

The logo for the Social Metrics Commission (SMC) features a stylized white wave above the letters 'SMC' in a large, white, serif font.

Social Metrics Commission

EQUALISATION

EQUALISATION IN POVERTY MEASURES: CAN WE DO BETTER?

A technical paper of the Social Metrics Commission

Chaired by **Philippa Stroud**, CEO of the Legatum Institute

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ABOUT THE SOCIAL METRICS COMMISSION

The Social Metrics Commission was formed in 2016 and is led by the Legatum Institute's CEO, Baroness Stroud. It is an independent and rigorously non-partisan organisation dedicated to helping policy makers and the public understand and take action to tackle poverty. Since its inception, its ultimate goal has been to develop new poverty metrics for the UK which have both long-term political support and effectively identify those who are in poverty. By doing so, it is hoped that Government and others will be better able to develop interventions that reduce the number of people experiencing poverty and improve outcomes for those people who do experience it.

This report is part of a series of technical papers, which explore the Commission's decisions in more detail and provide deeper insight into the work the Commission launched in September 2018.

The Commission would like to thank both the Legatum Institute for hosting the Commission and making available the resources of its Centre for Metrics, and the Legatum Foundation for their significant support of this work. This report would not have been possible without that support, and the research, editorial and functional independence that has underpinned the Commission's work.

SUPPORTERS OF THE COMMISSION

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- Oliver Wyman.

ABOUT THE LEGATUM INSTITUTE

As CEO of the Legatum Institute Baroness Stroud has been proud to Chair the Social Metrics Commission and for the Legatum Institute to host the Commission and contribute to the vital work that has been undertaken. The Legatum Institute is a London-based think-tank with a global vision: to see all people lifted out of poverty. Our mission is to create the pathways from poverty to prosperity, by fostering Open Economies, Inclusive Societies and Empowered People.

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CONTENTS

EXECUTIVE SUMMARY	2
INTRODUCTION	8
SECTION ONE: WHY DO WE NEED EQUIVALISATION?	9
SECTION TWO: THE CHOICE OF SCALE MATTERS	17
SECTION THREE: HOW HAVE EXISTING SCALES DEVELOPED?	27
SECTION FOUR: HOW TO BUILD ON THESE FOUNDATIONS	38
ENDNOTES	43

EXECUTIVE SUMMARY

OVERVIEW OF THE COMMISSION'S POVERTY MEASURE

Understanding poverty requires us to judge whether a family's resources are sufficient to meet their needs. In making this judgement, it is apparent that different families will have different needs. For example, needs vary by the number of people in the family, with larger families typically having greater needs. In fact, there are wide range of factors that might impact on families' needs, including the composition of the family (number of adults and number of children), the ages of the adults and children and family type.

The process through which many poverty measures account for these variations in needs is called equivalisation. The premise is simple; we know that families with greater needs will need more resources in order for those needs to be met. Equivalisation is the way in which we attempt to understand *how much more* larger families need in order to achieve the *same standard of living* as otherwise equivalent smaller families.

Seen in this light, it is clear that the process of equivalisation is central to developing an accurate measure of poverty. However, the Commission's 2018 report highlighted its concerns over the seemingly arbitrary nature of the UK's current approach and the lack of detailed discussion of the appropriateness of it and whether it could be improved. In response, the Commission has undertaken a programme of work to explore the nature and use of equivalisation both in the UK and internationally and test a range of different equivalisation approaches on the Commission's poverty measure. This report summarises this work and makes recommendations for how take forward future work to assess the appropriateness of the current approach and, where necessary, develop a new equivalisation scale for the UK.

THE NEED TO REVISIT EQUIVALISATION SCALES

The first thing to note is that a number of different equivalisation scales are used in measuring poverty in developed countries. These include the OECD modified scale (used by the UK Government, and in many other European countries) and an approach that uses the square root of household size (used by the OECD and others).

The Commission's research demonstrates that each of these approaches leads to different conclusions over the relative needs associated with adults and children, how economies of scale impact on assumed needs and the extent to which factors like family type and age impact on assumed needs.

This means that the choice of scale has a significant impact on:

- The overall rate of poverty; and
- The composition of poverty between people in families of different sizes, types and ages.

Given the scale of these potential differences, the obvious impacts on our understanding of poverty and the implications for policymakers, this is an area that should warrant significant testing and research to ensure that the most appropriate scale is used. This is also a view shared by the authors of the report that developed the OECD modified scale. They highlighted that the approach is “as arbitrary” as what came before it and that, while they had developed an approach which gained some level of international consensus, they did not believe that it necessarily reflected the real-life differences in families’ needs. As a result, they argued that more research was needed to develop approaches to equivalisation that would better reflect the differing needs of families.

DEVELOPING EQUIVALISATION SCALES

The second half of this report explores how previous approaches have been developed. In exploring the development of other approaches, two things are immediately apparent.

- Different measures of poverty are likely to need different equivalisation approaches. The most obvious example is the existing use of different equivalisation scales for poverty measures that adopt an after-housing-costs approach. Here, the observation that housing costs are a significant driver of both the extra needs for larger households and the economies of scale that larger families might enjoy, means that equivalisation scales need to adjust for whether housing costs are included or not. Similar arguments can also be made for measures like the Social Metrics Commission’s approach, which accounts for the costs of childcare and disability; and
- There is no reason to suppose that equivalisation scales should be common across countries or time. There are a range of reasons for this, including that it is likely that social norms on sharing (and the economies of scale that this brings) will vary between countries and over time.

Other research has also highlighted this and pointed to the idea that, rather than a single equivalisation scale, what is needed is a single methodology for creating and updating equivalisation scales on the basis of the specific poverty measure, location and time in which it is created.

Building on this notion, this report identifies a framework for how equivalisation scales should be developed in general, before going on to specify this for the UK and outline how to take forward future work to assess the appropriateness of the current approach and, where needed, to develop a new approach to equivalisation in the UK.

EQUIVALENCE SCALES TYPICALLY MIX EXPERT JUDGEMENT WITH EMPIRICAL EVIDENCE

Another conclusion that can be drawn from research into the development existing equivalence scales is that none of the scales currently in use are drawn solely from empirical evidence. Instead each of the approaches have used expert opinion and judgement to develop pragmatic scales.

The empirical evidence that underpins this judgement can be split into three broad categories:

- **Approaches using proxies of living standards:** These estimate the level of resources needed by different families to be at an equivalent level of living standards, based on proxy measures of living standards from survey data. Proxies might be based on questions about the affordability of certain goods and services, people's self-reported views of their living standards or other items that are judged to be correlated with living standards (e.g. home ownership).
- **Approaches using data on consumption levels:** These evaluate how patterns of consumption vary. Using various assumptions about the living standards drawn from consumption patterns, results are created that can be used to assess the point in the resource distribution where families of different sizes have equivalent levels of consumption, and therefore equivalent living standards.
- **Approaches based on 'baskets of goods':** These create a basket of goods for each family depending on their size and composition, with these baskets being proxies for needs. Under the assumption that these baskets yield equivalent standards of living, the baskets can be monetised to understand how resources need to vary to equalise living standards.

A PROCESS FOR TAKING WORK FORWARD

Based on this research into the development of equivalence scales and the range of possible empirical approaches, the Commission has suggested a five-stage process to develop equivalence scales:

- STAGE 1) Determine the specific nature of what the equivalisation is needed for:
- For what sort of measure of poverty / inequality – and what does that mean about where you are trying to estimate the equivalence of living standards?
 - For these purposes what does equivalence of living standards mean?
 - For what measure of resources – what is included and excluded?
 - For which location / geography?
- STAGE 2) Based on the answers from stage 1 - develop an empirical strategy to approximate the scale of extra resources that families of different sizes and types need to be able to achieve living standards equal to otherwise equivalent families. This might involve both surveying existing evidence and developing plans for new research;
- STAGE 3) Where new research is needed – undertake the empirical strategy outlined in stage 2;
- STAGE 4) Use a judgement-based process and the results of the empirical strategy to develop an equivalence scale, managing the trade-off between complexity and pragmatism / transparency; and
- STAGE 5) Determine whether the approach will need to be updated in future and, if so, develop a strategy for doing so.

We believe that a number of researchers, governments and organisations seeking to measure poverty and inequality in the UK and other countries could use this framework to consider the appropriateness of their current approach to equivalisation and, where needed, to create new scales.

DEVELOPING A NEW EQUIVALISATION SCALE FOR THE UK'S EXPERIMENTAL POVERTY STATISTIC

Based on the above, the Commission is making a set of recommendations for how the appropriateness of the existing UK approach can be judged and development of a new equivalisation scale could be taken forward. This scale would be used as part of the Commission's own measure of poverty and could inform the Government as it develops its own Experimental Poverty Statistics. The recommendations are outlined below.

STAGE 1: A new equivalence scale should be considered for the UK's Experimental Poverty Measure. In developing this, the following should be noted:

- The measure uses a social norm level of needs based at the median of Total Resources Available;
- Testing should also be undertaken to understand the potential differences in equivalisation scales that might exist at different points below the social norm (for example around the poverty line) and the implications of these for results; and
- The empirical evidence that informs the equivalence scale should take account of the Commission's approach to assets, debt, housing, childcare, and the extra costs of disability and social care.

STAGE 2: The Commission sees the benefit of collecting evidence from a range of approaches, including approaches based on:

- Proxies of living standards;
- Patterns of consumption; and
- Baskets of goods.

Alongside detailed literature reviews, original research should seek to explore how resources should be weighted such that different families can achieve the same standards of living, after accounting for:

1. The addition of second and subsequent adults to a family;
2. The addition of first and subsequent children to a family;
3. The overall economies of scale associated with family size;
4. Any differences in needs associated with children of different ages (e.g. baby, pre-school, school-age, adolescent);
5. Any differences in needs associated with adults of different ages (e.g. working-age, pensioner); and
6. Any differences in needs associated with other factors related to family type (e.g. lone parents).

STAGE 3: The Commission will work with a range of parties to undertake and coordinate research across the three approaches to developing evidence to inform a new equivalence scale. This work will provide the basis for answering the empirical questions needed.

STAGE 4: The Commission will use this evidence to test and develop a range of potential equivalence scales, before recommending a version it feels most appropriate for the UK's new Experimental Poverty Measure. The Commission will publish full details of the results of this work and the reasoning behind its recommendations.

STAGE 5: Alongside a recommendation on the most appropriate equivalence scale, the Commission will also make recommendations for whether and how it believes that this scale will need to be updated in future. This recommendation will be based on consideration of the extent to which equivalences have changed over time, and by balancing the costs of potential future research with the overall impact and benefit for accuracy within the poverty measure.

INTRODUCTION

Equivalisation plays a central role in poverty measurement across a range of developed countries. It is the process used in poverty measurement to make comparisons between families of different sizes and composition.

However, despite this central role, the Commission's 2018 report highlighted its concerns over the seemingly arbitrary nature of the UK's current approach and the fact that, outside of a detailed academic literature, there has been little discussion of the appropriateness of the current approach and whether it could be improved.

In an attempt to tackle this, the Commission's 2018 report summarised the significant work it had undertaken to develop a new equivalence scale for the UK, based on the JRF's Minimum Income Standards work. When compared to results from the OECD modified equivalence scale that is currently used in the UK, the results suggested that the existing approach:

- Is likely to underestimate the needs of children;
- Might not differentiate adequately between the needs of children of different ages;
- Might overestimate the needs of pensioner families; and
- Could underestimate the needs of lone parent families.

This work also demonstrated that the impacts on the distribution of poverty when moving from the OECD modified scale to one derived from MIS were incredibly large. While this demonstrated the importance of the decision over equivalence scales, the Commission was not confident enough that the nature and scale of changes brought about by the MIS-based approach accurately reflected differences in people's experiences to implement it within its measurement framework.

Instead it highlighted that significant work is needed to fully assess the appropriateness of the current approach and, where needed, develop a new equivalence scale that accurately reflects the realities of how needs vary for different families in the UK. This report provides a framework for that work to be taken forward, by:

- Building on the Commission's existing work to highlight the role and importance of equivalisation in poverty measurement;
- Summarising the approaches currently used across the developed world and how they were developed;
- Providing a framework for the development of equivalence scales for poverty and inequality measures; and
- Proposing how this should be taken forward to develop an equivalence scale specific to the Commission's measure of poverty.

SECTION ONE: WHY DO WE NEED EQUIVALISATION?

POVERTY REQUIRES US TO COMPARE RESOURCES AND NEEDS

Understanding poverty requires us to compare a family's resources with their needs. Where resources are insufficient to adequately meet their needs, we regard that family as being in poverty.

In general, resources are relatively straightforward to measure. For example, with a narrow view of resources represented by net income, household surveys and administrative data can be used to relatively accurately capture earnings, benefits and taxes. In the Social Metrics Commission's own measure, a wider concept of Total Resources Available can be captured in a similar fashion, for example by using data on liquid assets, childcare and housing costs also available within survey data.

In an ideal world, we would be able to do the same for needs; identifying a family's needs through detailed data. However, in practice, this is impossible. One of the key barriers is that, unlike the objective assessment that is possible for resources, needs are a subjective concept, meaning that even if we had detailed data on what people reported their needs to be, these would likely capture different things for different families.

This means that, to measure poverty, an approximation of needs must be developed. There are typically two approaches to doing this:

1. **Baskets of goods.** This approach is based on research that attempts to determine the basket of goods that families need to consume to be judged not to be in poverty. A monetary value can then be placed on this basket of goods. Where resources are below this value, families are regarded as being in poverty. This approach dates back to work in the early 20th Century by Rowntree and others. It is now best known in a similar approach adopted in the Joseph Rowntree Foundation's Minimum Income Standards work (though this work does not claim to provide a measure of poverty but rather asks groups of the public to determine what someone needs to have an 'acceptable minimum standard of living').ⁱ
2. **Proxying through resources.** Here, the resources that a family has available to them, and the spending power that comes with those resources, are judged to be an accurate proxy for the level of living standards that can be achieved. As such, this approach is based on developing a social norm level of spending power in society and comparing a family's own spending power to this level. The intuition being that if spending power is below a fraction of that norm, a family is unlikely to be meeting their needs. This means that we can consider two distinct steps to creating a poverty line here:
 - a. Deciding on a social norm level of spending power; and
 - b. Determining the level below this at which people are judged to be in poverty.

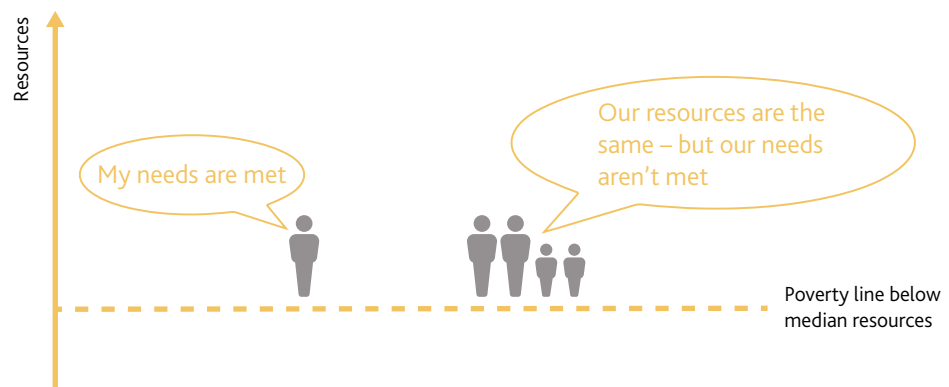
There are a wide range of poverty measures that seek to use this approach. The Social Metrics Commission's poverty measure uses this approach (by setting the social norm as the median of Total Available Resources and setting a poverty threshold at 54% of the median). A range of other measures take a similar approach (including the UK's Households Below Average Income publication).

EQUIVALISATION IS NEEDED WHEN USING RESOURCES AS A PROXY FOR NEEDS

Equivalisation is the process needed for the second of these approaches. In simple terms, this is because the ability of families to translate a given level of resources into living standards will vary based on a range of factors including the size of the family. For example, a four-person family would be unlikely to gain the same standards of living from £10,000 as a single person might.

However, taking the median of family resources and setting a fixed poverty line with reference to it would not take account of these variations. For example, a four-person family at the poverty line would be assumed to be able to enjoy the same standard of living as a single adult with the same resources, which clearly would not be the case. Figure 1 provides a stylised example.

Figure 1: Stylised example of why the differing needs of families to be accounted for



Equivalisation is the approach used to take account of this. It is the process through which we are able to compare the resources of families of different sizes and structures on a consistent basis and determine whether those resources are sufficient to provide equivalent standards of living.

This is in contrast to the first approach to measuring needs highlighted above, where baskets of goods are developed for a range of different families, meaning that differences in needs are systematically accounted for.

HOW FAMILIES' NEEDS VARY

As outlined above, families of different sizes and composition are likely to have different levels of need. For example, all else equal, a two-adult family will have a higher level of needs than a single person, and a family with two adults and one child will have greater needs than both. Overall, larger families tend to need more than smaller families, meaning that they will require a higher level of resources to meet these needs. This means that our approach to equivalisation needs to reflect this.

However, while the needs of a two-adult family will be higher than the needs of a single person, they are not likely to be twice as large. The reason is that economies of scale are likely to exist. For example, a one-bedroom apartment would cost the same to rent for a single person as a two-person family and a house only needs to be heated once, regardless of the number of people who are resident within it. There are further complications, including that children are likely to have different needs than adults.

Figure 2: Economies of scale in meeting needs



Two adults and a child need more resources than, say, a single adult...



... but their needs will not necessarily be three times as large, as:

There are efficiencies to living in a group; and children will consume differently to adults

There are also other characteristics that might indicate that needs vary between different families, for instance: the age of children (e.g. babies might have different needs than teenagers); age of adults (e.g. working-age adults might have different needs than pension-age adults); and family type (a child in a single-parent family might have different needs to a child in a two-adult family).

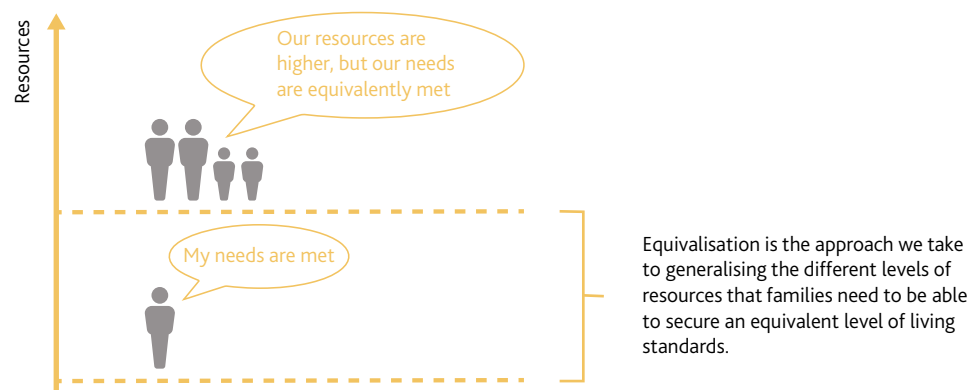
This means that equivalisation is not as simple as scaling needs one-for-one with the number of people in the property (for example creating a "resources per head" measure). Rather, equivalisation has to consider the number of people, the composition of the family formed by those people, and the economies of scale that exist when more people are added to a family unit.

WHAT IS EQUIVALISATION TRYING TO ACHIEVE?

The previous sections have demonstrated why equivalisation is needed to create an accurate measure of poverty; it allows us to take account of variations in needs of families of different sizes and compositions. Before turning to explain how equivalisation works in practice, it is helpful to demonstrate, in principle, what it is that equivalisation is trying to achieve.

The premise is simple; we know that families with greater needs will need more resources in order for those needs to be met. Equivalisation is the way in which we attempt to understand *how much more* larger families need in order to achieve the *same standard of living* as otherwise equivalent smaller families. Figure 3 provides a stylised example.

Figure 3: Stylised example of what equivalisation is trying to achieve



Described like this, the principle behind equivalisation is relatively straightforward. For two families to have equivalent living standards, it would mean that the comparable individuals in those families are able to derive the same utility from the resources available to them. We could judge this utility directly in terms of the individuals' levels of material wellbeing, or we could judge it in terms of their ability (or not) to consume. Individuals in different households who can afford/consume the same products/services can be said to have the same living standards.

However, in practice, this whole approach is complicated by the fact that we cannot directly measure living standards. This means that it is hard to assess when families have equivalent living standards. As a result, a range of methods can be developed to tackle this issue. In particular, these include:

- Using consumption patterns to understand the level of resources different families need in order to be able to afford the same sorts of expenditures (in particular, focussing on the extent to which families are able to purchase "non-essentials"). This approach relies on the assumption that families experience equivalent levels of living standards if they have a similar share of expenditure on different categories of consumption;

- Using proxies of living standards. For example, measures of material deprivation (which seek to understand the extent to which people can / cannot afford certain goods and services), self-reported living standards or other factors correlated with living standards could be used to understand the resources needed to provide equivalent living standards for different families. Such approaches assume these proxies (e.g. material deprivation, self-reported responses) are good indicators of overall living standards; and
- Using qualitative techniques to capture what people think different families would need to consume to have an equivalent standard of living – whether through social norms or expert judgment of needs. This approach relies on the assumption that comparable baskets of goods and services can be defined for different families.

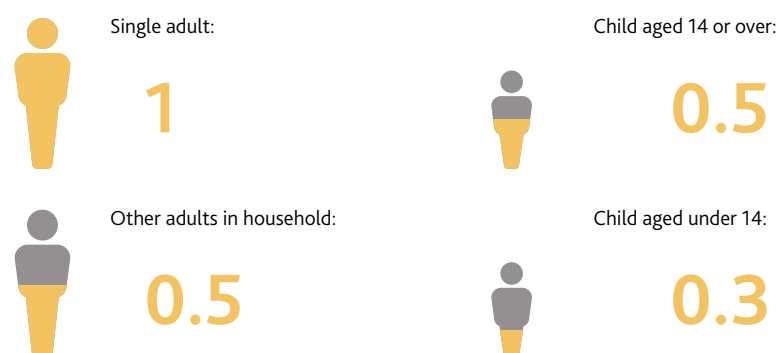
Section 3 explores these methods in more detail.

HOW DOES EQUIVALISATION WORK IN PRACTICE?

Once an understanding of how much more different families might need to enjoy equal standards of living, this evidence can be used to create equivalence scales. A range of different equivalence scales currently exist, with each having different ways of weighting adults and children and taking account of economies of scale, based on different views of the evidence. Before turning to describing in more detail how these scales look and the methods through which they have been developed, this section explains the practicalities of how equivalisation scales are used in poverty measurement.

To do this, we use the OECD Modified Scale as an example. This is a commonly used equivalence scale. For example, it is used by the UK Government in its Households Below Average Income publication and by a range of organisations and researchers, including the European Commission. Figure 4 shows equivalence factors for adults and children for the OECD Modified Scale.

Figure 4: Equivalence factors for different family members in the OECD Modified Scale



Source: Department for Work and Pensions, Households Below Average Income (HBAI), 2018

Notes: Reference household taken to be one adult with no children.

An equivalisation factor for each family can then be created by summing the equivalence factors for each individual within the family. For example, a two-adult family would have an equivalence scale of 1.5 (1+0.5). Table 1 shows equivalence scales for a range of example families.

Table 1: Equivalence scales for example families, using the OECD modified scale

Example family type	OECD Modified
Single adult	1
Couple, with no children	1.5 (1+0.5)
Lone parent, one child	1.3 (1+0.3)
Couple, one child	1.8 (1+0.5+0.3)
Couple, two children	2.1 (1+0.5+0.3+0.3)
Single pensioner	1
Pensioner couple	1.5 (1+0.5)

Source: SMC analysis, Department for Work and Pensions, HBAI, 2018.

Notes: In these examples, the eldest child is assumed to be 12 and where there is a second child, they are 10

CREATING EQUIVALISED RESOURCES

Once each family has an equivalence factor, the resources of households of different sizes and compositions can then be compared by dividing total household resources by the sum of the weightings for the household. This provides a measure of equivalised resources for each family.

For example, if an adult with no children has £20,000 of resources, their equivalised resources would be the same, as their equivalence factor is 1. In contrast, a couple family with one young child with £20,000 of resources, would have an equivalised resources figure of £11,111 (£20,000 divided by their equivalisation factor of 1.8).

In intuitive terms, this reflects the fact that a single person with £20,000 of resources is likely to be able to achieve a higher standard of living than a couple with one child, as the couple with one child has to use those resources to meet the needs of three people.

CREATING A POVERTY LINE, OR LINES

Once equivalised resources have been estimated for all families, we can use them to assess the incidence of poverty amongst families of different sizes and compositions. There are two broad ways of doing this:

1. By creating one poverty line against which the equivalised resources of each family are compared; or
2. By creating family-specific poverty lines for each family and comparing unequivalised resources to these.

Table 2 explains, in broad terms, how the two approach differ.

Table 2: Options for the how to incorporate equivalisation into poverty measurement (based on the SMC measure of poverty)

Measurement step	Option 1: a single poverty line	Option 2: family-specific poverty lines
1a Creating a benchmark for social norms in society	i. Equivalise available resources for all families, so that they can be directly compared.	i. Equivalise available resources for all families, so that they can be directly compared.
	ii. Calculate the median of equivalised Total Resources Available.	ii. Calculate the median of equivalised Total Resources Available.
1b	iii. Set benchmark as the median of equivalised Total Resources Available.	iii. Create family-specific norms benchmarks by multiplying the equivalised median of Total Resources Available by the family's equivalisation factor.
2 Setting a threshold beneath the social norm, under which families are deemed to be in poverty.	iv. Set poverty line as proportion of this equivalised median.	iv. Set family-specific poverty line as a proportion of the family's benchmark.
	v. Apply this to all families.	
3 The family's available resources are then compared to the poverty line.	vi. Equivalise a family's Total Available Resources.	v. Compare the family's unequivalised Total Resources Available to the family-specific poverty line.
	vii. Compare equivalised Total Resources Available to the equivalised poverty line.	

Source: Family Resources Survey and HBAI dataset (2017/18), SMC analysis.

Step 1a: In both cases, creating a benchmark level of social norms requires the measure of available resources to be equivalised in order to be able to compare across families on a consistent basis. The reasoning here is clear; we want the median level of available resources across all family types to act as a proxy for the typical level of needs in society. Equivalisation allows us to set a benchmark of needs, which explicitly accounts for the fact that households of different sizes have different levels of needs.

Step 1b: The two approaches then differ in terms of how the benchmark is determined:

- Option 1 simply sets a single equivalised benchmark (the same for all families) as the median of families' equivalised Total Resources Available; and
- Option 2 takes a different approach as it creates family-specific benchmarks that explicitly reflect the fact that different families will need different levels of Total Resources Available to achieve the social norm level.

Step 2: This step is the same for each approach. This involves setting the poverty line at a given proportion of the benchmark (e.g. 54% in the case of the Social Metrics Commission's measure).

Step 3: The differences highlighted in step 1b mean that step 3 is different for the two approaches.

- Under Option 1, all families have the same poverty line. This means that, to compare the experience of poverty for families of different sizes, the poverty line needs to be compared to each family's equivalised available resources; and
- Under Option 2, families already have a poverty line that reflects the fact that their needs vary based on family size and composition. This means that their unequivalised available resources can be directly compared to the family-specific poverty line.

In practice, each of these approaches is mathematically equivalent and yields identical results; the choice between them does not impact on either the overall rate of poverty or our understanding of which households are in poverty.

However, the Commission's view is that, rather than talking about one poverty line for all families and comparing this to their equivalised available resources, it was more intuitive to explicitly state that families of different sizes have different poverty lines and require different levels of resources to be above these. As such, the remainder of this report uses the second of these approaches in all analysis and examples.

SECTION TWO: THE CHOICE OF SCALE MATTERS

WHY IT IS TIME TO RECONSIDER OUR APPROACH TO EQUIVALISATION

Equivalisation plays a central role in poverty measurement across a range of developed countries. However, the Commission's 2018 report highlighted its concerns over the seemingly arbitrary nature of the UK's current approach and the fact that, outside of a detailed academic literature, there has been little discussion of the appropriateness of the current approach and whether it could be improved.

In an attempt to tackle this, the Commission's 2018 report summarised the significant work it had undertaken to develop a new equivalence scale for the UK, based on the JRF's Minimum Income Standards work. This demonstrated that the impacts on the distribution of poverty from moving from the OECD modified scale to one derived from MIS were incredibly large. This section extends that research to consider other possible equivalence scales and the differences they make to our understanding of poverty in the UK.

DIFFERENT SCALES EXIST

The OECD Modified Scale (and a companion scale developed by the Department for Work and Pensions for after-housing-costs measures) has been used in the headline measure of Households Below Average Income since 2007. Researchers, academics and others measuring poverty have followed this approach. However, the first thing to note is that a range of different scales exist. Table 3 provides examples of the range of equivalence scales that are, or have been, used in headline poverty measures in developed countries over the last few decades.

Table 3: Main equivalence scales used in poverty measures in developed countries

Scale	When was it developed?	Who is it used by?	Further detail
Square root of household size	1974	OECD studies, Congressional Budget Office.	Commonly used for comparative research across different jurisdictions.
McClements Scale (and after-housing-costs version)	1977	Previously used in UK, no longer in use.	Used in official DWP statistics up until 2007 and part of a significant academic debate.
OECD Modified	1994	Eurostat, Department for Work and Pensions, New Zealand, Canada, other OECD countries.	Developed to provide a common scale for international comparison.
Three Parameter Scale (used in the U.S. supplemental poverty measure)	1996	U.S. Supplemental poverty measure.	Adopted when the U.S. Supplemental Poverty launched in 2010.
OECD Modified (companion scale – after housing costs)	2005	UK's Department for Work and Pensions.	Developed to be used to produce AHC statistics alongside BHC statistics using the conventional OECD Modified scale.
Scale derived from Joseph Rowntree Foundation Minimum Income Standards work	2008	Academic studies but not formal measurement.	

Source: Chanfreau, J & Burchardt, T, Equivalence scales: rationales, uses and assumptions, 2008 and United States Census Bureau, Equivalence Adjustment of Income, 2016

Each of these scales has been developed through different methodologies, using different approaches, assumptions and evidence (a summary of these can be found in Section 3). As such, it is no surprise that each comes with different results; both in terms of the differences in needs that they believe exist between families of different sizes and compositions, and the final results for the equivalence factors applied to individuals and families.

A helpful way to conceptualise these differences is through the recently developed Three Parameter Scale. This formed the basis for the equivalisation scales used for the USA's supplemental poverty measure. In its simplest form, this identifies a set of three questions that all equivalisation scales need to consider:

1. How the needs of first and subsequent adults are weighted;
2. How the needs of children are weighted compared to adults; and
3. How to take account of economies of scale in household size.

To these, three further questions can be added:

4. How are children and adults distinguished (i.e. at what age)?
5. How do the needs of different aged children and / or different aged adults vary?
6. Do other factors matter (e.g. do lone parents have a different weighting)?

Table 4 summarises how each of the existing scales considers these questions.

Table 4: Equivalence factors for different family members, for different scales

Scale	How are the needs of first and subsequent adults weighted	How are children weighted compared to adults?	What is the age of a child?	Differences in needs by age of children / adults?	Other factors
<i>OECD Modified</i>	First adult: 1 Subsequent adults: 0.5	Children under 14: 0.3 Children 14 and over – assumed to be same as adult	Below 14	No	No
<i>OECD Modified (companion scale – after housing costs)</i>	First adult: 1 Subsequent adults: 0.72	Children under 14: 0.34 Children 14 and over – assumed to be same as adult	Below 14	No	No
<i>McClements Scale (and after-housing-costs version)</i>	<u>McClements:</u> First adult: 1 Subsequent adults: 0.64 <u>AHC version:</u> First adult: 1 Subsequent adults: 0.82	<u>McClements:</u> Increases depending on child age, ranging from 0.148 to 0.59) <u>AHC version:</u> Increases depending on child age, ranging from 0.13 to 0.69)	Varies	Yes	No

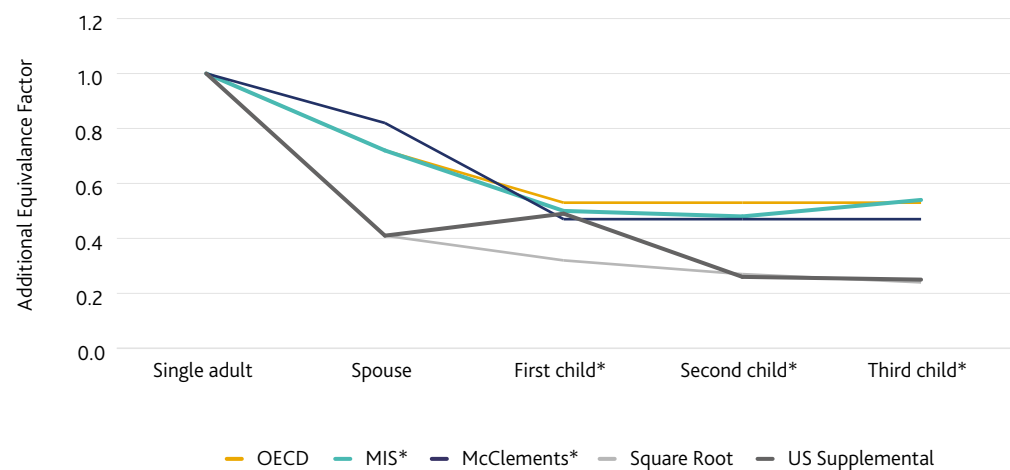
Scale	How are the needs of first and subsequent adults weighted	How are children weighted compared to adults?	What is the age of a child?	Differences in needs by age of children / adults?	Other factors
<i>Square root of household size</i>	First adult: 1 Second adult: 0.41 Subsequent adults add a steadily declining amount	No difference, increases depending on number of people in household	N/A	N/A	No
<i>Three Parameter Scale (used in the U.S. supplemental poverty measure)</i>	First adult: 1 Second adult: 0.41	<p><u>Multiple adults with children:</u> Child counted as half an adult and then total family size multiplied by the power of 0.7.</p> <p>First child with a couple: 0.49 Second child with a couple: 0.26</p> <p><u>Lone parent with children:</u> Child counted as half an adult with an additional lone parent modifier added. Family size then multiplied by the power of 0.7.</p> <p>First child with a lone parent: 0.51 Second child with a lone parent: 0.28</p>	Under 18	No	Yes, Lone parenthood
<i>MIS-derived scale</i>	<p><u>Working age:</u> First adult: 1 Second adult: 0.72</p> <p><u>Pensioner</u> First adult: 0.91 Second adult: 0.53</p>	<p>Depends on age of child, number of children, and whether the family is in lone parent.</p> <p><u>Lone parent range:</u> 0.26-0.88</p> <p><u>Multiple adult range:</u> 0.26-0.72</p>	Varies	Yes	Yes, Lone parenthood

Source: SMC analysis, Chanfreau. J & Burchardt. T, Equivalence scales: rationales, uses and assumptions, 2008 and United States Census Bureau, Equivalence Adjustment of Income, 2016

Note: Equivalisation factors for children vary with age, so an average figure is used for this analysis.

Figures 5 and 6 show how these assumptions translate into additional equivalence factors for different individuals as they are added to a family unit, for both a couple family and a single-parent family. As an example of some of the differences, the top figure shows that, compared to the other main scales used, both the Three Parameter Scale used in the USA's supplemental poverty measure and the square root scale assume that single adults have a higher level of needs and spouses a lower level of needs. This reflects the fact that these two scales assume higher economies of scale of moving from a single person to a couple household.

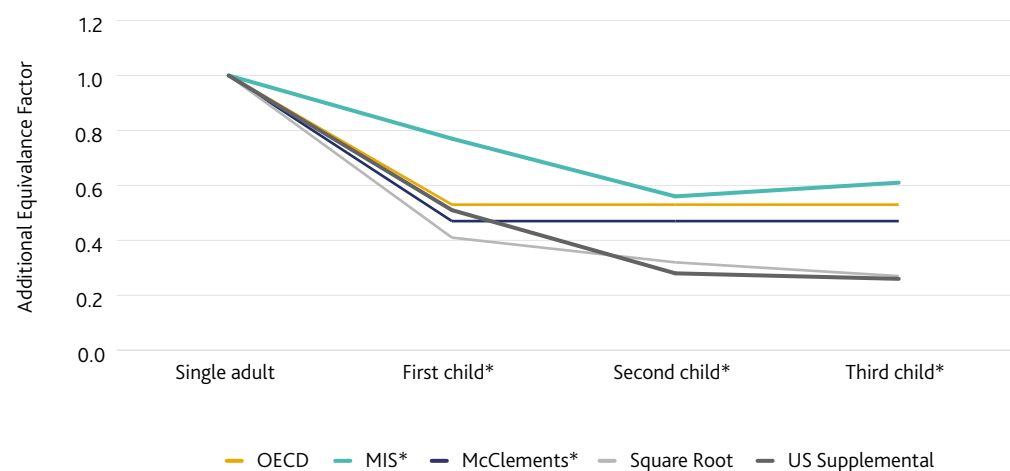
Figure 5: Assumed additional needs of different individuals, for single and couple families



Source: SMC analysis, Chanfreau, J & Burchardt, T, Equivalence scales: rationales, uses and assumptions, 2008 and United States Census Bureau, Equivalence Adjustment of Income, 2016

* Note: Equivalisation factors vary with age, so an average figure is used for this analysis.

Figure 6: Assumed additional needs of different individuals, for single-parent families



Source: SMC analysis, Chanfreau, J & Burchardt, T, Equivalence scales: rationales, uses and assumptions, 2008 and United States Census Bureau, Equivalence Adjustment of Income, 2016

*Note: Equivalisation factors for children vary with age, so an average figure is used for this analysis.

Another way of demonstrating the differences between the different scales is to look at the total equivalisation factors that each of the scales creates for a set of specimen families. Table 5 shows how these vary.

For example, under the scales shown here, equivalence factors for couples with two children, equivalence factors range between 2.00 (square root scale) and 2.68 (OECD Modified Scale, AHC).

Table 5: Equivalisation factors for different specimen families, by equivalence scale

	OECD modified	OECD modified, AHC	MIS* (after housing and childcare)	McClements* AHC	Square Root	US Supplemental
Single adult	1.00	1.00	1.00	1.00	1.00	1.00
Couple	1.50	1.72	1.72	1.82	1.41	1.41
Couple one child*	1.84	2.14	2.18	2.25	1.73	1.90
Couple two children*	2.18	2.56	2.62	2.68	2.00	2.16
Couple three children*	2.52	2.98	3.12	3.11	2.24	2.40
Lone parent one child*	1.34	1.42	1.72	1.43	1.41	1.51
Lone parent two children*	1.68	1.84	2.20	1.86	1.73	1.79
Lone parent three children*	2.02	2.26	2.71	2.29	2.00	2.06

Source: SMC analysis, Chanfreau, J & Burchardt, T, Equivalence scales: rationales, uses and assumptions, 2008 and United States Census Bureau, Equivalence Adjustment of Income, 2016

Note: Equivalisation factors vary with age, so an average figure is used for this analysis, calculated by taking the mean equivalisation factor for children across all ages.

In more tangible terms, table 5 shows how these differences translate into financial values. For example, it shows that, under the OECD modified scale (AHC), a couple household are assumed to need £109 more a week than a single adult.

We can then see that there are distinct differences between the different equivalence scales. For example, with the OECD modified scale (AHC), a lone parent with one child is assumed to need £63 more a week to achieve comparable standards of living to a single adult who is at the poverty line. This compares to £109 a week under the MIS-derived approach and £65 a week under the McClements (AHC) approach.

Table 6: Baseline needs (single adults at the SMC poverty line) and additional needs for difference family types, compared to single adults, for different equivalence scales (£ per week)

	OECD modified	OECD modified, AHC	MIS* (after housing and childcare)	McClements* AHC	Square Root	US Supplemental
BASELINE LEVEL OF NEEDS AT POVERTY LINE						
Single adult	£151	£151	£151	£151	£151	£151
ADDITIONAL NEEDS FOR OTHER FAMILIES						
Couple	£76	£109	£109	£124	£63	£62
Couple, one child	£127	£172	£178	£189	£111	£136
Couple, two children	£178	£236	£245	£254	£151	£175
Couple, three children	£230	£299	£320	£319	£187	£211
Lone parent, one child	£51	£63	£109	£65	£63	£77
Lone parent, two children	£103	£127	£181	£130	£111	£119
Lone parent, three children	£154	£190	£258	£195	£151	£160

Source: SMC analysis, Family Resources Survey and HBAI dataset (2017/18)

Note: Equivalisation factors vary with age, so an average figure is used for this analysis, calculated by taking the mean equivalisation factor for children across all ages. Baseline level of needs is set using the single adult threshold for the Standard SMC measure using OECD modified AHC equivalisation.

CHOICE OF SCALE MAKES A DIFFERENCE TO OUR UNDERSTANDING OF POVERTY

Perhaps unsurprisingly, these differences in equivalisation factors and assumed needs of different families has a significant impact on our understanding of poverty. Firstly, by applying each of the equivalisation methodologies to the Social Metrics Commission's poverty measure, we can see that these differences translate into different values for the "social norm" (i.e. median of equivalised Total Resources Available) and, consequently, poverty thresholds. Table 7 shows these differences.

For example, the equivalised median of Total Resources Available (the social norm of needs) is £280 under the OECD modified (AHC) scale, but £315 under the MIS-derived approach and £352 under the approach that uses the square root of household size. Poverty thresholds are also significantly different. For example, a couple has a £260 poverty threshold under the OECD modified (AHC) scale, a £252 threshold under the Three-Parameter Scale and £293 under the MIS-derived scale.

Table 7: Social norm level of needs and poverty thresholds under different equivalisation approaches, SMC poverty measure, 2017/18

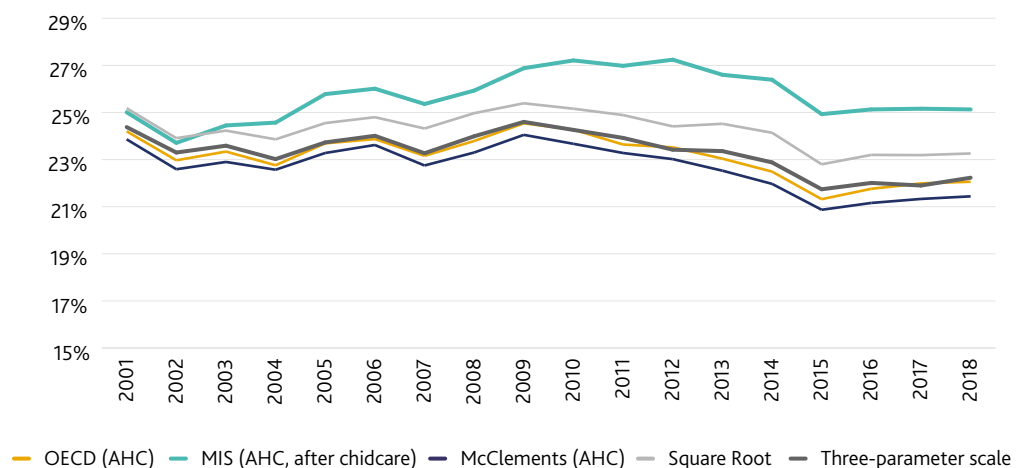
	Equivalised median	Poverty thresholds			
		Single adult	Couple	Couple two children	Lone parent two children
OECD modified	£324	£175	£263	£382	£294
OECD modified (AHC)	£280	£151	£260	£387	£278
MIS (AHC and after childcare cost)	£315	£170	£293	£445	£374
McClements AHC	£270	£146	£266	£391	£272
Square root	£352	£190	£269	£380	£329
Three- Parameter Scale	£314	£170	£252	£387	£320

Source: SMC analysis, Family Resources Survey and HBAI dataset (2017/18)

Note: Equivalisation factors vary with age, so an average figure is used for this analysis, calculated by taking the mean equivalisation factor for children across all ages.

Figure 7 uses the Social Metrics Commission's measure of poverty to show how the overall poverty rate differs under each of the different equivalisation methodologies. For example, it shows that, while the SMC baseline (using the OECD Modified Scale – companion, AHC) has an overall rate of poverty of 22% of the population in 2017/18, under the MIS-derived scale this changes to 25% and, under the approach that uses the square root of household size, it changes to 23%.

Figure 7: Difference in results from different equivalisation factors, using a 54% poverty threshold in the SMC's measure of poverty



Source: SMC analysis, Family Resources Survey and HBAI dataset (2017/18)

Notes: Figures calculated using the threshold used across other SMC publications and estimates.

To some extent, these differences in overall poverty rates can be tackled by choice of the poverty threshold. For example, as the Social Metrics Commission has argued, when new measures or methodologies are introduced, poverty thresholds should be adjusted to ensure that these choices do not impact on the overall rate of poverty.

However, whilst this can ensure that each equivalisation approach can yield the same overall rate of poverty, because the relativities between the needs of different families can be very different, the choice of equivalisation scale continues to make a significant difference to our understanding of poverty. In short, for any given rate of poverty, the choice of equivalisation methodology will have a significant impact on the composition of those classed as being in poverty.

Table 8 shows the results of the analysis once the overall rate of poverty has been equalised for each of the equivalisation options. It shows how the rates of poverty for different family types changes under each of the different equivalisation approaches, compared to the SMC baseline.

For example, this shows that, under the McClements (AHC) scale, poverty rates for lone parents and single pensioners are estimated to be lower and, for pensioner couples, higher. Whilst these differences are modest, differences under other approaches can be large. For example, using an equivalisation scale derived from MIS leads to a 14-percentage point increase in lone parent poverty and offsetting falls in pensioner poverty.

Table 8: Difference in results from different equivalisation factors, compared to OECD Modified Scale (overall rates of poverty equalised)

	Equivalence scale			
	McClements (AHC) - threshold at 54.8% of median	MIS-derived (AHC and after childcare) - threshold at 49.1% of median	Square root - threshold at 52.25% of median	Three-parameter scale - threshold at 54.1% of median
OVERALL	0%	0%	0%	0%
Single, no children	0%	0%	+1%	+1%
Lone parent	-1%	+14%	+7%	+5%
Couple, no children	0%	0%	-1%	-1%
Couple, with children	0%	+1%	-3%	-3%
Pensioner, single	-1%	-10%	+9%	+7%
Pensioner, couple	+1%	-7%	0%	+1%

Source: SMC analysis, Family Resources Survey and HBAI dataset (2017/18)

Notes: Baseline is SMC poverty levels for 2017/18 using the OECD Modified Scale (companion – AHC). Thresholds for each approach were adjusted to ensure parity of poverty rates compared to baseline in 2016/17.

“In our view, more research efforts should be devoted to the choice of equivalence scales...”

Authors: OECD review of Equivalisation Scales, 1994

THE NEED FOR MORE RESEARCH

Given the scale of these potential differences, the obvious impacts on our understanding of poverty and the implications for policymakers, this is an area that should warrant significant testing and research to ensure that the most appropriate scale is used.

However, in fact, relatively little policy-focussed work has been conducted in this area, particularly in the UK and other countries that have adopted the OECD Modified Scale.

This is surprising given that the authors of the report that developed the OECD modified scale highlighted that the approach is “as arbitrary” as what came before it. In short, while they had developed an approach which gained some level of international consensus, they did not believe that it necessarily reflected the real-life differences in families’ needs any more accurately.

As a result, they argued that more research was needed to develop approaches to equivalisation that would better reflect the differing needs of families. We agree with this conclusion.

Before turning to outline and inform how that work might be taken forward, the next section summarises the approach that existing scales take and how they have been developed.

SECTION THREE: HOW HAVE EXISTING SCALES DEVELOPED?

THE ROLE OF JUDGEMENT IN DETERMINING EQUIVALENCE SCALES

Across the world, different approaches to equivalisation are used to assess the relative levels of needs of different families. Looking across the variety of options that are used, two things are immediately apparent when considering how they have been developed:

1. The majority of scales have drawn upon advanced empirical analysis to try and estimate the relative needs of families of different types and sizes; and
2. None of the scales currently in use are drawn solely from this empirical evidence, instead they use a significant body of expert opinion to accompany or interpret the results.

There are a number of reasons for this. These include that, as highlighted above, it is impossible to objectively identify “needs” for every family, so some form of judgement around social norms and / or generalisations need to be made. These cannot be directly inferred from empirical evidence, and instead require at least some degree of interpretation to transform them into equivalence scales.

Another challenge is that variations in needs are likely to be incredibly complex. To some extent, empirical exercises can attempt to replicate this complexity, but in operationalising this within an equivalence scale there is likely to be a trade-off between complexity and pragmatism / transparency.

Together this means that all equivalence scales in widescale use for poverty analysis in developed countries rely to some extent on expert opinion.ⁱⁱ

In developing the equivalence scale of the USA’s supplemental poverty measure, the authors highlight this very point:

“Although the empirical evidence helps determine the limits of what makes sense, there is no objective procedure for measuring the different needs for different family types. As with the determination of the reference family poverty threshold itself, for which empirical evidence can inform but not prescribe what is fundamentally a social or political judgment, so [it is] with the adjustments for different family types.

Thus, similarly, we have opted for a procedure that, while taking into account the empirical evidence and previous experience, recognizes that the decision is based on judgment and seeks to make the process as transparent as possible”

The exact role that expert opinion can play varies depending on the approach. Some equivalisation scales, having looked at the empirical data, conclude that a simple equation (like the square root of household size) can be used to provide a good approximation of relative needs. On the other end of the spectrum, some scales are lifted directly from empirical analysis, with expert opinion only forming a small part of the analysis, for example to iron out idiosyncrasies in the data, or to make

normative judgements about how many different variations of families type the scales account for. Between these approaches is a middle ground that uses a structural equation to generalise the relationship between the needs of different families, with the parameters of this equation derived from empirical research (e.g. the USA's three-parameter scale).

Under each of these approaches, the development of equivalence scales is a three-stage process:

Stage 1

Develop an empirical strategy to approximate / calibrate the scale of extra resources that larger families need to be able to achieve living standards equal to otherwise equivalent smaller families. This might involve both surveying existing evidence and developing plans for new research.

Stage 2

Where new research is needed: undertake empirical strategy.

Stage 3

Based on the results of the empirical strategy, use a process based on judgement to develop practical equivalence scales.

EMPIRICAL APPROACHES USED TO INFORM THE DEVELOPMENT OF EQUIVALENCE SCALES

As highlighted above, development of equivalence scales frequently draws on evidence from data on the extra resources that larger families need to achieve the same living standards, compared to equivalent smaller families.

A range of research has attempted to provide this evidence using an array of different techniques to convert measurable data into scales that can be used to compare family needs. Broadly speaking, the methods used in the literature fall under one of three broad approaches:

- **Approaches using proxies of living standards:** These methods use econometric / statistical techniques to estimate the relative levels of resources needed by different families to be at an equivalent level of living standards, based on proxy measures of living standards derived from survey data. These proxies might be based on questions about the affordability of certain goods and services, people's perceptions of their living standards or assessments of other items judged to be closely correlated with living standards (e.g. home ownership).
- **Approaches using data on consumption levels:** These use econometric / statistical techniques to evaluate how patterns of consumption vary. Using various assumptions about the living standards drawn from consumption patterns, results are created that can be used to assess the point in the resource distribution where families of different sizes have equivalent levels of consumption, and therefore living standards.
- **Approaches based on 'baskets of goods':** These create a basket of goods for each family depending on their size and composition, where the baskets are proxies for needs. Under the assumption that these baskets yield equivalent standards of living, the baskets can be monetised to understand how resources need to vary to equalise living standards.

The details, history and implications of each of the approaches are detailed below.

APPROACHES BASED ON PROXIES OF LIVING STANDARDS

What is it trying to achieve?

To work out the levels of resources that would make different family types have similar levels of living standards, using proxies of living standards derived from survey data.

How does it do it?

These approaches attempt to calculate the levels of income at which utility is equal across families. Because this cannot be measured directly, proxies such as self-reported ability to afford certain goods and services or satisfaction with income are used, with the assumption that this accurately reflects subjective wellbeing. Equally, anything that is judged to be closely correlated with living standards (for example, measures of home ownership) could be used as a proxy.

This approach is operationalised by calculating, for example, income satisfaction (or the extent of material deprivation, or home ownership) as a function of income, and accounting for the type of household as well as factors such as measurement error and time effects.

The results of this can then be used to identify a set of parameters that define how household income relates to the proxy of living standards in question. These are then used to estimate the relative weight of each item that the scale uses (such as the number of children).

How well does it do it?

The choice of living standard proxy is the defining feature of this approach, but the relative weights used to calculate equivalence are still ultimately determined by the formula that these parameters are fitted to. In this sense, the role of expert opinion is still the key determinant, with the data source being secondary.

That being said, investigations into income satisfaction such as from Biewen and Juasz (2015) found that estimates fitted well regardless of the different combinations of adults and children, indicating that this method may work well in principle. Ultimately however, its weakness is the extent to which it relies on self-reported data.

Direct use in existing equivalence scales

None that we are aware of in national poverty measures. However, work (including that of Scope) has been undertaken to estimate the impact of the extra costs of disability on the income otherwise similar families need to enjoy an equivalent standard of living.

The central concept behind equivalisation is to work out the effective difference in resources needed by different families in order to be equivalently well-off. In the most basic sense this would mean that the equivalence scales would attempt to work out the level at which each family had an equivalent living standard, or level of utility.

Direct welfare measurement is perhaps the most intuitive way that this could be taken forward; if the amount of money required to ensure that families had equivalent levels of utility could be inferred, then equivalisation scales could easily be created from them. However, the central challenge is that quantifying utility is more challenging, and relies on either the use of proxies to measure it, or self-reported data.

This can take the form of asking people about their subjective views on their life satisfaction or income. In the context of satisfaction with income, the assumption used is that this accounts implicitly for the type of household that they live in and its relative level of needs, thereby providing a good measure of utility, whilst controlling for a number of factors that would affect the suitability of other proxies. Accounting for this fact means that the relationship that would exist between income and levels of reported satisfaction with that income can then be used to understand the appropriate equivalence scales that different families would have.

To control for other factors that might affect satisfaction with income, some approaches also control for factors such as disability, or whether someone in the family has recently got married, as well as more general demographic characteristics, and inputs to account for the source of the income, and therefore the relative level of risk associated with it. Levels of utility are then tested against a variety of different potential scales, including those accounting for the differential status of partners in the household (e.g. married or unrelated), as well as components like number of children.

Using this type of approach with German data, one report found that there were higher economies of scale than other methods had previously found.ⁱⁱⁱ This would have implied that larger families should have smaller equivalence scales. The study also found that as the equivalence scale increases in income dependence. For example due to the presence of children, benefits from economies of scale became smaller. Comparatively, when a household was less income dependent, economies of scale grew as income increased.

Overall the results were slightly lower than alternatives that were tested against, such as the Luxembourg or OECD scales.^{iv} This suggested that such an approach was useful in validating and critiquing existing scales and provided a useful set of findings for comparison.

The appeal of this approach is clear; equivalence scales are ultimately attempting to measure the extent to which levels of material income could or should affect levels of utility. Therefore, using this to directly assess and calculate equivalence scales is theoretically very appealing. However, the challenge is that this approach still relies on subjective data to inform what the scales should actually be, as well as judgements as to which factors should or should not be controlled for when evaluating satisfaction data.

There are also real challenges with asking people to rate their own standards of living and using this to make comparisons with others. These include that families' judgements may well refer to their previous experiences or other people they know, or live close to them, rather than the experience of others across society. This means that some people with very low living standards may report that they are comfortable because in the past they have been in an even worse situation, or because they know people whose lives are even harder. Similarly, some people who are well-off in comparison to many others might feel that they are struggling because they used to have a higher standard of living, they know people who are wealthier, or they had expected to have achieved a higher standard of living.

Ultimately, difficulties in measuring utility directly mean that such approaches have not moved beyond the realm of academic usage. This is the reason that alternatives, such as using consumption as a proxy, have appeared, not necessarily because they are viewed as conceptually preferable, but rather that there is a preference for more clearly measurable inputs that can be compared, rather than data that inherently relies on a high degree of participant judgement.

This weakness illustrates the wider challenge of measuring utility directly. As one review of equivalisation factors noted, one possible remedy to this critique would be to use subjective scales such as “the minimum income they deem to be needed to make ends meet,”^v though such approaches have the obvious weakness of relying on individuals to clearly understand the type of income that they have to include.^{vi} Instead, more categorical measures can also be used such as subjective assessments about whether they are doing “alright”, “just about getting by”, or other similar alternatives,^{vii} but these still suffer from similar drawbacks; namely that not all survey participants would necessarily be aligned on how each of these items could or should be defined.

Whilst such approaches have an understandable appeal and can create equivalence scales for academic analysis, they do not yet appear to have become part of official measures of poverty. This partially reflects the difficulty with assessing utility in a comprehensive way, but also the wider lack of updates to equivalence scales. Nonetheless, it does mean that it is difficult to assess the success, or failure, of this approach as, whilst internally coherent, how it would be received as part of an official measure of poverty is yet to be determined.

APPROACHES BASED ON CONSUMPTION LEVELS

What is it trying to achieve?

To identify where in the resources distribution different families can achieve patterns in consumption that make them equally well off.

How does it do it?

Analysing expenditure data in order to identify, for a subset of spending, how it differs between family types. This approach uses assumptions about the utility derived from subsets of spending to understand the levels of resources different families need to buy equivalent baskets of goods (in standard of living terms).

The relative levels of resources can then be compared, and used to generate a set of rules or scales that can be applied to estimate the equivalence scales of each family.

How well does it do it?

Significant empirical literature on this approach, which produces usable values. However, the methods are complex, data in the UK suffers from some quality issues and there is a very healthy debate around the assumptions used and whether the approaches actually identify what they claim to.

This approach was used for some time in the UK to form the McClements scale. However, this was later replaced by alternative scales due to the fact that they allowed better international comparison, and to address some specific perceived weaknesses in how the McClements scale dealt with the needs of certain family types.

Direct use in existing equivalence scales

McClements scale

One proxy that could plausibly be used is consumption, with the theory being that the comparative levels of consumption between different family types offer an illustration of their relative levels of need. Using this type of approach has the advantage that consumption data is more directly measurable than satisfaction or utility data, and that it provides a reasonable proxy of living standards which also implicitly controls for the overall resource constraint that a family has.

An example of using consumption data is the McClement's equivalence scale, which was used in the UK prior to 2004/05 to measure poverty. Drawn from the work of a Department of Health and Social Security analyst of the same name, this approach came from a 1977 paper, which used the Family Expenditure Survey to estimate "equivalent income scales for families with children in the UK."^{viii}

The basic premise underlying such work is that "the addition of a child will reduce the household's standard of living given a fixed money income."^{ix} Using data to analyse relevant economies of scale, the paper then estimated the total equivalence scales across a variety of different commodities, and

used these to estimate the required income scales for families, having identified variation in costs that came from both the number of children and their ages.

More specifically, McClements found that the age of children was the “predominant influence on families’ living standards” and calculated estimated additional costs accordingly.^x Crucially, it evaluated the extra estimated costs for having children across a wide array of different consumption areas, including housing, food, alcohol, clothing, and transport, finding that the only area where economies of scale were obvious was housing.

These findings were key as previous equivalence scales had not distinguished between the age of children, and had also taken a different approach to economies of scale. The equivalence scales calculated by McClements consequently accounted for the former with a differential equivalisation factor for younger children, and the latter finding laid the groundwork for companion AHC scales. In this sense, consumption data provided a valuable guide into the actual costs that families faced, and how equivalence scales should respond to that.

However, challenges still remain. For example, a range of academic literature has challenged the assumptions made in this approach and ones similar to it. There are also questions over the extent to which the approach can adequately address the challenge that consumption patterns and levels are limited by a lack of resources, rather than choices made by families. A specific methodological objection came from Muellbauer,^{xi} who noted that there was a degree of circularity in the reasoning in that the final scales would depend partially on those used in the earlier stages of the methodology.

It should be noted that the original McClements paper acknowledged some weaknesses in the approach, and noted that a number of improvements could be made with better theories, data, and methods.^{xii} Despite some issues such as the smaller weighting given to children appearing to reduce inequality, alternative calculations with other data found similar results to the McClements scale,^{xiii} and the estimates were generally viewed as an improvement on previous methods as they were grounded in empirical research.

APPROACHES BASED ON 'BASKETS OF GOODS'

What is it trying to achieve?

Creating baskets of goods that would provide families of different sizes with the same standard of living and putting a value on these baskets to understand the difference in resources each family needs.

How does it do it?

A range of approaches, from qualitative research to develop consensual budget standards, to using expert views on nutritional needs.

In either case, a composite set of goods is calculated, gauged to a family's size and characteristics in some way. This basket of goods is then converted into a financial sum, which is in turn used as a benchmark for each family type.

Relative equivalence scales can be calculated from this, or thresholds can be set directly by the basket of goods, depending on what standard of living it was calculated for.

How well does it do it?

Well regarded, but there is a challenge over what exactly each of the approaches is actually identifying and whether that relates appropriately to standard measures of poverty. For example, if a basket of goods is being collected to determine the level at which a family would be in destitution then its use may not be appropriate to use for calculating relative living standard expectations for the average family.

There is also an additional implementation challenge in that baskets of goods have to be regularly updated, so a large supporting work and research programme may be required if they are to be used.

Direct use in existing equivalence scales

MIS-derived scale

USA official poverty measure

Instead of using consumption, which suffers from measurement and data issues, as well as the challenge that people may be limiting consumption due to lack of resources, one option is to use a 'basket of goods' approach. Under this approach, a set of goods and services is defined at the 'standard' that is being measured, and then the relative cost of the baskets, determined through primary research, can be used to create relative needs, and therefore implicit equivalence scales.

This approach has the benefit of being incredibly intuitive, and can overcome many of the issues that would otherwise exist with the creation of equivalence scales; for example it does not need to account for the relative level of income of a given set of families, and can also be certain that each basket is accounting for the discrete characteristics of families of a certain size.

One such example is the 'Minimum Income Standard', developed with the support of the Joseph Rowntree Foundation. Under this approach, using study groups to determine the appropriate packages and then costing them, a minimum level of income for families is determined. A secondary goal, but one option, is then the creation of 'benchmarks' for different family types which are "more evidence-based than the assumptions made in equivalence scales."^{xiv}

This was one of the objectives of MIS, and the advantages are clear; it is based on methods that are "transparent and systematic", and which includes "consensus of ordinary people ... supported by expert judgement."^{xv} Whilst this may be the case, despite the Minimum Income Standard becoming an established publication in UK poverty debates, it has not become part of the equivalisation method used in any core poverty measures.

Another approach based on developing baskets of goods is that used in the United States' Official Poverty Measure (OPM). This directly estimates poverty thresholds for different family compositions on the basis of a multiplier of the amount of money required to meet nutritional needs. This is achieved by taking analysis of 1955 data that suggested families spent approximately one third of their after-tax income on food, and combining it with an estimated monetary cost of a designated 'economy' food plan in 1965.^{xvi}

This meant that the effective 'threshold' for each family was three times the cost of the nutritional package, composed of one-third food expenses and two-thirds non-food expenses. Thresholds were therefore dollar amounts that varied between families, by the size of the family and the age of members. Initially these thresholds also varied by farm/nonfarm status, by the sex of the family head, and several other factors. In 1981 these were simplified so that families had one of 48 thresholds.^{xvii} These were set in a base year of 1963 and since updated by the Consumer Price Index.^{xviii}

The implied equivalence scales are therefore the ratios between these different thresholds. This approach illustrates both the benefits of such an approach; namely that it is tied to an extremely tangible set of empirical research, but also the drawbacks; principally the fact that the data quickly becomes outdated and extensive judgement is still required to transform such baskets into the appropriate level at which equivalence scales would be created and compared.

EQUIVALISATION SCALES IN PRACTICE

It is apparent from the summaries above that neither of the most used equivalisation scales (the OECD modified scale, and the square root of household size) are a direct application of the results of either of the three empirical strategies outlined above. Instead, and as highlighted earlier, these scales have been guided by the empirical literature, but also by pragmatism, the perceived need to use one scale to make comparisons across different countries and a range of other considerations.

- **The square root of family size (1974-):** This uses the square root of a family size as the approximation of the equivalence scale for that household. This equivalence scale is calculated by taking the square root of the number of members of a given household, regardless of what their characteristics are.

Under this approach, the addition of another member of the family will have the same impact regardless of the individual's characteristics, with only the number of people changing the scale. As a result, a lone parent with three children will have the same equivalence scale as a couple with two children.

The origins of this approach lie in calculations from 1974^{xix} that found the scale fitted implied equivalence scales created through another method, but had the advantage of being both easy to calculate and transparent.^{xx} The scale is still used in many contemporary settings due to the international comparability, including in some OECD publications,^{xxi} as well as for Eurostat and the Luxembourg Income Study.^{xxii}

- **OECD Modified (1994-):** The OECD Modified scale refers to a 1994 iteration on the previous OECD equivalisation method. This was originally set out in 1982^{xxiii} as a series of scales introduced for analysis, rather than based on a specific set of findings. However, subsequent analysis found that the original scale overstated the relative impact of additional people being added to the household, and an amended version was therefore suggested, which reduced the weighting applied to both additional adults and children.^{xxiv}

The authors of this scale noted that, although close to the average of other scales, the decision over the specifics of the scale was arbitrary – reflecting the extent to which normative decisions played a large role in its formation. Despite this, since its inception the modified OECD scale has been put to general use across the EU after a decision in 1998.^{xxv}

SECTION FOUR: HOW TO BUILD ON THESE FOUNDATIONS

ISSUES TO CONSIDER BEFORE APPROACHING THE DEVELOPMENT OF EQUIVALENCE SCALES

The previous sections have outlined the need to reconsider the use of equivalence scales in the UK and the range of empirical approaches that have previously been used to develop equivalence scales in the past. Before turning to outline proposals for how work to develop a new equivalence scale could be taken forward in the UK, this section both outlines a set of general issues that need to be considered when developing equivalence scales and provides a framework through which equivalence scales for a range of metrics might be developed.

DIFFERENT MEASURES ARE LIKELY TO NEED DIFFERENT SCALES

There is a strong case to argue that different measures of poverty (and inequality more generally) need equalisation scales that are tailored to the specific nature of each measure.

Different measures include and exclude different things

An obvious example is that poverty is regularly measured on both a before (BHC) and after housing costs (AHC) basis. In fact, different equalisation scales already exist for AHC and BHC measures. For example, both the OECD Modified and McClements scales have BHC and AHC versions.

There are two clear reasons why different equivalence scales would be needed here:

1. Housing costs are a large driver of the difference in needs for larger families. This means that when equivalence scales for BHC measures of poverty would need to account for the extent to which the needs of families of different sizes will be determined by the size of property that they require. In contrast, using an AHC version of poverty will reduce the difference in needs that larger families have. If this is not accounted for, the extra needs of housing (which have already been accounted for through an AHC measure) would be double counted. This means that, all else equal, we would expect that AHC measures of poverty would use equalisation scales where the extra needs that an additional family member brings are smaller; and
2. Since housing costs are likely to be one of the most significant areas where economies of scale of larger families might be enjoyed, an AHC measure of housing costs would need to take this into account. This means that, all else equal, we would expect that AHC measures of poverty use equalisation scales that assume economies of scale are smaller when moving from a single adult to a couple household.

The balance and overall impact of these factors is an empirical question, but the general point is that different equalisation scales will be needed when different measures of poverty are used.

Overall, the use of different equivalence scales for BHC and AHC measures sets a precedent for the idea that different measures need different scales, and it is clear that other things might also be considered in the same way. For example, the Social Metrics Commission's measure of poverty that is also "after childcare costs". This means that at least some of the extra needs of families with children have already been accounted for. Again, this would need to be accounted for through the equivalisation scale chosen, or we risk double counting part of the extra needs that families with children have.

Equivalences are likely to vary across the resource distribution

A further consideration is where the focus on equivalence should lie with regards to the resources, or income, distribution. The challenge here is that, if equivalisation is attempting to measure the additional resources that larger households might need in order to achieve the same standard of living as otherwise equivalent smaller families, this might vary across the income distribution. There are a number of reasons for why this might be the case, including assumptions around the diminishing marginal utility of income. It could also be the case that essential goods have high economies of scale, but that non-essential goods have lower economies of scale – or vice-versa. Depending on these relativities, equivalisation scales at different points on the income scale might be very different.

Ultimately, the extent to which this is true will be an empirical question, but should differences be found, the important point is that different measures of poverty or inequality might need to consider equivalence scales at different points in the income distribution. For example:

- Measures that benchmark poverty to a proportion of social norms in society are likely to need to ensure that equivalences are calculated with regards to that social norm (i.e. how do people expect needs to vary at the social norm level of resources);
- "Breadline" measures of poverty may need to consider equivalence scales from the perspective of those around that breadline; and
- Measures of inequality focussed around comparing high- and low-income families (e.g. the 90:10 ratio) may need to consider how equivalences vary right the way across the distribution or use an average.

Again, this issue suggests that a range of equivalisation scales may be needed to reflect the range of circumstances in which equivalisation is used.

SHOULD SCALES BE FIXED OVER TIME AND BETWEEN COUNTRIES?

There are also good reasons to suppose the different equivalence scales may be needed for different countries and at different points in time. On the former, it is apparent that the difference in relative costs of children and adults and the economies of scale present as more people are included within a family might vary country by country. There are many reasons why this might be the case, including differences in public services, benefits in kind and social attitudes towards sharing.

Highlighting these issues, the authors of the report that proposed the OECD Modified Scale raised the question of whether, rather than an equivalence scale fixed across countries, what might be

needed was “a single methodology...applied to estimate equivalence scales which can be different across different countries”.

Equally, relativities between the needs of children and adults and economies of scale might change over time. One obvious example is that how families and others share housing needs might change over time, meaning that assumptions about housing needs for different sized families might also change.^{xxvi} This means that, as well as being relevant for creating equivalence scales that vary between countries, one could easily imagine a similar “single methodology” which could be used to update equivalence scales over time.

HOW TO APPROACH THE DEVELOPMENT OF EQUIVALISATION SCALES

Taking these issues into account suggests that we can build on the three-stage process (highlighted in section 3) that is needed to develop equivalence scales. This is shown below:

- STAGE 1)** Determine the specific nature of what the equivalisation is needed for:
- a. For what sort of measure of poverty / inequality – and what does that mean about where you are trying to estimate the equivalence of living standards?
 - b. For these purposes what does equivalence of living standards mean?
 - c. For what measure of resources – what is included and excluded?
 - d. For which location / geography?
- STAGE 2)** Based on the answers from stage 1 - develop an empirical strategy to approximate the scale of extra resources that families of different sizes and types need to be able to achieve living standards equal to otherwise equivalent families. This might involve both surveying existing evidence and developing plans for new research;
- STAGE 3)** Where new research is needed – undertake the empirical strategy outlined in stage 2;
- STAGE 4)** Use a judgement-based process and the results of the empirical strategy to develop an equivalence scale, managing the trade-off between complexity and pragmatism / transparency; and
- STAGE 5)** Determine whether the approach will need to be updated in future and, if so, develop a strategy for doing so.

We believe that a number of researchers, governments and organisations seeking to measure poverty and inequality in the UK and other countries could use this framework to consider the appropriateness of their current approach to equivalisation and to create new scales. The rest of this section considers the specific case of the Commission’s measure of poverty, which is being used to inform a new Experimental Poverty measure for the UK.

DEVELOPING AN EQUIVALENCE SCALE FOR THE UK'S EXPERIMENTAL POVERTY MEASURE

Based on the above, the Commission is making a set of recommendations for how the appropriateness of the UK's current approach could be assessed and the development of a new equivalisation scale taken forward. This scale would be used as part of the Commission's own measure of poverty and inform that chosen by the Government as it develops its own Experimental Poverty Statistics. The boxes below highlight the Commission's views on how each stage could be taken forward.

Stage 1: A new equivalence scale should be considered for the UK's Experimental Poverty Measure. In developing this, the following should be noted:

- The measure uses a social norm level of needs based at the median of Total Resources Available. It is at this point that the Commission believes an understanding of equivalences between different families is needed;
- Testing should also be undertaken to understand the potential differences in equivalisation scales that might exist at different points below the social norm (for example around the poverty line) and the implications of these for results; and
- The empirical evidence that informs the equivalence scale should take account of the Commission's approach to assets, debt, housing, childcare, and the extra costs of disability and social care.

Stage 2: Given the breadth of the questions needed to be answered to develop an equivalence scale for the UK's Experimental Poverty Measure, the Commission sees the benefit of collecting evidence from a range of approaches. As such, it believes that work should be taken forward across each of the different approaches that have been used to inform the development of equivalence scales in the past. These are approaches based on:

- Proxies of living standards;
- Patterns of consumption; and
- Baskets of goods.

In each area, detailed literature reviews will be needed. These should summarise both contemporary and historic and UK-based and international evidence in these fields. Original research across these three approaches should then seek to explore how resources should be weighted such that different families can achieve the same standards of living, after accounting for:

1. The addition of second and subsequent adults to a family;
2. The addition of first and subsequent children to a family;
3. The overall economies of scale associated with family size;
4. Any differences in needs associated with children of different ages (e.g. baby, pre-school, school aged, adolescent);
5. Any differences in needs associated with adults of different ages (e.g. working-age, pensioner); and
6. Any differences in needs associated with other factors related to family type (e.g. lone parents).

Stage 3: The Commission will work with a range of parties to undertake and coordinate research across the three approaches to developing evidence to inform a new equivalence scale. This work will provide the basis for answering the empirical questions needed.

Stage 4: The Commission will use this evidence to test and develop a range of potential equivalence scales, before recommending a version it feels most appropriate for the UK's new Experimental Poverty Measure. The Commission will publish full details of the results of this work and the reasoning behind its recommendations.

Stage 5: Alongside a recommendation on the most appropriate equivalence scale, the Commission will also make recommendations for whether and how it believes that this will need to be updated in future. This recommendation will be based on consideration of the extent to which equivalences have changed over time, and by balancing the costs of potential future research with the overall impact and benefit for accuracy within the poverty measure.

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