

Technical Appendix – Calculating the proportion of families who will be impacted by the cut

Section 1 - Calculating family populations for each constituency

To estimate the proportion of families impacted at constituency level by changes to the benefit system we need to estimate the number of working-age benefit units in each constituency.

Benefits are administered at a benefit unit level. A benefit unit is single adult or a married or cohabiting couple and any dependent children, so corresponds to a family.

A household is defined as all people who live in a dwelling. So, it is possible to have multiple benefit units in a single household. For example, four unrelated adults living together would be four benefit units. We cannot use the number of households to estimate the proportion of each constituency impacted by benefit changes, as our denominator would be too small and the estimate therefore too large. It is necessary to derive an estimate of the overall number of working-age benefit units in a constituency.

The methodology for calculating populations is split into two parts.

1. Firstly, we calculate 2019 constituency level estimates for working-age households with children and working-age households without children.
2. Secondly, we scale these household estimates to benefit unit estimates using a regional adjustment.

Data sources:

The following data sources have been used to calculate the Constituency benefit unit populations.

Data	Link	Notes
Constituency household populations for England and Wales, 2011	https://www.nomisweb.co.uk/census/2011/qs113ew	Go to download .csv in the bottom left, choose Parliamentary Constituency as geography
Constituency household populations for Scotland, 2011	https://www.scotlandscensus.gov.uk/documents/2011-census-table-data-uk-parliamentary-constituency-2005/	Download bulk data files zip. Then table QS188SC.csv
Constituency individual populations for England and Wales, 2011 and 2019	https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/datasets/parliamentaryconstituencymidyearpopulationestimates	
Constituency individual populations for Scotland, 2011 and 2019	https://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by-theme/population/population-estimates/2011-based-special-area-population-estimates/ukpc-population-estimates	
Households Below Average Income, 2019/20. EUL Microdata	https://beta.ukdataservice.ac.uk/datacatalogue/studies/study?id=5828	A UK Data Service account will be required to download this.

Section 1.1

Calculate 2019 constituency level estimates for working-age households with children and working-age households without children

Step 1 - Calculate Westminster Parliamentary Constituency (WPC) level figures for working-age households with children and working-age households without children for 2011.

The derivations for this are given in Appendix 1.

Step 2 - For 2011 and 2019, calculate WPC individual level populations for 0 to 19 and 20 to 64.

The 0 to 19 age group was chosen because for a couple of the data sources, population data was only available for 5 year age bands. We have chosen the cut off to be the top of the 15 to 19 age group, rather than the 10 to 14 age group.

Step 3 - For each WPC calculate the percentage change between 2011 and 2019 for both the 0 to 19 and 20 to 64 populations. These will be referred to as population growth factors.

Step 4 - For each WPC, take the 2011 household populations, and estimate the 2019 populations.

- i. For families with children apply the 0 to 19 population growth factor.
- ii. For families without children apply the 20 to 64 population growth factor.

At this point we have 2019 constituency level estimates for working-age households with children and working-age households without children.

Section 1.2

Scale these 2019 constituency household estimates to benefit unit estimates using a regional adjustment

Step 5 - Calculate regional numbers for benefit units who would be applicable for Universal Credit or Working Tax Credits (WTC). This can be calculated from 2019/20 HBAI data from the Family Resources Survey using the following specification:

Below refers to the data fields used in the HBAI microdata.

Fields: GVTREGN, NEWFAMBU_KID

Grossing factor: GS_INDBU

Filters: HBAIYEAR == 26, NEWFAMBU_UC == 1

Step 6 - Sum up existing 2019 WPC household population to regional level. Separate figures are required for households with children and households without children.

Step 7 - For each region calculate the ratio between the Household estimate and the HBAI benefit unit figures. Separate figures are required for households with children and households without children. This is the benefit unit adjustment ratio.

The regional adjustments used are as follows:

Table 1: Benefits units with children

Region code	Region name	HBAI: Benefit units with children	Estimated Households with children	Adjustment
E15000001	North East	298,873	312,373	96%
E15000002	North West	905,643	885,620	102%
E15000003	Yorkshire and the Humber	620,855	650,620	95%
E15000004	East Midlands	560,137	566,494	99%
E15000005	West Midlands	696,800	715,506	97%
E15000006	East	772,201	751,708	103%
E15000007	London	1,145,680	1,111,869	103%
E15000008	South East	1,058,694	1,092,055	97%
E15000009	South West	609,488	618,691	99%
W08000001	Wales	353,462	359,969	98%
S15000001	Scotland	602,779	598,187	101%

Table 2: Benefits units without children

Region code	Region name	HBAI: Benefit units without children	Estimated Households without children	Adjustment
E15000001	North East	820,971	566,409	145%
E15000002	North West	2,151,316	1,533,703	140%
E15000003	Yorkshire and the Humber	1,631,350	1,125,646	145%
E15000004	East Midlands	1,398,129	974,196	144%
E15000005	West Midlands	1,717,314	1,150,974	149%
E15000006	East	1,712,701	1,200,521	143%
E15000007	London	3,078,674	1,935,023	159%
E15000008	South East	2,599,269	1,778,954	146%
E15000009	South West	1,519,966	1,143,310	133%
W08000001	Wales	922,995	639,344	144%
S15000001	Scotland	1,719,569	1,283,314	134%

Adjustments for households without children are much higher, as most multi-benefit unit households do not contain children. Note that this spreads the multi-benefit unit households evenly across a region, so within a region would slightly overestimate the number of benefit units in areas where most households are single benefit unit ones and underestimate the number of benefit units in areas where there are a lot of larger households. However, this is the best approximation given the data available.

Step 8 - For each WPC 2019 household estimate (calculated in Section 1.1 – step 4), apply the appropriate regional and family type benefit unit adjustment ratio. We now have WPC 2019 benefit unit populations for families with and without children.

Step 9 - Calculate 2019 WPC total working age benefit unit by summing the estimate for families with children and families without children.

Section Two – Calculating number of families in receipt of Universal Credit and Tax Credits

Data Sources:

Families in receipt of Universal Credit: [Stat-Xplore - Log in \(dwp.gov.uk\)](https://www.dwp.gov.uk/stat-xplore)

Families receiving Tax Credits: [Child and Working Tax Credits Statistics: Provisional Awards- April 2021 - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/statistics/child-and-working-tax-credits-statistics-provisional-awards-april-2021)

Section 2.1 - Families receiving Universal Credit and WTC

1. The latest data for the number of families receiving Universal Credit are extracted from StatXplore, split by family type.
2. Nil payments are excluded. [Payment Indicator = “Yes”]
3. Family types are grouped to give families with and families without children.
4. Families with children with WTC entitlement are calculated as the sum of families claiming WTC and CTC, and working families claiming CTC only (such families have an underlying eligibility for WTC, but the way in which tax credits are tapered away for higher incomes means that WTC is tapered away first – see <https://www.gov.uk/guidance/new-one-off-500-payment-for-working-households-receiving-tax-credits> for details). Families without children with WTC entitlement is taken from the column ‘families with no children (WTC only)’. These are both multiplied by 1000 to scale them up.
5. The figures for WTC and UC are summed for families with and families without children.
6. These figures calculated in step 5 are summed to give a total for all working-age families.

Section 2.2 – Calculation of Rates

1. The total number of families, along with the number of families receiving UC & WTC within each WPC are rounded to the nearest 10.
2. The rates are calculated by dividing the rounded number of families receiving UC & WTC by the rounded number of families. This is done for all families, families with children and families without children.

Appendix 1 – Create 2011 data for households with and without children at Parliamentary Constituency Level.

The census household data files present many different household breakdowns. The following section specifies exactly how we took these to create population figures for working-age families with children and working-age families without children.

i – England and Wales, households with children:

One family only: Married couple: One dependent child; measures: Value

One family only: Married couple: Two or more dependent children; measures: Value

One family only: Same-sex civil partnership couple: One dependent child; measures: Value

One family only: Same-sex civil partnership couple: Two or more dependent children; measures: Value

One family only: Cohabiting couple: One dependent child; measures: Value

One family only: Cohabiting couple: Two or more dependent children; measures: Value

One family only: Lone parent: One dependent child; measures: Value

One family only: Lone parent: Two or more dependent children; measures: Value

Other household types: With one dependent child; measures: Value

Other household types: With two or more dependent children; measures: Value

ii – England and Wales, working-age households without children:

One person household: Other; measures: Value

One family only: Married couple: No children; measures: Value

One family only: Married couple: All children non-dependent; measures: Value

One family only: Same-sex civil partnership couple: No children; measures: Value

One family only: Same-sex civil partnership couple: All children non-dependent; measures: Value

One family only: Cohabiting couple: No children; measures: Value

One family only: Cohabiting couple: All children non-dependent; measures: Value

One family only: Lone parent: All children non-dependent; measures: Value

Other household types: All full-time students; measures: Value

Other household types: Other; measures: Value

iii- Scotland, households with children:

One family household: Married couple: One dependent child

One family household: Married couple: Two or more dependent children

One family household: Cohabiting couple: One dependent child

One family household: Cohabiting couple: Two or more dependent children

One family household: Lone parent family: One dependent child

One family household: Lone parent family: Two or more dependent children

Other household types: One dependent child

Other household types: Two or more dependent children

iv – Scotland, working-age households without children:

One person household: Aged under 65

One family household: Married couple: No children

One family household: Married couple: All children non-dependent

One family household: Same-sex civil partnership couple
One family household: Cohabiting couple: No children
One family household: Cohabiting couple: All children non-dependent
One family household: Lone parent family: All children non-dependent
Other household types: All full-time students
Other household types: Other