages are inflexible: the redistribution does not have a major impact on demand in this case.
3. Once we require that policy changes are fiscally neutral and also incorporate wage push effects and other potential supply side responses, we find negative macroeconomic effects for our simulations increasing the Scottish Child Payment and abolishing rents.
4. In our simulations abolishing rents, assuming that fiscal neutrality would only require the Scottish Government to raise the net cost of the policy results in negligible macroeconomic effects. This is because the cost of the policy is halved in this scenario, as is the increase in income tax required to fund it.
5. The magnitude of the macroeconomic effect varies across simulations and targets. This is because they involve targeting family income in different ways, and to different extents.
6. A key determinant of the scale of fiscally neutral policy changes is the responsiveness of wages to the rises in taxes. If the longer-term evidence on the nature of wage determination is believed, the response is likely to be substantial, and the macroeconomic impacts negative. If wages are inflexible, however positive, but broadly negligible, macroeconomic outcomes are possible.

That we find there to be negative macroeconomic effects in our simulations does not necessarily suggest that *actual* policies or modes of funding would generally have negative economic effects. Again, we simulate hypothetical policies here to highlight the fact that targeting certain levers might have wider economic effects. Rather, when viewed next to the policy only effects, they suggest that any large scale initiatives aimed at reducing child poverty through boosting family incomes must consider *both* the positives and negatives – this is true of any economic policy, all of which come with a set of trade-offs. The variability of the impact also highlights the importance of this consideration. The trade-offs involved in the implementation of any policy will depend on the channel they target and the extent to which it is exploited to meet any policy targets.

These factors will ultimately determine the *type* of trade-off in question and its magnitude. For example, funding an increase to the SCP that met the final 2030/31 target through income taxes ultimately meant transferring cash from high to low-income households. This - to varying extents based on the assumption regarding the presence of a wage-push effect – resulted in a modest decline in GDP and large decrease in consumption among high-earning households, in return for a child poverty rate of 10%. Throughout we have focussed on highlighting specific trade-

offs, generated when the cost of policies is raised through increases to income taxes. There might be other ways of funding policies, for example through diverting funding from other policy areas, which would create more explicit and perhaps subtle trade-offs.

Furthermore, the results suggest the potential of combining the policies in such a way as to limit or even more than offset any macroeconomic losses, while maintaining the gains in terms of reduced child poverty (and greater average incomes for those household in the lowest 40% of the income distribution).

7 Conclusion

As part of the Child Poverty (Scotland) Act 2017, the Scottish Government set statutory intermediate 2023/24 and final 2030/31 targets for rates of child poverty of 18% and 10% respectively. In this report, we used a microsimulation model to analyse the effectiveness of three policy levers that could be used to increase the income of parents in poverty and make progress towards these targets: increasing the Scottish Child Payment, reducing housing costs through abolishing rents, and increasing hours worked by parents.

Perhaps unsurprisingly, we found that increasing the Scottish Child Payment was the most effective channel through which child poverty could be reduced – both the intermediate and final targets can be met in this way. This is because the Scottish Child Payment represents a direct cash transfer to households. Neither of the targets can be met by reducing rents, and only the intermediate target can be met by increasing the hours of work of all parents in poverty to 20 hours per week. In 2030/31, even increasing hours of work for parents to 35 per week could not meet the 10% child poverty target.

We then used a macrosimulation model to estimate the potential economic impact of the counterfactual household income distribution implied by each policy change. When considered without the requirement of being funded by increases in government revenue, all of the policies have unambiguously positive effects on the economy (at their greatest if wages are inflexible). Again, this was most true for simulating increases to the Scottish Child Payment, as it involved large lump sum transfers to households. Once we impose the restriction that the policies are funded through across the board increases to income tax rates – the mode of raising revenue to offset their costs most easily available to the Scottish Government – we find that, with inflexible wages, the consequences for economic activity are negligible in size, but positive. However, if wages are very sensitive to changes in income taxes we find that fiscally neutral Scottish Child Payment or rent reduction policy changes tend to have negative consequences for economic activity. Macroeconomic outcomes are inversely related to the responsiveness of wages to income tax changes.

Rather than suggesting a particular policy prescription, our micro-to-macro modelling suggests that policies targeting all three levers will be best suited to reducing child poverty towards the target levels. There are diminishing returns to using each lever in isolation, and so it is likely that targeting all of them or a subset in combination would make the most progress in this regard.

To understand in more detail how the levers can be used to most effectively to meet the targets requires further analysis examining their interactions and trade-offs, as well as more detailed consideration of the different constraints faced by parents in poverty. This type of analysis would also benefit from insight from those with direct experience of poverty to advise on the most effective solutions. As well as those levers we modelled here, other similar channels should also be considered, for

example targeting parents with disabilities or work limiting health conditions through disability benefits.

Research which helps understand the response of people in poverty to particular policy interventions, such as social security, would also benefit future work in this area. Without understanding how people might respond to any changes in incentives, and why, it is difficult to design an appropriate policy. As we previously discussed in this report, however, there is not a great deal of evaluation evidence on such responses in the case of benefits targeted directly at reducing child poverty, particularly those similar to the Scottish Child Payment.

Economic models and counterfactual analysis often represent a simplified version of the world. In this report, we have shown how analysis using these tools can provide key insights into the trade-offs and effectiveness of policy levers that can be used to target the incomes of parents in poverty. Further, and more detailed, analysis in this area is a powerful tool that can be utilised to help further tackle child poverty in Scotland.

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Appendix 1: Microsimulation modelling

The microsimulation modelling for this project was carried out using the IPPR Tax-Benefit Model, maintained by Manchester Metropolitan University. The model is a tax-benefit microsimulation model that simulates net incomes for every member of a population sample.

Base data

The model uses as its principal input data the UK's Family Resources Survey (FRS), produced by the Department for Work and Pensions (DWP), which asks 19,000 households in the UK each year detailed questions about their family circumstances and the incomes of each member of the household.²³ The sample size for Scotland is 2,800 and the latest data relates to the 2018/19 financial year. In order to reduce sampling variation in the results of the modelling, we pool the latest three years of FRS data, giving us a Scottish sample of 8,400 households.

Uprating

In order to estimate net incomes in a given policy year, each household's earnings, rent payments, childcare costs, and other financial values, are uprated from the value reported in the survey data to April of the chosen policy year. Office for National Statistics (ONS) time series are used as far forward as they exist and Office for Budget Responsibility (OBR) forecasts thereafter. Earnings, pension contributions and investment income are uprated in line with average earnings growth, childcare costs in line with the Consumer Prices Index (CPI), and rents in line with the appropriate OBR rent forecast.

For example, when modelling a policy year of 2023/24, each adult within a household that was interviewed in October 2016 would have their earnings uprated in line with ONS time series data on average earnings growth from October 2016 to October 2020. Their earnings would then be uprated in line with OBR forecasts of average earnings growth from October 2020 to April 2023.

Policy parameters

Once the base data is uprated to the chosen policy year, the rules of the tax and benefit system are applied to that each household's gross income to estimate their income tax, national insurance and council tax liability, and their benefit (and tax credit) income. This enables an estimate to be produced of their net income after tax paid and benefits received.

Each year, tax thresholds and benefit rates typically rise with inflation. To uprate these policy parameters to our chosen policy year, we use government announcements on future rates as far into the future as possible. After that, we use the government's default assumption to increase rates each year. We define the

²³ <https://www.gov.uk/government/collections/family-resources-survey--2>

default assumption as the increase from which, if there is any deviation, changes are scored as a cost or saving in HM Treasury's budget costings.

So we assume that the state pension will rise in line with the higher of CPI, average earnings growth and 2.5% (the "triple lock"); for other benefits, including the Scottish Child Payment, we assume rates increase each April in line with the annual CPI growth in the previous. Beyond any government announcements, tax thresholds are also assumed to grow in line with CPI.

Counterfactual scenarios

The model's base scenario – which as described above uses OBR forecasts and default assumptions for tax/benefit uprating – produces an estimate of the income of each household in the chosen policy year if policy is unchanged. It is then possible to run the model using alternative assumptions to see how the income of each member of the sample changes between the two scenarios.

For example, one can run the model assuming a higher or lower rate of the Universal Credit standard allowance and see how the income of each member of the sample is likely to change from the base scenario as a result. It is possible to alter any combination of tax and benefit parameters in this way.

It is also possible to alter the uprating assumptions – for example, to assume that earnings rise faster or slower than the OBR projection. Finally, it is possible to alter specific variables in the base data (e.g. rents or earnings for some households) and see how the net incomes of each household changes.

Statistics

The estimate of income for each member of the sample represents effectively a projection of what the Family Resources Survey data might look like in the chosen policy year under the base scenario assumptions.

Given this projection, it is possible to derive a number of aggregate statistics in the same way as one would be able to do using the actual Family Resources Survey. By totalling receipt of benefits across the population sample, and using the grossing variables in the FRS, we can estimate expenditure on benefits, or state income from income tax, National Insurance and council tax. Poverty statistics are based on equivalised income – income adjusted for family size. The FRS records complete information on number of adults and children in each household, so equivalised income can be derived and the number of people in poverty estimated.

Where the base and a counterfactual scenario are modelled, the aggregate statistics for the two scenarios can be compared. For example, if the counterfactual scenario represents an increase in the Scottish Child Payment, the increase in government expenditure and the change in poverty between the two scenarios represents the direct costs and poverty effects of this change in policy.

Note that these fiscal and poverty impacts are first-order effects. They show the direct impacts of the change in policy without any behavioural responses. It may be

that the policy might induce changes in behaviour: for example, more or fewer people might choose to work. The model does not show these effects.

Detailed modelling issues

1.1 Benefit take-up

Whether a family takes up all of the benefits to which they are entitled has a critical impact on their income. So the model carries out an explicit simulation of the benefit take-up decision so that the projected income distribution reflects the reality that benefit take-up is not 100%.

Take-up is simulated for means-tested benefits and tax credits using an aligned dynamic microsimulation approach. We use a Monte Carlo simulation of benefit take-up, where the aggregate proportion of families taking up each benefit is aligned to match the latest statistics on benefit (or tax credit) take-up published by the Department for Work and Pensions (or Her Majesty's Revenue and Customs (HMRC)).

Take-up probability

For each benefit, an econometric equation is estimated on a merged dataset consisting of Family Resources Survey data on receipt of benefits and tax-benefit model simulated data on benefit entitlement. During each run of the model, for each scenario and for each family (benefit unit) that is entitled to the benefit, the equation is applied to the family's circumstances to estimate their probability of taking up the benefit.

Aligned monte carlo simulation

Uniform random numbers are then drawn for each family and the difference between the random number and the estimated probability is calculated. Families entitled to the benefit are then ranked in order of this difference and selected to take-up the benefit until the alignment total – based on published take-up rates – is reached.

2.1 Transition to Universal Credit

Universal Credit (UC) is a substantial change to the benefit system, replacing six legacy benefits with one new benefit. UC will change entitlements for some families quite substantially so the pace of rollout of UC makes a material difference to the projection of the distribution of income.

We use the OBR's projection of UC rollout rates for sub-groups of the population to as the probabilities of being on UC. As with benefit take-up, we carry out an aligned Monte-Carlo simulation to decide which families will be subject to Universal Credit rules and which will be under the legacy benefit system.

3.1 Monte Carlo modelling

In the case of the simulation of benefit take-up and the rollout of Universal Credit, a probability is estimated of the event happening to each family and then random

numbers are drawn to determine whether the event does happen in each case. So-called Monte Carlo simulation (i.e. based on the drawing of random numbers) is used because the probabilities are not deterministic: they do not predict perfectly whether the outcome happens, but only indicate the likelihood. Another way of putting this is that there is unexplained variation in the occurrence of the outcome and the Monte Carlo simulation reflects this uncertainty.

Because in both cases the Monte Carlo simulation is aligned – i.e. constrained to hit aggregate totals obtained from external data (take-up statistics and OBR forecasts of UC rollout) – the aggregate rate of the events occurring will not vary between runs of the model. However, the distribution of the events can vary: i.e. different families may be simulated to have the event occur.

Where a model run is comparing a base and a comparison scenario, we re-use each family's random numbers so that the comparison between the two scenarios reflects the pure effect of the difference between the two scenarios. However, the base projection of the income distribution may vary very slightly between runs of the model. Therefore model results will fluctuate very slightly between runs of the model. This fluctuation reflects the fact that there is uncertainty in exactly who will take up their benefit entitlement and whether each household is subject to Universal Credit or legacy benefit rules.

4.1 Survey of Personal Incomes adjustment

It is recognised that surveys tend to under-report incomes at the top of the income distribution. For this reason, when estimating measures of the income distribution (e.g. inequality), the DWP's Households Below Average Income (HBAI) dataset and publication adjusts incomes at the top of the distribution in line with data obtained from HMRC's Survey of Personal Incomes, which is based on income tax records. We use the same methodology as HBAI to adjust top incomes. This is likely to improve the model's results when these depend on the highest incomes: for example, it is likely to improve estimates by the model of income tax receipts.

5.1 Poverty calibration

Poverty estimates produced by the model are calibrated to the latest published official poverty statistics such that any changes to poverty shown in model results represent the pure effects of the difference between the modelled scenarios and not any differences between the model's poverty estimates and the those obtained from the HBAI dataset.

This calibration operates by discounting, for purposes of producing poverty estimates, equalised net income of each household by the difference between modelled income using a policy year of 2018/19 and income from the latest (2018/19) HBAI dataset.

Scenarios modelled in this project

Three scenarios were modelled in this project: an increase in the Scottish Child Payment, a decrease in rents for households in poverty with children, and an increase of hours of work for parents in poverty. This section sets out more detail on the assumptions used for these scenarios.

6.1 Scottish Child Payment increase

In the base scenario, the Scottish Child Payment is set at £10 per week in 2020/21 and uprated in line with projected CPI to the chosen policy year (2023/24 or 2030/31). In scenarios where we increased the Scottish Child Payment, we did so by increasing its 2020/21 rate to the stated value and then uprated this increased value by projected CPI to either 2023/24 or 2030/31.

Where income tax is raised to pay for the additional expenditure on the Scottish Child Payment, this increase in income tax will reduce the after-tax income that is used to calculate entitlement to means-tested benefits such as Universal Credit, increasing poverty slightly. Also, the income tax rise and consequent reduction in after-tax income, is likely to result in more families being entitled to means-tested benefits, and therefore the Scottish Child Payment. Our modelling takes into account these knock-on effects of raising income tax.

We raised the level of the Scottish Child Payment iteratively until the relevant child poverty target was reached and then progressively increased income tax rates until the increased revenue covered the increased expenditure. However, we constrained ourselves to increasing Scottish Child Poverty rates in steps of £5 per week (in 2020/21) and increasing income tax rates across the board (i.e. for all income tax bands) in whole percentage points. Given these constraints, we considered any outcome where the net loss or gain to Scottish government revenues to be less than £100 million per year to be tantamount to fiscal neutrality.

7.1 Rent reductions

In this scenario, we set any rent payments to zero for all households in poverty with children. Reducing rent payments will reduce Housing Benefit payments by government. When income tax rates are increased to pay for the reduction in rent payments, as discussed above, this will in turn increase poverty slightly and increase entitlement to means-tested benefits. These knock-on effects are included in the results.

Having reduced rents for these households to zero, we calculated the aggregate rent reduction across Scottish households and set this total as the amount needed to be raised by income tax rises. As before, we considered fiscal neutrality to be delivered with a net balance of less than £100 million per annum.

8.1 Increases in hours

In this scenario, we increased the hours of work (at pre-existing pay rates) of all parents in poverty to a minimum of 5 hours per week, and moved every out-of-work parent in poverty into work at 5 hours per week at the minimum wage, ran the model

and estimated the poverty rate. (Where a parent in poverty had more than one job, we used their total hours of work to decide how much to increase their hours, and then applied the increase to their first job record in the FRS job table.)

We then increased the target hours to 10 hours per week and recalculated the poverty rate. This process continued in steps of 5 hours at a time until the poverty target was reached.

As a result of proceeding in steps of 5 hours at a time, and because of the slight fluctuation in results between runs of the model due to the Monte Carlo simulation of benefit take-up described above, we treated a poverty rate of within 1 percentage point of the target as having achieved the target.

Appendix 2: Detailed results of macroeconomic simulations

1. Introduction

The first stage of our analysis, the results of which we report in detail in Appendix 1, involves microeconomic simulations of the immediate impact of three hypothetical policies on household incomes: increased Scottish Child Benefit payments; reduced housing costs and increased earnings for families with children in poverty. In each case we model the extent to which these changes could help achieve the Scottish Government's interim and final relative child poverty targets. These should be thought of as illustrative scenarios, not realistic proposals on how the targets should be met in practice. The poverty target we seek to meet relates to relative poverty, after housing costs.

Since the interventions are significant, the simulations imply substantial changes in gross and net incomes across all household types. The scale of these changes is such that we would expect them to generate substantial behavioural responses by households, for example, through altering their consumption and labour supply decisions that are likely to have macroeconomic consequences for the Scottish economy.

2. The macroeconomic impacts of adjusting the Scottish Child Payment to meet interim and final Child Poverty targets.

It aids understanding of the overall impacts of increases in the Scottish Child Payment (Scottish Child Payment) if we “decompose” these into demand-side and supply-side effects. Demand side effects identify the consequences of the changes in disposable income for consumption and the knock-on effects of this to the wider economy. Not surprisingly, these effects depend on whether the increase in Scottish Child Payment is *unfunded* (by the Scottish Government) or is *funded* by the Scottish Government through a rise in income tax rates. Given limitations on Scottish Government borrowing and the absence of a sovereign wealth fund, the *funded* case is the one of most practical concern; the unfunded case is not an option open to the Scottish Government, but the results provide a useful benchmark.²⁴

Supply side effects reflect wage bargainers' responses to any rise in income tax and any labour supply response (which in our model operates through bargaining behaviour). We consider the demand and supply side impacts of the increase in the SCB in turn.

²⁴ The *unfunded* case implies some additional form of “external” funding such as: funding by the Westminster Government or a sovereign wealth fund. The analysis could also apply to the case of “costless” deficit financing, where the relevant government had unlimited borrowing powers at a (near) zero interest rate.

2.1 The demand-side impacts of the Scottish Child Payment

We begin by abstracting from all potential supply-side responses to the increase in the Scottish Child Payment. We achieve this in our macroeconomic modelling by imposing a fixed nominal wage in the labour market and, initially, assuming no migration. This allows us to isolate the demand-side effects of the rise in the Scottish Child Payment. However, if, in reality nominal wages were (approximately) fixed, as would be the case under a national bargaining system in which wages were effectively determined at the UK level, the results indicate the likely overall macroeconomic impacts of the Scottish Child Payment.

The demand side impacts of the increase in Scottish Child Payment depend, as we would expect, on the method of financing. Here we consider two alternatives, one of which is hypothetical, but serves to aid the interpretation of our results:

- *Unfunded* by the Scottish Government. This case is purely hypothetical – the Scottish Government typically has to fund the cost of adjusting any of its policy levers.
- *Funded* by the Scottish Government through a rise in income tax rates to produce a “balanced budget” increase in Scottish Child Payment. This case is fiscally neutral since income tax rises to pay for the increased Scottish Child Payment. This is the default, more realistic, case for the Scottish Government.

We consider each of these cases in turn.

Consider first, the case of a Scottish externally financed/ deficit-financed/ *unfunded* (by the Scottish Government) increase in Scottish Child Payment. While this scenario is unrealistic, it provides a useful benchmark to assist with interpretation by isolating the demand effects.

The “external funding” in this case implies an injection of new spending through the substantial increase in (net) transfers to households required to replicate (in the shock to incomes) the distributional pattern across household quintiles generated by the microsimulation. The transfers were £584 million and £3.03billion respectively to meet the interim and final targets for child poverty. The first two numerical columns of Table 1 summarise the long-run impacts of an externally funded rise in Scottish Child Payment²⁵. Since capital stocks are fixed in the short-run, macroeconomic impacts are limited by capacity constraints initially. However, over the long-run capital stocks adjust fully to the increase in Scottish Child Payment, as in Table 1. In this case gross investment is just sufficient to maintain capital stocks.

²⁵ It should be noted that all results are presented relative to a baseline. For example, a long-run value of -1% for GDP simply says that relative to the baseline, the economy will be 1% smaller.

Table 1. The long run demand impacts of meeting the Interim (18%) and Final (10%) targets for Child Poverty through unfunded rises in the Scottish Child Payment.

	Unfunded (by Scottish Government)		Fiscally neutral	
	Intermediate (23/24)	Final (30/31)	Intermediate (23/24)	Final (30/31)
GDP (£m)	0.25%	1.13%	0.01%	0.05%
Consumption	0.61%	2.79%	0.00%	0.01%
Investment	0.29%	1.31%	0.04%	0.17%
Total Exports	0.00%	0.00%	0.00%	0.00%
Total Imports	0.34%	1.56%	0.00%	-0.01%
Nominal Gross Wage	0.00%	0.00%	0.00%	0.00%
Real Take Home Wage	0.00%	0.00%	-0.92%	-4.20%
CPI	0.00%	0.00%	0.00%	0.00%
Real cost of capital	0.00%	0.00%	0.00%	0.00%
Unemployment Rate (pp difference)	-0.20%	-0.93%	0.01%	0.03%
Employment	0.22%	0.99%	-0.01%	-0.03%
Total HH Tax	0.24%	1.09%	2.61%	11.87%
Income Tax	0.22%	0.99%	5.22%	23.73%
Transfers to HH from Gov	8.36%	37.91%	8.36%	37.91%
Real Scottish Government				
Consumption	0.00%	0.00%	0.00%	0.00%
(Lowest quintile) Consumption	2.20%	11.11%	2.15%	10.91%
2 Consumption	1.57%	7.04%	1.29%	5.78%
3 Consumption	0.46%	1.74%	0.06%	-0.13%
4 Consumption	0.22%	0.97%	-0.39%	-1.81%
(Highest quintile) Consumption	0.16%	0.70%	-0.87%	-4.00%

The microsimulation results imply significant increases in transfers to households of 8.36% and 37.9% respectively for interim and final targets being met.

Key features of the *unfunded* (by the Scottish Government) cases in columns 1 and 2 of Table 1:

- There is an across-the-board expansion of the economy, and all households benefit from an increase in real consumption. However, households in the lower quintiles benefit significantly more (e.g. In HG1 household benefit from an average increase in consumption of 2.2% as compared to the 0.16% for HG5, when meeting the intermediate target.
- The intermediate target is, of course, associated with a smaller income transfer and consequent expansion in the economy (0.25% GDP as against 1.13%). Again, the impact on the distribution of income and consumption across households is very progressive.
- In the long-run the capital stock (investment) increases by more than employment (and the weighted average of these two effectively determines the

GDP change). This reflects the greater capital intensity of the expenditure of low-income households.

Next consider the macroeconomic impacts of the *fiscally-neutral* increase in Scottish Child Payment. Here the increase in Scottish Child Payment has to be fully funded by raising rates of income tax, which tends to reduce households' disposable income. Key features of the *fiscally neutral* cases:

- The increase in income tax reduces the stimulus to consumption; in effect the increase in consumption of lower-income household groups is now financed by a virtually offsetting reduction in the consumption of higher income households. There is still an expansion in GDP, but very modest indeed for both intermediate and final targets.
- However, employment actually falls slightly – again a reflection of the fact that the demand stimulus is very modest in scale and shifts in favour of the capital-intensive consumption of households in the lower quintiles.
- The big increase in income tax revenues required to balance the budget here results in significant reductions in the real post-tax wage of 0.92% and 4.20% respectively for the 23/24 and 30/31 targets.

2.2 The supply side impacts of the increase in the Scottish Child Payment

We consider two main possible impacts. First, the rise in income tax rates required in the fiscally neutral scenarios is likely, under some assumptions about bargaining, to lead to upward pressure on wages and therefore prices, reducing competitiveness. Second, the substantial changes in effective child benefits may impact on work incentives, especially for mothers. While there is some ambiguity about the evidence here, the weight points to a predominantly adverse impact on aggregate labour supply (and so a weakening of labour's bargaining power). However, this supply side response is based on an exogenous shift in the labour force, calibrated to results reported in the literature.

Potential supply side responses to the rise in income tax.

This may vary depending on the precise nature of bargaining. For example, under national bargaining nominal wages are ultimately determined at the level of the national economy. This would result in effectively no reaction on the part of wage bargainers to the increase in income tax rate and the results reported in Table 1 above would hold.

However, conventional bargaining models treat workers as bargaining over real take home pay. We have seen that fiscally neutral funding of the rise in Scottish Child Payment results in a reduction of the real post-tax wage, which under conventional bargaining leads to a “wage push” effect as workers seek to restore their take home wage. The process effectively acts as a negative supply side shock.

Key features of the results:

- There is now upward pressure on nominal wages, as workers seek to restore their take home pay. This also pushes up prices, which adversely impacts

competitiveness and therefore exports relative to the results reported in the last two columns of Table 1. Of course the impact is much greater for the final than the intermediate child poverty targets since the former implies a much bigger wage push response (given the scale of the fall in the real take home wage in the former case.

- This induces a fall in aggregate consumption and investment, reinforcing the impact of the contraction in exports.
- While the real wage still falls, it does so by less than when the nominal wage is fixed: workers' attempt to restore their real wage is frustrated by the increase in the unemployment rate, which reduces workers' bargaining power.
- Overall, there is a contraction in economic activity for both cases, although this is much bigger the Final target, with a fall in GDP of 1.99% and employment of 2.66% as against the 0.39% and 0.44% falls experienced in meeting the intermediate target.
- While the lowest two income quintiles continue to benefit, there are now greater than offsetting losses in the consumption of other household groups, which in effect fund the increase in child benefit, and suffer most from the loss of competitiveness.

Table 2. The long run impacts of meeting the Interim (18%) and Final (10%) targets for Child Poverty through fiscally neutral rises in the Scottish Child Payment under conventional bargaining.

	Intermediate (23/24)	Final (30/31)
GDP (£m)	-0.39%	-1.99%
Consumption	-0.20%	-1.04%
Investment	-0.33%	-1.74%
Total Exports	-0.47%	-2.42%
Total Imports	-0.08%	-0.40%
Nominal Gross Wage	0.54%	2.80%
Real Take Home Wage	-0.75%	-3.37%
CPI	0.17%	0.88%
Real cost of capital	0.13%	0.70%
Unemployment Rate (pp difference)	0.42%	2.12%
Employment	-0.44%	-2.26%
Total HH Tax	3.20%	14.92%
Income Tax	6.41%	29.89%
Transfers to HH from Gov	8.36%	37.91%
Real Scottish Government Consumption	0.00%	0.00%
HG1 (Lowest) Consumption	2.01%	10.15%
2 Consumption	1.12%	4.84%
3 Consumption	-0.11%	-0.99%
4 Consumption	-0.57%	-2.73%
(Highest quintile)Consumption	-1.14%	-5.39%

Recall that these results assume that there is no migration response to the changes. Since the unemployment rate rises and the real wage falls in the simulations reported in Table 2, a strong migration response would result in net outmigration from Scotland to the rest of the UK (RUK), which would add a negative labour supply shock, which would result in further losses of GDP and employment (although real wage and unemployment rates would be pushed back towards their initial levels). So the results reported in Table 2 do not reflect a worst case scenario.

Recall also, that the results reported in Table 2 are not established immediately: it takes time for capital stocks to adjust fully to the change in Scottish Child Payment, so these effects would only manifest themselves over a number of years.

Further analysis of the importance of the response of wage bargaining to tax rate changes is provided in part B of the Annex to this Appendix we further explore the sensitivity of the macroeconomic results of an increase in the SCP to assumptions about the response of wage bargains to the rise in income taxation. There is considerable uncertainty around this, but it has a substantial effect on macroeconomic impacts.

Potential impacts of increasing Scottish Child Payment on labour supply

The simple static model of labour supply would suggest that (universal) child benefits represent a pure income effect that would push out recipients' consumption-leisure budget constraint and lead to an increase in leisure and a contraction in the labour supply of recipients (e.g. Blundell, 1995). In a search theoretic framework an increase in Scottish Child Payment is likely to increase the reservation wage and reduce the participation rate of affected individuals.

Magda et al (2018, 2020) appears to be the most recent contribution to the likely labour supply impacts of increases in child benefits. These analyse the impact of the introduction of a new universal child benefit in Poland. They find evidence of a significant negative impact on the labour force participation of mothers (whether partnered or single) of 2.5 percentage points (2.1% in 2020 version, although 2.5 – 3.0 percentage points mentioned in conclusion). This was equivalent to a 1.3% fall in female participation in 2018 and 2020 versions.

Schirle (2015) analysed the impact of a universal childcare benefit in Canada and found significant negative effects for mothers at both the extensive (participation) and intensive (hours) margins. She finds that the benefit reduces the participation rate by 1.3 percentage points (although these impacts vary inversely with the mother's level of education attainment). At the median working hours are reduced by one hour. (Table 1 implies that the base year participation rate for all mothers was 79%, so the estimate implies a reduction to 77.7%, a fall of 1.65%. (Average hours were 21.2, which fell then to 20.2, a fall of 4.7%. Since this implies an income elasticity well above other estimates as noted by the author herself we focus solely on the estimated participation rate below. Naturally, including the estimated hours change would result in a much bigger adverse labour supply shock that we consider below.)

Koebe and Schirle (2016) extend Schirle's (2015) analysis by looking at differential impacts of child benefits on married and single mothers. They find very different effects according to marital status. Results for married mothers were as before, but labour supply of divorced/ separated mothers increases with child benefit. They suggest this

may be to do with e.g. single mothers then being able to secure child care from the market, whereas those with partners have a (partner-influenced) preference for provision within the family. Divorced/ separated mother appear to increase their participation by 2.8 percentage points. They do not discuss the overall impact on labour supply. These results serve to highlight the fact that the evidence on the impact of child benefit on female labour supply is not straightforward: there are likely to be countervailing forces operating, depending on the domestic circumstances of recipient mothers.

There is, however, no evidence of an overall stimulus to mothers' labour supply from the literature. Here we adopt a fairly conservative approach by neglecting estimates of the adverse impacts hours, but treating the adverse impacts on all mothers' participation rates as percentage changes in the aggregate labour supply of mothers (effectively assuming hours are impacted identically to participation rates). Accordingly, we take the 2.5% estimated reduction in mothers' participation rate from Magda et al (2018, 2020) and express this as a (suitably scaled) fall in the aggregate workforce. From the microdata mothers are 16.9% of the workforce leading to a change in aggregate labour force of 0.42%, which is the shock we apply to the macro model. We can also combine this with the other changes to demand and supply

To illustrate the likely impacts Table 3 reports the long-run impacts of a 0.42% reduction in the labour force. The first numerical column reports the result of this change in isolation; the second/ third column combines this with the change in the demand and the overall labour supply response to a rise in taxation (within the fiscally neutral case and bargaining model) for the intermediate/ final target.

Table 3. Illustrative long-run response to 0.42% fall in labour force and this combined with an increase in Scottish Child Payment required to meet the intermediate target.

	Labour supply Only	Labour supply plus demand and tax response (intermediate target)	Labour supply plus demand and tax response (Final target)
GDP (£m)	-0.47%	-0.70%	-2.28%
Consumption	-0.24%	-0.36%	-1.19%
Investment	-0.44%	-0.62%	-2.01%
Total Exports	-0.56%	-0.84%	-2.77%
Total Imports	-0.09%	-0.14%	-0.46%
Nominal Gross Wage	0.64%	0.96%	3.22%
Real Take Home Wage	0.21%	-0.62%	-3.24%
CPI	0.20%	0.30%	1.01%
Real cost of capital	0.16%	0.24%	0.80%
Unemployment Rate (pp difference)	-0.11%	0.34%	2.03%
Employment	-0.52%	-0.78%	-2.58%
Total HH Tax	0.69%	3.66%	15.37%
Income Tax	1.40%	7.34%	30.78%
Transfers to HH from Gov	0.00%	8.36%	37.91%
Real Scottish Government			
Consumption	0.00%	0.00%	0.00%
HG1 (Lowest) Consumption	-0.15%	1.91%	10.04%
2 Consumption	-0.21%	0.98%	4.70%
3 Consumption	-0.20%	-0.24%	-1.11%
4 Consumption	-0.21%	-0.71%	-2.86%
(Highest quintile)Consumption	-0.33%	-1.36%	-5.60%

Given the uncertainty surrounding the estimates of the impact of child benefit these results should be regarded as illustrative. However, they indicate the kinds of impacts that the existing literature emphasises.

In isolation, the Scottish Child Payment-induced contraction in labour supply:

- Leads to a rise in nominal wages and prices and an increase in the real wage; competitiveness is adversely impacted, as are exports, which fall by 0.37%
- This also induces a fall in consumption, of 0.16%, and investment of 0.29%, so there is a 0.31% contraction in GDP and a 0.34% fall in employment
- Reduces all household quintiles' consumption, though with highest income groups hit hardest.

When this is combined with the demand-side impact of the increase in Scottish Child Payment required to meet the intermediate (final) child poverty target and the bargained wage response to the rise in income tax, so that we combine shocks that generate the results in the first (second) column of Table 2 and the first column of Table 3 :

- The scale of the contraction is enhanced e.g. with 0.70% (2.28%) fall in GDP because we are combining two adverse impacts: the wage push effect due to the rise in income tax rates is now reinforced by the reduced willingness of workers to provide labour at the prevailing wage rate.
- The adverse impacts on consumption also reinforce each other, but households in the two lowest income quintiles continue to benefit, albeit to a more limited extent.
- The effects on the real wage tend to counteract each other, but here the negative impact on the real wage predominates and it falls by 0.62% (3.24%).

3. The macroeconomic impacts of attempting to meet Child Poverty targets by reducing housing costs.

The analysis proceeds as for the Scottish Child Payment above in that it focusses initially on the demand-side macroeconomic impacts of lowering housing costs by reducing rents to zero and then considers possible supply-side reactions. Although the analysis within the microsimulation model is implemented by assessing the impact of an across-the-board reduction in rents, we treat that “as if” it was a rise in housing benefit that, in the fiscally neutral case, has to be financed through a rise in income tax.

3.1 The demand-side impacts of reducing rentals

As before, we begin by abstracting from all potential supply-side responses to a stimulus that is intended to emulate the impact of a Scottish-specific rise in housing benefit.²⁶ This allows decomposition of the overall impacts of improved housing benefits into demand and supply-side induced effects.

However, it should be kept in mind that if nominal wages are in fact inflexible, due to the influence of national bargaining, for example, then the results reported in this Section reflect the likely actual macroeconomic response.

As before the demand side impacts depend on the method of financing:

- *Unfunded* (by the Scottish Government)/ externally-funded/ deficit-financed (with zero borrowing costs). This case is not available to the Scottish Government, which has no sovereign wealth fund and is subject to a limited borrowing constraint. The case is hypothetical, but useful for decomposing results into their constituent elements.

²⁶ As before we impose a fixed nominal wage in the labour market and, initially, assume no migration.

- The fiscally neutral case, involving a rise in income tax. Here our default assumption is that the Scottish Government is assumed to have to raise funds equivalent to the full cost of the rent reduction (subsidy).²⁷

We consider each case in turn.

Consider first, the *unfunded* (by the Scottish Government) case (externally financed/ deficit-financed) increase in housing benefits (reduction in rents to zero). While hypothetical it provides a useful benchmark.

This case implies an injection of new spending through the increase in households' disposable income, which we here treat as an increase in transfers. While within the microsimulation the reduction in rents also implies a reduction in (endogenously determined) pre-existing housing benefits, this saving accrues to the UK, not the Scottish, Government. Here we focus on the effective gross transfers of £564 million implied by attempting to meet the intermediate target and £691 million implied by attempting to meet the final child poverty target. In fact, the maximum feasible adjustments for both 2023-24 and 2030-31 fail to achieve either of the poverty targets. In the case of the intermediate (18%)/ final target (10%) for child poverty in fact only a 20.8% and 15% rate, respectively, is actually achieved.

The first two numerical columns of Table 4 summarise the long-run impacts of an unfunded/ externally funded reduction in rents. The scale of macroeconomic impacts is initially limited by capacity constraints, but over the long-run capital stocks adjust fully to the increase in HB, with the results summarised in Table 4.

²⁷ The Annexe to this Appendix considers a second scenario in which the SG is assumed to have successfully negotiated that it receives the savings in HB generated as rents fall from the UK government, so that only the net cost of the rent reduction has to be met through the adjustment of income taxes.

Table 4. The long run demand impacts of attempting to meet the Interim (18%) and Final (10%) targets for Child Poverty through (hypothetical) across-the-board reductions in rent.

	Unfunded (by Scottish Government)		Fiscally neutral	
	Intermediate (23/24)	Final (30/31)	Intermediate (23/24)	Final (30/31)
GDP (£m)	0.24%	0.25%	0.01%	0.01%
Consumption	0.60%	0.63%	0.00%	0.00%
Investment	0.28%	0.29%	0.04%	0.04%
Total Exports	0.00%	0.00%	0.00%	0.00%
Total Imports	0.33%	0.35%	0.00%	0.00%
Nominal Gross Wage	0.00%	0.00%	0.00%	0.00%
Real Take Home Wage	0.00%	0.00%	-0.90%	-0.95%
CPI	0.00%	0.00%	0.00%	0.00%
Real cost of capital	0.00%	0.00%	0.00%	0.00%
Unemployment Rate (pp difference)	-0.20%	-0.21%	0.01%	0.01%
Employment	0.21%	0.22%	-0.01%	-0.01%
Total HH Tax	0.23%	0.24%	2.54%	2.68%
Income Tax	0.21%	0.22%	5.07%	5.35%
Transfers to HH from Gov	8.07%	8.49%	8.07%	8.49%
Real Scottish Government Consumption	0.00%	0.00%	0.00%	0.00%
HG1 (Lowest) Consumption	3.01%	3.48%	2.98%	3.46%
2 Consumption	1.41%	1.16%	1.14%	0.87%
3 Consumption	0.20%	0.23%	-0.21%	-0.19%
4 Consumption	0.14%	0.15%	-0.46%	-0.48%
(Highest quintile)Consumption	0.15%	0.17%	-0.85%	-0.89%

Recall that there is no upward pressure on nominal or real wages in the absence of supply side responses. The main results are summarised below for the attempt to meet the intermediate (final) targets for child poverty.

- Because of the net increase in households' disposable income from the increased transfers to households of 8.07% (8.49%): consumption increases by 0.60% (0.63%) and this ultimately also induces investment to rise by 0.28% (0.29%); exports are unchanged (since there is no change in competitiveness), although imports increase by 0.33% (0.35%) as economic activity expands.
- There is, overall, an effective stimulus to demand so that GDP increases by 0.24% (0.25%) and employment by 0.21% (0.22%).
- All household quintiles benefit from an increase in consumption, although the impact is heavily concentrated in the lowest two income quintiles, as we would expect. It is this that generates the expansion in overall economic activity.

- The macroeconomic effects associated with attempting to meet the 30/31 target for child poverty are greater, since the scale of the (implied) transfer to households is greater, further increasing all households' consumption. (However, the additional benefit from this is limited because of the way that the benefits system operates.)
- Note that the long-run impact of the reduction in rents fails to achieve either the intermediate or final target for child poverty despite rents being reduced to zero. This serves to emphasise the limitations of this mechanism, used on its own, as a means of reducing child poverty.

However, for both intermediate and final targets the macroeconomic effects are notably smaller than the corresponding values for increases in child benefit. This reflects the fact that the effective net transfers to households are smaller than for child benefit.²⁸

Note that, as with the increases in Scottish Child Payment, the stimulus is comparatively capital intensive, with capital (equal to investment in long-run equilibrium) increasing proportionately more than employment. This reflects the greater capital intensity of the expenditure of low-income households.

Consider next the macroeconomic impacts of a *fiscally neutral* increase in housing benefits. Although actual housing benefit payments fall as rentals are reduced (in the microsimulation), as noted above this saving accrues to the UK Government. Accordingly, we assume that the Scottish Government has to meet the full gross costs of the housing subsidy (reduction in rentals by increasing income tax rates. (The Annexe analyses the case where the Scottish Government secures an agreement for the UK Government to pass on the savings from its reduced payments of housing benefits.)

Columns 3 and 4 of Table 4 report the results of the fiscally neutral increases in housing benefits (reductions in rents) in an attempt to meet the interim (final) targets for child poverty.

- Imposing fiscal neutrality renders the stimulus to economic activity negligible with GDP increasing by 0.1% (0.1%) and employment actually falling by 0.1% (0.1%), reflecting the comparative capital intensity of the change in the distribution of consumption. Investment and capital stocks ultimately rise by 0.4% (0.4%).
- In effect, the increase in the consumption of households in the lowest two quintiles is offset by the contraction in the consumption of the higher-income households; the real take home wage now falls.
- However, here the attempt to meet the final child poverty target, whilst still associated with a greater effective transfer to households, is associated with no additional stimulus to consumption: the additional taxation reduces the consumption of higher income households to the point where this entirely offsets the stimulus to lower income groups.

²⁸ We could calculate GDP multipliers for each here – although, of course, this is a very crude indicator of efficacy.

3.2 Potential supply side responses to the elimination of rents.

Table 4 would capture the key macroeconomic impacts if wages are inflexible, for example because of the prevalence of nation-wide bargaining. However, we have already noted that conventional bargaining models treat workers as bargaining over real take home pay, and this is the case we now consider. There may also be other supply side reactions to the rise in housing benefits. We consider these in turn.

Response to the rise in income taxation

The fiscally neutral reduction in rents results in a reduction of the real post-tax wage (by 0.90% and 0.95% respectively for the intermediate and final child poverty targets – columns 3 and 4 of Table 4), which under conventional bargaining leads to a “wage push” effect as workers seek to restore their real take home wage. This effectively adds a negative supply side shock to the demand changes considered in Table 4 above. The long-run results of allowing for this wage push effect are summarised in Table 5.

The key features of the fiscally neutral cut in rents (increase in notional housing subsidy) under conventional bargaining are as follows for the attempt to meet the interim (final) target for child poverty:

- There is now upward pressure on nominal wages and prices as workers attempt to make good their loss of real wages indicated in the final columns of Table 4 above, effectively adding an adverse supply shock to the cases reported above.
- This reduces net exports by 0.46% (0.48%). Consumption and investment now also fall, by 0.20% and 0.32% respectively (0.21% and 0.34%)
- Employment falls by 0.43% (0.45%) and there is now a contraction in GDP of 0.37% (0.40%)
- While the real wage still falls – because the upward pressure on wages is mitigated by the resultant increase in unemployment - the extent is less than when the nominal wage is fixed.

Table 5. The long run impacts of attempting to meet the Interim (18%) and Final (10%) targets for Child Poverty through fiscally neutral reductions in housing benefit under conventional bargaining.

	Intermediate (23/24)	Final (30/31)
GDP (£m)	-0.37%	-0.40%
Consumption	-0.20%	-0.21%
Investment	-0.32%	-0.34%
Total Exports	-0.46%	-0.48%
Total Imports	-0.08%	-0.08%
Nominal Gross Wage	0.52%	0.55%
Real Take Home Wage	-0.73%	-0.77%
CPI	0.16%	0.17%
Real cost of capital	0.13%	0.14%
Unemployment Rate (pp difference)	0.40%	0.43%
Employment	-0.43%	-0.45%
Total HH Tax	3.10%	3.28%
Income Tax	6.21%	6.56%
Transfers to HH from Gov	8.07%	8.49%
Real Scottish Government Consumption	0.00%	0.00%
HG1 (Lowest) Consumption	2.85%	3.32%
2 Consumption	0.97%	0.70%
3 Consumption	-0.37%	-0.36%
4 Consumption	-0.63%	-0.67%
(Highest quintile)Consumption	-1.12%	-1.17%

Other potential supply side responses to the increased subsidy to housing.

Our simulations of the housing subsidy are conducted “as if” we are providing an income transfer to households, which is calibrated to the size of their rental payments. The payment is made directly to landlords (for social and private housing) in lieu of (some fraction – for the longer-term target all - of) households’ rental payments. So there is no direct incentive for landlords to alter their behaviour; they are in exactly the same position immediately after the change as before. (However, changes in households’ behaviour, considered next, may induce landlord responses.)

Households that pay rent are, of course, better off and their behaviour will alter, as it does for any other stimulus to their disposable income. Their consumption increases, as we seen above (though only marginally in the fiscally neutral cases) and we analyse the consequences of that. We would expect some of that expenditure to go to housing i.e. increase the demand for housing, but the ramifications for housing are not separately identified in the current model.

Currently housing stock is simply a part of the capital stock that responds to gaps between user costs and rental rates, which does endogenously adjust fully in the long run. (The long-run elasticity of capital supply will vary depending on supply constraints – including any on labour supply. But, for example, with a strong migration response and a fixed interest rate it would effectively be infinitely elastic over the long-run in a regional context.)

In practice, however, it would be likely that the transmission mechanism for reducing rentals would operate through a policy of increasing the supply of social housing, which will to some extent result in the formation of new households, given overcrowding in the private rented sector and the extent of homelessness. To the extent that this is so there would be no necessary feedback effects on the private rental sector, but this is the subject of some debate. In the presence of considerable overcrowding (and homelessness) the expansion of social housing would not “crowd out” any of the private sector provision.

Regardless of the actual degree of crowding out, however, the increased supply of social housing would have important impacts on the economy, which are not further analysed here. (See e.g. Boyle et al, 2020, for a recent analysis of the economic impact of social housing provision on the Scottish economy. Gibb et al, 2020, provides a review of the economic impacts of social housing, but also considers its wider effects, including on health and wellbeing.)

4. The macroeconomic impact of increasing hours of work and earnings.

The key objective here is to increase the earnings of those households where child poverty is present. However, the Scottish Government currently has no power to influence wage rates or earnings directly (for example, through adjustments of a minimum wage).

Here increased earnings are generated through increases in working hours and in the labour market participation of those households in which child poverty is present, with the scale of the increase linked to the (attempted) achievement of the interim and final child poverty targets. We begin by assessing the likely macroeconomic consequences of this stimulus to the supply side.

There is an increase in the effective supply of labour as many households move into work and many others supply increased hours to satisfy the intermediate child poverty target (of 18%). In the CGE model the estimate of the change in total labour supply (2.2% and 4.4% respectively for achievement of the interim and attempt to meet the final target) provides the aggregate shock to the supply side of the labour market. The long-run impact of this shock is summarised in the third column of Tables 6 and 7 respectively for the 23/24 and 30/31 targets.

Table 6. The long-run impacts of increasing earnings to satisfy the intermediate child poverty target (23/24).

	Demand Side only	Demand income tax funded	Labour supply only	Labour supply & demand
GDP (£m)	0.35%	0.01%	1.64%	1.65%
Consumption	0.87%	0.00%	0.84%	0.83%
Investment	0.40%	0.04%	1.54%	1.56%
Total Exports	0.00%	0.00%	1.96%	1.96%
Total Imports	0.49%	0.00%	0.31%	0.31%
Nominal Gross Wage	0.00%	0.00%	-2.17%	-2.18%
Real Take Home Wage	0.00%	-1.30%	-0.72%	-0.73%
CPI	0.00%	0.00%	-0.69%	-0.70%
Real cost of capital	0.00%	0.00%	-0.55%	-0.55%
Unemployment Rate (pp difference)	-0.29%	0.01%	0.39%	0.40%
Employment	0.31%	-0.01%	1.81%	1.80%
Total HH Tax	0.34%	3.67%	-2.39%	-2.36%
Income Tax	0.31%	7.33%	-4.83%	-4.77%
Transfers to HH from Gov	0.00%	11.71%	0.00%	0.00%
Real Scottish Government				
Consumption	0.00%	0.00%	0.00%	0.00%
HG1 (Lowest) Consumption	2.64%	2.53%	0.53%	2.39%
2 Consumption	1.87%	1.46%	0.71%	1.67%
3 Consumption	0.91%	0.33%	0.68%	0.85%
4 Consumption	0.50%	-0.36%	0.75%	0.49%
(Highest quintile)Consumption	0.21%	-1.24%	1.14%	0.28%

The impact of the pure stimulus to workers' aggregate willingness to supply more labour is summarised in the third numerical column of Tables 6 and 7. There are a number of aspects of the results of the stimulus to labour supply in achieving, or attempting to achieve, the interim (final) targets that are worth noting:

- First, the significant increase in aggregate labour supply results in a substantial increase in GDP of 1.64% (3.32%) and employment of 1.81% (3.62%), although the real wage falls by 0.72% (1.27%). The fall in the real wage reflects that fact that the increased willingness to supply labour weakens labour's bargaining power.
- The stimulus to supply induces increased demand: exports increase by 1.96% (3.82%) through improved competitiveness (as nominal wages and price fall), investment increases by 1.54% (3.00%) and consumption by 0.84% (1.63%). The stimulus to consumption is moderated by the fall in the real wage – and while imports do increase, this is limited by the change in competitiveness.
- It should be noted that the impacts summarised in Table 7 do not succeed in achieving the 30/31 child poverty targets. At this stage the increase in hours is limited by the 35 hour maximum working week, for example, and child poverty falls only to 18.5%.

- The results summarised in Tables 6 and 7 do not (with the exception of the second column) relate to fiscally neutral scenarios. In the case of the “Labour supply” and “Adjusted labour supply” columns the stimulus to activity changes both benefit payments and income tax receipts, resulting in a stimulus to net government revenues of £274 million (£1,147 million) for the labour supply simulation. However, the costs of the policy (e.g. improved child care provision) are not incorporated either.
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Table 7. The long-run impacts of increasing earnings to satisfy the final child poverty target (30/31).

	Demand side only	Demand income tax funded	Labour supply only	Labour supply & demand
GDP (£m)	0.61%	0.02%	3.20%	3.21%
Consumption	1.52%	0.01%	1.63%	1.62%
Investment	0.69%	0.07%	3.00%	3.03%
Total Exports	0.00%	0.00%	3.82%	3.83%
Total Imports	0.86%	0.00%	0.61%	0.60%
Nominal Gross Wage	0.00%	0.00%	-4.17%	-4.18%
Real Take Home Wage	0.00%	-2.26%	-1.39%	-1.41%
CPI	0.00%	0.00%	-1.34%	-1.34%
Real cost of capital	0.00%	0.00%	-1.07%	-1.07%
Unemployment Rate (pp difference)	-0.50%	0.02%	0.79%	0.80%
Employment	0.53%	-0.02%	3.54%	3.53%
Total HH Tax	0.59%	6.39%	-4.60%	-4.58%
Income Tax	0.53%	12.78%	-9.30%	-9.25%
Transfers to HH from Gov	0.00%	20.45%	0.00%	0.00%
Real Scottish Government				
Consumption	0.00%	0.00%	0.00%	0.00%
HG1 (Lowest) Consumption	4.04%	3.84%	1.03%	2.74%
2 Consumption	3.40%	2.69%	1.39%	2.50%
3 Consumption	1.95%	0.95%	1.33%	1.73%
4 Consumption	0.60%	-0.90%	1.45%	1.07%
(Highest quintile)Consumption	0.48%	-2.05%	2.22%	1.30%

The distributional results of the aggregate labour supply shock, as revealed in final five rows of the third columns of Tables 6 and 7 suggest that, typically, higher income quintiles gain the most from the change. However, this reflects the fact that the shock to the macroeconomic model has to be entered as a stimulus to **total/ aggregate** labour supply. In fact, however, we know from the microsimulation that the changes impact primarily on lower income quintiles.

The consequences of simply treating these increases in incomes (through earnings) as pure transfers to households are summarised in the “Demand only” column of Table 6 (on the implicit assumption that these are *unfunded*). The purpose of this simulation is simply to emphasise the distributional impact associated with the increase in earnings across quintiles derived from the microsimulations. Of course, this is much

more progressive than observed in column 3 of Table 6, with increases in real consumption varying from 4.04% for the lowest quintile to 0.48% for the highest. A similar pattern is apparent in the first column of Table 7. (The second columns of Tables 6 and 7 simply show the hypothetical impact of imposing fiscal neutrality on the stimulus: higher income quintiles now experience a reduction in incomes and consumption. The pattern is clearly progressive, but the macroeconomic impact is negligible.)

Column 4 reports the results of imposing the distributional impacts apparent from column 1 on the increments to earnings under the labour supply stimulus (reported in column 3 of Tables 6 and 7). Here the labour supply impact is moderated by adjusting the distribution of earnings better to reflect those of the microsimulation. The impact on the aggregate economy is very similar to the “Labour supply only” simulation, both for the intermediate and final child poverty targets (Tables 6 and 7 respectively). However, the distributional outcome is now more progressive, and the impact on investment (consumption) is more (less) favourable as we would expect. The Adjusted labour supply results (the final column of each Table) therefore represent our best estimates of the overall macroeconomic impact of the change in the pattern of hours and earnings.

5. Conclusions

We consider the likely macroeconomic impacts of separately increasing each of three policy levers with a view to achieving the interim 23/24 (18%) and final 30/31 (10%) Scottish Government’s child poverty targets: the Scottish Child Payment (Scottish Child Payment); the level of housing benefit/subsidy (HB, simulated in this study through a reduction in rents) and increasing hours and earnings of those families in which child poverty is present.

Adjustment of all three levers individually, on the scale required to attempt to meet the child poverty targets, does generally result in macroeconomic impacts. Accordingly, these should be taken into account in any comprehensive assessment of policy efficacy. However, the scale of their macroeconomic impacts generally differ across levers and vary depending on the financing of the changes and the nature of labour markets – in particular, whether there is an induced “wage push” effect in response to the policy change, as conventional bargaining implies. However, irrespective of the lever and these conditions, it is always the case that:

- Each lever succeeds in stimulating the average consumption of the lowest two household quintiles.
- All levers lead to an improvement in child poverty, although to different degrees. It is possible, in principle, to achieve both interim and final poverty targets through adjustment of the Scottish Child Payment, but it is not feasible to do so through adjustment of either of the other two levers alone.²⁹ (A result that is apparent from the microsimulations.)

²⁹ It proved possible to achieve the interim target by adjusting hours worked, but not the final target. Neither target was achievable solely through the adjustment of rents.

Macroeconomic impacts of the Scottish Child Payment and rent reductions

Assessment of the wider macroeconomic impacts does vary with financing, the nature of the labour market and across policy interventions. However, the first two of these levers have very similar qualitative macroeconomic impacts, reflecting the fact that both the Scottish Child Payment (Scottish Child Payment) and the level of housing benefit (HB) operate by increasing the disposable incomes of targeted households:

- In the absence of any wage-push response, such as would be implied by a preponderance of regional wages in fact being determined through a centralised system of national bargaining:
 - If the changes are *unfunded* (by the Scottish Government) then increases in Scottish Child Payment or HB stimulate the incomes of all households, though the scale of the impact is much greater for the lower income quantiles, generating a significant expansion in economic activity and employment.
 - However, given the absence of significant borrowing powers (or a sovereign wealth fund) the *unfunded* case is not a feasible option for the Scottish Government; instead adjustment of the levers has to be fully *funded* by an increase in income taxation. In this case - of *fiscal neutrality* - the overall macroeconomic impacts of the two levers are negligible.³⁰
- However, in the presence of conventional bargaining, where workers attempt to offset any reduction in the real take home wage due to higher tax rates by pushing for higher wages:
 - *Fiscally neutral* changes in each lever would lead to a *contraction* in economic activity and employment.
 - Furthermore, there may be additional supply-side impacts that, on the balance of the evidence seem likely to reinforce this contraction. The weight of the evidence suggests that the predominant impact of increased universal child benefits is to reduce the labour supply of mothers, which would exert a further negative effect on economic activity.
- While the qualitative impact of the Scottish Child Payment and HB is very similar, the former is associated with larger macroeconomic impacts. In part this reflects the interaction of each lever with the rest of the tax-benefit system; households' disposable income remains sensitive to adjustments of Scottish Child Payment – even at higher levels of Scottish Child Payment – whereas there is a limit to the extent to which HB can be increased. (Since it is emulated here by reductions in rent, the limit is reached when rentals are reduced to zero.)

Macroeconomic impacts of increasing hours/ earnings

This is simulated as the increase in hours / participation required by the attempt to meet the intermediate and final targets for child poverty. The resultant stimulus to labour supply weakens labour's bargaining power, putting downward pressure on wages and prices and improving competitiveness. The mechanism is therefore quite

³⁰ In fact, GDP increases very slightly, while employment falls very slightly, reflecting the greater capital intensity of the expenditure of lower income households.

different from the direct stimulus to disposable income that is key to understanding the impact of Scottish Child Payment and HB.

Under conventional bargaining there is a wage-push effect, but in this case it operates in a downward direction since bargaining power is weakened by the increased willingness to supply labour:

- There is a beneficial supply-side stimulus, operating through improved competitiveness, that results in a significant stimulus to economic activity and leads to an increase in consumption by all household quintiles (with a progressive distribution).
- Furthermore, the scale of this effect is greater, on our estimates, than even the combined effect of an adverse labour supply response to the Scottish Child Payment (taking account of an additional adverse labour supply effect as well as the demand stimulus and induced wage-push effect).

Of course, there is reason to be cautious in placing too much weight on the scale of the beneficial impact of the increase in hours, since we have taken no account of the costs of inducing such a response (e.g. through improved child care provision). Furthermore, the impacts of the Scottish Child Payment on female labour supply are uncertain.

Overall

We focus on the fiscal neutrality cases here, since these are the only options currently open to the Scottish Government. From the microsimulations we know that the Child Poverty targets cannot be met through the adjustment of any single one of the levers we consider, although each one generates an improvement. This, in itself suggests the value of using some combination of levers. This view is reinforced by our macroeconomic analysis, which emphasises the differentiated macroeconomic impacts of the levers – particularly the increase in hours and earnings of those households in which child poverty is present.

If labour market conditions imply a considerable degree of wage inflexibility, as has appeared to be the case since the Great Recession, fiscally neutral increases in the Scottish Child Payment and in Housing Subsidy would likely have a negligible impact on the macroeconomy. However, if there is a return to the wage behaviour that has characterised longer-term trends and the net of tax wage becomes the focus of bargaining then both these stimuli, operating primarily through an increase in household disposable income, would be likely to have a negative macroeconomic impact (that would be reinforced by a probable negative impact on mothers' labour supply).

However, if, as here, a substantial increase in the labour supply and earnings of relevant households can be encouraged, a significant macroeconomic stimulus may result. There would appear to be the potential to use some combination of policy levers

to at least ensure a non-negative macroeconomic outcome, while maximising the prospects of achieving interim and final targets for child poverty.³¹

³¹ We have abstracted throughout from induced migration flows. This would not change the fundamental nature of the analysis, since migration flows, responding to real wage and unemployment differentials, would simply reinforce the direction of change in economic activity

References

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Annex to Appendix 2: The macroeconomic impact of the subsidy to housing if the Scottish Government funds only the cost *net* of any savings in housing benefits.

In part A of this Annex we repeat the analysis of Section 3 of Appendix 2 for the case where the Scottish Government funds only the *net* cost of the housing subsidy: the UK Government is assumed to agree to pass any housing benefit savings arising as a direct result of the Scottish Government's policy to introduce a new housing subsidy.

In part B we consider the sensitivity of the results of our analysis of child benefit payments to the response of wage bargainers to the rise in income tax rates.

A.1 The demand side impacts of improving housing benefits.

As before, we begin by abstracting from all potential supply-side responses to a stimulus that is intended to emulate the impact of a Scottish-specific rise in housing benefit (HB).³² In fact, the microsimulation assesses the impact of an across-the-board reduction in rents, but we treat that "as if" it were a rise in housing benefit that, in the fiscally neutral case, is financed through a rise in income tax.

This allows decomposition of the overall impacts of improved housing benefits into demand and supply-side induced effects. However, if nominal wages are in fact inflexible, due to the influence of national bargaining, then the results reflect the likely actual macroeconomic response.

The demand side impacts depend on the method of financing:

- Externally-funded or deficit-financed increase in housing benefits (hypothetical). However, the scale of the implied transfer to households by the Scottish Government here depends upon whether the full gross cost or only the net cost is met by the Scottish Government. The former case is dealt with in the main report; the latter case is dealt with in this Appendix.
- Balanced budget increase in HB: fiscally neutral, involving a rise in income tax. For this case there are two scenarios:
 - In the first, the Scottish Government is assumed to have to raise funds equivalent to the full cost of the rent reduction (subsidy). This is the case analysed in Sections 3 and 4 of the main report.
 - In the second scenario the Scottish Government is assumed to negotiate with the Treasury to ensure that the savings in HB generated as rents fall become part of the Scottish Government's revenue, so that only the net cost of the rent reduction has to be met through adjustment in income taxes. This is the case analysed here.

We consider each of these cases in turn.

³² As before we impose a fixed nominal wage in the labour market and, initially, assuming no migration.

Unfunded (by Scottish Government)/ Externally-funded (or deficit-financed) increase in HB (decrease in rent)

Consider first, the case of a Scottish externally financed (or deficit-financed) increase in CB. While hypothetical, given the absence of a wealth fund and the restrictions on Scottish Government's borrowing powers, it provides a useful benchmark.

External funding implies an injection of new spending through the increase in households' disposable income, which we here treat as an increase in (net) transfers. In the microsimulation the reduction in rents also implies a reduction in (endogenous) housing benefits. Here we focus on the effective *net* transfers of £286 million implied in the attempt to reach the intermediate target and £376 million net cost to the Government of attempting to meet the final child poverty target. In fact, the maximum feasible adjustments for both 2023-24 and 2030-31 do not succeed in achieving either of the poverty targets.

Table A.1. The long run demand impacts of attempting to meet the Interim (18%) and Final (10%) targets for Child Poverty through (hypothetical) across-the-board reductions in rent: Scottish Government funds only the net cost.

	<u>Policy only</u>		<u>Fiscally neutral policy plus wage-bargaining response</u>	
	Intermediate (23/24)	Final (30/31)	Intermediate (23/24)	Final (30/31)
GDP	0.12%	0.14%	0.01%	0.00%
Consumption	0.30%	0.34%	0.00%	0.00%
Investment	0.14%	0.16%	0.02%	0.02%
Total Exports	0.00%	0.00%	0.00%	0.00%
Total Imports	0.17%	0.19%	0.00%	0.00%
Nominal Gross Wage	0.00%	0.00%	0.00%	0.00%
Real Take Home Wage	0.00%	0.00%	-0.46%	-0.52%
CPI	0.00%	0.00%	0.00%	0.00%
Real cost of capital	0.00%	0.00%	0.00%	0.00%
Unemployment Rate (percentage point difference)	-0.10%	-0.11%	0.00%	0.01%
Employment	0.11%	0.12%	0.00%	-0.01%
Total HH Tax	0.12%	0.13%	1.29%	1.46%
Income Tax	0.11%	0.12%	2.57%	2.92%
Transfers to HH from Gov.	4.10%	4.62%	4.10%	4.62%
Real Scottish Government Consumption	0.00%	0.00%	0.00%	0.00%
(lowest quintile) Consumption	1.53%	1.90%	1.52%	1.88%
2 Consumption	0.71%	0.63%	0.58%	0.48%
3 Consumption	0.10%	0.13%	-0.11%	-0.11%
4 Consumption	0.07%	0.08%	-0.23%	-0.26%
(highest quintile) Consumption	0.08%	0.09%	-0.43%	-0.49%

Note: "Gov." refers to the Scottish Government

The first two numerical columns of Table A.1 summarise the long-run impacts of an externally funded rise in HB. The scale of macroeconomic impacts is initially limited by capacity constraints, but over the long-run capital stocks adjust fully to the increase in HB, as in the Tables of results in the body of the report.

Recall that there is no upward pressure on nominal or real wages in the absence of supply side responses. The main effects:

- There is an effective stimulus to demand because of the net increase in households' disposable income and consumption, from which all households benefit, although the impact is heavily concentrated in the lowest two income quintiles, as we would expect. This generates an expansion in overall economic activity.
- The macroeconomic effects associated with attempting to meet the 30/31 target for child poverty, since the scale of the (implicit) transfer to households is greater, further increasing all households' consumption.
- As we would expect, the macroeconomic impacts are typically smaller than those reported in Tables 4 and 5 in the main text: the scale of the transfer (and of the required rise in taxation under fiscally neutral cases) is less here because the Scottish Government is assumed to benefit from the reduction in the UK Government's housing benefits expenditure.

Again, for both intermediate and final targets the macroeconomic effects are notably smaller than the corresponding values for increases in child benefit. This reflects the fact that the effective net transfers to households are smaller than for child benefit. Note, however, that the adjustment in child benefits, while larger, also has a bigger impact on the child poverty. (Could calculate GDP multipliers for each here – though, of course, very crude indicator, but we do want ways of comparing alternative policies.)

Note that, as with the child benefit increases, the stimulus is comparatively capital intensive, with capital increasing proportionately more than employment. This reflects the greater capital intensity of the expenditure of low-income households.

Fiscally neutral increases in HB: Scottish Government funds the cost net of HB savings

The results are similar, qualitatively, to those reported in Sections 4 and 5 of the main report:

- Imposing fiscal neutrality renders the stimulus to economic activity negligible.
- In effect, the increase in the consumption of households in the lowest two quintiles is offset by the contraction in the consumption of the higher-income households; real wages now fall.
- Indeed, in this case the attempt to meet the final child poverty target, whilst still associated with a greater effective transfer to households, is associated with what is effectively a very small contraction in aggregate consumption; the additional taxation reduces the consumption of higher income households to the point where this dominates.

A.2 Potential supply side responses to the rise in taxation associate with the improvement in housing benefits.

Again, Table A.1 would capture the key macroeconomic impacts if wages are, for whatever reason, inflexible. However, we have already noted that conventional bargaining models treat workers as bargaining over real take home pay.

Response to the rise in taxation

The fiscally neutral rise in HB results in a reduction of the real post-tax wage (by 0.46% and 0.52% respectively for the intermediate and final child poverty targets – last two columns of Table A.1), which under bargaining leads to a “wage push” effect as workers seek to restore their take home wage. We know that this effectively adds a negative supply side shock to the demand changes considered in Table A.1 above.

The results of the fiscally neutral cut in rents (increase in notional housing subsidy) are reported in Table A.2. Key features of the results are:

- There is now upward pressure on nominal wages and prices as workers attempt to make good their loss of real wages indicated in the final columns of Table A.1 above, effectively adding an adverse supply shock to the cases reported above.
- This adversely impacts competitiveness and net exports and there is now a contraction in GDP of 0.19% (0.21%) in the attempt to meet the intermediate (final) target for child poverty
- While the real wage still falls, this is by less than when the nominal wage is fixed.
- Of course, the scale of these impacts is noticeably lower than when the Scottish Government is assumed to have to meet the full costs of the policy change (the results of which are reported in Table 5 in the main report).

Table A.2. The long run impacts of attempting to meet the Interim (18%) and Final (10%) targets for Child Poverty through fiscally neutral reductions in rent under bargaining: with the Scottish Government only funding the net cost.

	<i>Intermediate (23/24)</i>	<i>Final (30/31)</i>
GDP (£m)	-0.19%	-0.21%
Consumption	-0.10%	-0.11%
Investment	-0.16%	-0.18%
Total Exports	-0.23%	-0.26%
Total Imports	-0.04%	-0.04%
Nominal Gross Wage	0.26%	0.29%
Real Take Home Wage	-0.37%	-0.42%
CPI	0.08%	0.09%
Real cost of capital	0.06%	0.07%
Unemployment Rate (pp difference)	0.20%	0.23%
Employment	-0.21%	-0.24%
Total HH Tax	1.57%	1.78%
Income Tax	3.15%	3.56%
Transfers to HH from Gov	4.10%	4.62%
Real Scottish Government Consumption	0.00%	0.00%
HG1 (Lowest) Consumption	1.45%	1.81%
HG2 Consumption	0.49%	0.38%
HG3 Consumption	-0.19%	-0.20%
HG4 Consumption	-0.32%	-0.36%
HG5 (Highest) Consumption	-0.57%	-0.64%

Note: "Gov." refers to the Scottish Government

Other potential supply side responses to the increased subsidy to housing.

The discussion in the Appendix 2 remains applicable to the current case. Clearly, the scale of the impacts would now be lower than if the Scottish Government has to meet the full gross costs of the policy.

B. The impact of the responsiveness of wages to any rise in income taxes.

Here we explore this issue further, since we have already seen that the assumption of conventional bargaining that workers seek to fully restore their net of tax real pay can have significantly adverse macroeconomic consequences, as the results (repeated from our earlier analysis) in the first and fourth numerical columns of Table B.1 confirm. However, if workers were persuaded only to seek to establish 50% of their real take home pay the adverse consequences would be much smaller, as columns 2 and 4 show. If workers were to accept a social contract that implied that implied workers accepted lower take home pay because of the wider societal benefits of reduced child

poverty – or if nominal wages are inflexible because of weak bargaining power – the macroeconomic impacts become positive (though very small) as columns 3 and 6 indicate.

Table B.1. The long run impacts of attempting to meet the interim and final targets for child poverty through fiscally neutral increases in the SCP under alternative assumptions about the response of wages to the tax rise.

	<u>Intermediate target (23/24)</u>			<u>Final target (30/31)</u>		
	Conventional bargaining	Seek to restore 50% of net wage	Social wage	Conventional bargaining	Seek to restore 50% of net wage	Social wage
GDP (£m)	-0.39%	-0.16%	0.01%	-1.99%	-0.79%	0.07%
Consumption	-0.20%	-0.09%	0.01%	-1.04%	-0.42%	0.02%
Investment	-0.33%	-0.13%	0.04%	-1.74%	-0.62%	0.19%
Total Exports	-0.47%	-0.21%	0.01%	-2.42%	-1.00%	0.02%
Total Imports	-0.08%	-0.04%	0.00%	-0.40%	-0.17%	-0.01%
Nominal Gross Wage	0.54%	0.24%	-0.01%	2.80%	1.15%	-0.03%
Real Take Home Wage	-0.75%	-0.85%	-0.93%	-3.37%	-3.86%	-4.21%
CPI	0.17%	0.07%	0.00%	0.88%	0.36%	-0.01%
Real cost of capital	0.13%	0.06%	0.00%	0.70%	0.29%	-0.01%
Unemployment Rate (pp difference)	0.42%	0.19%	0.00%	2.12%	0.90%	0.01%
Employment	-0.44%	-0.20%	0.00%	-2.26%	-0.96%	-0.01%
Total HH Tax	3.20%	2.87%	2.61%	14.92%	13.12%	11.84%
Income Tax	6.41%	5.74%	5.21%	29.89%	26.26%	23.67%
Transfers to HH from Gov	8.36%	8.36%	8.36%	37.91%	37.91%	37.91%
Real Scottish Government Consumption HG1 (Lowest)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Consumption HG2	2.01%	2.09%	2.15%	10.15%	10.59%	10.91%
Consumption HG3	1.12%	1.22%	1.29%	4.84%	5.39%	5.79%
Consumption HG4	-0.11%	-0.02%	0.06%	-0.99%	-0.49%	-0.13%
Consumption HG5 (Highest)	-0.57%	-0.47%	-0.39%	-2.73%	-2.19%	-1.80%
Consumption	-1.14%	-0.99%	-0.87%	-5.39%	-4.57%	-3.98%

Note: "Gov." refers to the Scottish Government

Historically, the evidence tends to support a conventional bargaining view, but since the Great Recession there has been greater evidence of wage inflexibility.