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ABSTRACT *Since 1990 there has been extensive exploration of the meaning of housing affordability by members of the academic, professional and advocacy communities in Britain. These debates have revealed weaknesses in the traditional ratio standard of affordability and led to arguments in support of an alternative, residual income concept of affordability. However, so far there has been only limited success in operationalising and applying the residual income approach in the UK. In the US, by contrast, arguments in support of a residual income approach to housing affordability emerged in the late 1960s and early 1970s, culminating in the formulation of operational standards utilising normative family budgets. This paper draws upon the US experience to formulate a residual income housing affordability standard for the UK that utilises the non-shelter components of the Family Budget Unit (FBU) 'Low Cost but Acceptable' budgets as the normative standard for minimum adequate residual income. The paper concludes by suggesting how use of such a 'shelter' poverty standard to assess housing affordability problems and needs in the UK might yield results that differ from those based on the ratio standard.*

KEY WORDS: Housing affordability, residual income, shelter poverty

Introduction

What is the housing affordability problem? Most fundamentally, the problem is an expression of the subjective social and material experiences of people, constituted as households, in relation to their individual housing situations. However, public policy (and to some extent individual experience) is mediated through normative definitions of housing affordability that transcend individual experience. Such definitions make it possible to arrive at conclusions, potentially contentious to be sure, about the overall extent of affordability problems and their distribution socially and geographically, and they should provide an important foundation stone for the (at least somewhat rational) discussion and formulation of adequate and appropriate policies to address the problem.

In the UK since about 1990 there has been considerable discussion in the research and advocacy communities about the need for greater clarity about the meaning of housing affordability and the relative merits of various conceptual approaches. These debates have revealed weaknesses in the traditional ratio standard of affordability and led to compelling

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arguments in support of an alternative, residual income concept of affordability. However, there has been only limited adoption and practical application of the residual income approach to the assessment of housing affordability problems and needs in Britain. In part this may be attributed to the weight of tradition, familiarity and simplicity of the ratio approach, but it has also been due to challenges in locating a sound basis for operationalising residual income.

Interestingly, in the US arguments in support of a residual income approach to housing affordability emerged much earlier, in the late 1960s and early 1970s. These discussions culminated in the formulation of operational standards utilising normative family budgets and their application to the measurement of affordability problems. Thereafter, interest in a residual income approach diminished until fairly recently, and there is at present rather less awareness of the merits of the residual income approach in the US than in the UK. Nonetheless, over the past three decades some work has continued to compute the extent and distribution of housing affordability problems in the US on a residual income standard in comparison with the ratio standard.

Building upon the theoretical foundations laid in the UK and the practical experience in the US, this paper presents a residual income housing affordability standard for the UK utilising a normative standard for minimum adequate residual income that is independent of the social security system, thereby overcoming a major challenge to operationalising such a standard.

The paper begins with a summary of the UK literature that has provided a critique of the ratio standard of housing affordability and the logic of the residual income approach. This is followed by a brief review of the relevant US literature, with particular attention to the 'shelter poverty' version of the residual income concept. The following section presents the procedure for operationalising the shelter poverty concept for the UK utilising the non-shelter components of the Family Budget Unit (FBU) 'Low Cost but Acceptable' budgets as the normative standard for residual income. The next section summarises the principal features of the model. The final section hypothesises how the results of measuring housing affordability problems in Britain on the shelter poverty standard might compare with those based on the ratio approach.

UK Debates about Housing Affordability Standards

The literature on housing affordability concepts that emerged in the UK since about 1990 seems to fall into three categories (although some studies combine more than one of these): conceptual and theoretical explorations; examination of the implications of various affordability standards for housing benefit formulas and rent setting in social housing; and a very small number of studies of the extent and distribution of housing affordability problems based on one or more of the standards. This review will focus primarily on the first and last of these as most relevant to the subject of this paper.

Bramley, in an unpublished paper (1990), offered a broad definition of affordability that appeared to move in the direction of a residual income approach, but then apparently actually used a ratio in his research (as noted in Hancock, 1993, pp. 129, 133). On the other hand, two reports by Brownill, Sharp, Jones and Merritt, growing out of a Joseph Rowntree Foundation project on housing affordability in London, provided deeper criticism of the ratio approach (Brownill *et al*., 1990; Sharp *et al*., 1990, Chapter 2) and made the logical case for a residual income approach: "It is the amount of money left after

housing costs have been met that is crucial in determining whether the costs of housing are really affordable. . .” (Brownill *et al*., 1990, p. 49). Their work was thus a significant step forward. However, the authors did not then suggest a normative standard for a minimally adequate residual income or a direction for establishing such a standard.

In 1991 two substantial theoretical works on ‘the economic principles of affordability’ came forth. Hancock presented a paper by this title at the Housing Studies Association Conference in 1991, although it did not appear in print until 1993. Whitehead’s paper, ‘From Need to Affordability’, began at a fairly high level of abstraction, concluding that a definition of affordability means “the opportunity cost of housing vis-à-vis other goods and services. . .” (1991, p. 873). The ‘opportunity cost’ language is essentially the logic of residual income. Her subsequent discussion of definitions of affordability standards compared residual income and ratio approaches, suggesting an equity argument against the latter:

> The standard may be defined in terms of the absolute amount of residual income remaining once the housing has been purchased, i.e., it is set at a level which allows the household to pay for the housing and still purchase a socially acceptable bundle of other goods. Alternatively, the standard may be defined in terms of a relative measure specifying the acceptable proportion of income to be spent on housing. This implies an acceptance of the underlying distribution of income and a view that housing should represent no more than a given element within that income. (p. 875)

Hancock’s (1993) paper delved into a more formal theoretical analysis of affordability, arguing (p. 127) “from first economic principles that it is more logical to use some form of residual income definition than one based on a prescribed ratio of housing costs to income”. Her analysis of the residual income and ratio approaches led her to conclude:

> Any statement about affordability has essentially to be a statement about opportunity-cost. If the statement wishes to take a view about the affordability of housing, then it has to specify what opportunity-cost it considers excessive. The value of the foregone goods and services is measured in terms of their total cost, and not in terms of the fraction of consumers’ income absorbed. It therefore makes little sense to define affordability in terms of the ratio of housing costs to incomes if it is believed that opportunity-cost is important. In a ratio definition, it is possible for individuals to be consuming very little of either housing or other goods and for the housing costs still to be considered affordable. . . (p. 133)

She then formulated several operational definitions, and examined the incidence of unaffordability in the Glasgow area, one of the very few such studies in the UK. Two of her definitions were residual income approaches, one using 100 per cent and the other 140 per cent of Income Support as the normative standards (pp. 133–135).

Two papers by Kearns on rental affordability for housing associations and their tenants neatly bracket 1990 and are quite indicative of the shift that was taking place toward the formulation of a sound and operational definition of affordability in the UK (Kearns, 1988, 1992). In his 1988 study he only considered the ratio approach, specifically applying normative standards that housing cost after housing benefit be no more than 20 per cent to 25 per cent of net income (pp. 45 ff.). In his later report, much of the empirical work still

utilised the ratio approach, but in a section called 'Tackling Affordability as Standard of Living Issue', he endorsed the logic of the residual income approach and examined empirically the residual incomes of housing association tenants in Scotland. At least as importantly, he moved the debate forward by recognising the importance of income, not only household type, as part of a realistic affordability standard (1992, p. 540). He also went on to discuss the challenge of setting a normative standard for residual incomes in order to operationalise the approach (pp. 542–543).

In a 1994 paper, Bramley focused in detail on the scope and causes of 'An Affordability Crisis in British Housing', but began with an overview of affordability definitions. He expressed intellectual support for the residual income approach, but concern about its relationship to the definition of poverty:

> It seems to both the author and others that the most coherent normative concept of affordability is one that links normative judgements about housing needs/standards with judgements about minimum income requirements for non-housing consumption. This implies that housing affordability is closely bound up with the definition of a poverty line, and that the key ratios are likely to be expressed in terms of residual income (after housing costs) relative to that line. In general, there is less consensus about poverty line definition than about basic housing standards, and normative need-type statements lose much of their force if they do not reflect consensus... (p. 104)

His caveat may be justified, but is diminished by ambiguity about the type of poverty line definition that is relevant for a residual income approach to affordability. One of the principal reasons why there is less consensus about a poverty line definition is because such definitions usually include housing costs as an essential component. If there were to be a clearer focus on defining a 'poverty' standard for non-shelter items, perhaps there would be greater consensus than about poverty as conventionally conceived.

A 1994 paper by Chaplin *et al*. examined affordability definitions and measures, with particular attention to the ratio and residual income approaches. Although they presented critiques of each approach, they affirmed that the ratio approach cannot stand up to careful scrutiny. Throughout the paper they repeatedly acknowledged the basic logic of the residual income approach, stating, for example: "Affordability... must involve... whether the household has enough income over for the other necessities of life once the housing bills are paid" (p. 6). Their principal concern about the residual income approach was the choice of non-shelter standard, but they offered no new insights or proposals in this regard.

Their paper concluded with a proposal 'Toward a Better Measure of Affordability' that is, in fact, quite flawed (pp. 22–23). They proposed using data on the distribution of incomes and rents to arrive at an empirically based standard for the ratio or residual income standard or both. They suggest using the actual rent or rent/income ratio that is three standard deviations from the mean, in contrast with the usual empirical approach that uses just the mean or, rarely, the median, "so as to ensure that no (only 0.02% of) individual households suffer affordability problems". One major flaw is their unjustified assumption "that incomes and rents are distributed normally about the mean". Furthermore, they then give examples for both the ratio and residual income versions of their approach that assume implausibly small standard deviations in relation to the means. If realistic figures were used, their model probably would reveal that both monetary rents

and rent/income ratios would have to be very close to zero to meet their three standard deviation test for affordability. This would hardly be a useful basis for a normative standard under either a residual income or ratio definition.

The most comprehensive examination of housing affordability was Yip's (1995) DPhil thesis from the University of York, 'Housing Affordability in England', which apparently and unfortunately has not resulted in any published work. In his thesis, Yip explained well the ratio, residual income and behavioural approaches to affordability, carried out extensive empirical analyses of housing expenditure patterns, and computed the incidence of affordability problems in England on various standards using data from the UK Family Expenditure Survey. One of his residual income standards used 140 per cent of the Income Support level (as had Hancock, 1993); the other two were empirically based on average incomes before and after housing costs (Yip, 1995, p. 217). Yip's thesis was an empirical *tour de force*, making use of sophisticated statistical methods to extract as much insight as one could imagine from Family Expenditure Survey data. He did not, however, make any conceptual advances.

Since 1995 the UK literature on affordability concepts has, for the most part, shown familiarity with the debates and cited some of the preceding sources, but been focused on policy issues, particularly rent-setting in social housing and Housing Benefit reform. As far as it has been possible to determine, no further conceptual work has been done. The papers by academics and policy research centres have all acknowledged the conceptual weaknesses of the ratio approach and recognised the logical superiority of residual income, but none has been able to untie the Gordian knot binding the operationalisation of residual income to the existing standards embedded within income support and housing benefit policies (see, for example: Freeman *et al*., 1997, 1999; London Research Centre, 1996; Wilcox, 1999; Wilson & Morgan, 1998). What is needed is a housing affordability standard for the UK based on an independent, normative standard for residual income that is tied to neither the benefit systems nor the existing distribution of incomes.

US Debates about Housing Affordability Standards

In the 1960s and early 1970s, concern with poverty and urban problems in the US included considerable discussion of housing affordability concepts. A number of housing analysts looked at housing affordability in relation to income adequacy and living standards, not merely as a matter of housing costs; and they began questioning the conventional ratio approach to affordability.

Dolbeare appears to have been one of the first to go beyond recognition of the inadequacy of the ratio standard, especially for the poor, and suggest an alternative. In a limited circulation pamphlet, she offered an alternative as part of a proposal for "housing grants for the very poor" (1966):

> The subsidy might cover the difference between the amount the family could afford for shelter after meeting other basic needs and the cost of shelter—the 'residual' approach...
>
> The compelling argument in favor of the residual approach is that it covers, if necessary, the full amount needed for housing, thus assuring that the recipient is able to meet as many... other basic needs—food, clothing, medical care, etc.—as possible. (p. 12)

The non-shelter standard in this residual income approach was an amount equal to the federal Poverty Threshold for a household of a given size, minus an estimated typical shelter cost for low-income households of that size (p. 33).

The issue emerged in the policy arena under the auspices of the US President's Committee on Urban Housing, one of the commissions established in the wake of the urban riots of the mid-1960s. In its 1968 report the Committee concluded that "no flat percentage can be equitable for all. . ." (p. 42). Several of the consultants to the Committee went a little further in conceptualising how a variable standard might be developed, but most then retreated to the simpler, conventional ratio standard (G.E. TEMPO, 1968, p. 15; Robert Gladstone and Associates, 1968, pp. 56–57). One did examine the differential effect of household size on housing affordability, and in doing so utilised the concept of a 'minimum adequate' budget that varies with household size. Not surprisingly, he found that smaller households with incomes at the minimum budget level could obtain and afford shelter at higher rent/income ratios than could larger households (Von Furstenberg, 1968, p. 107).

Over the next few years, some elements of a consensus seemed to be emerging. In 1971 a committee of the US Congress published reports on housing affordability standards that it had requested from a number of experts. Three of the papers argued explicitly and strongly for using a residual income approach to analysis of housing needs and subsidy formulas for federal housing programmes (Frieden, 1971; Lowry, 1971; Newman, 1971). Both Newman and Lowry suggested that US Bureau of Labor Statistics (BLS) standard family budgets should be used to set the standard for non-housing expenses.

In the mid-1970s, a big step forward was taken when two research projects independently operationalised the residual income approach using the non-housing components of the BLS Lower Budgets and applied this standard to estimate the extent of housing affordability problems (Grigsby & Rosenberg, 1975, p. 78, for Baltimore; Stone, 1975, p. 23, for the US as a whole). In his paper, Stone introduced the term 'shelter poverty' to characterise households for whom the squeeze between income and housing cost leaves them unable to meet their non-shelter needs at the BLS Lower Budget standard.

Thereafter, Stone continued to update and apply the shelter poverty standard (1983, 1990, 1993, 2006), but otherwise, until quite recently, there was only limited consideration in the US of the residual income approach to housing affordability. For example, a report growing out of the Experimental Housing Allowance Project Study proposed a residual income affordability standard, but suggested that the non-shelter standard be set at three-quarters of the federal poverty standard, a level considerably lower than the BLS Lower Budget non-shelter level. However, after making the proposal, the author proceeded to use the traditional 25 per cent of income standard in his analysis (Budding, 1980).

In 1989, Leonard *et al*. restated the arguments against the ratio approach and in favour of the residual income logic in an Appendix to a report on the low-income housing crisis that applied the conventional 30 per cent of income standard (1989, pp. 69–72). They operationalised a residual income standard based on the BLS Lower Budget non-housing components, as had been done earlier by Stone and by Grigsby & Rosenberg. Since the BLS budgets were not computed after 1981, Stone's later work, as well as that of Leonard *et al*. updated the non-shelter standard by applying appropriate Consumer Price Index changes to corresponding BLS Lower Budget components.

In recent years, other analysts in the US have expressed tentative recognition of the appropriateness of the residual income approach, as both indicator and standard. For example, Bogdon & Can (1997), in a paper on the measurement of local housing affordability problems, compared various approaches, including the ratio measure and the shelter poverty residual income approach, as well as several others that are actually adaptations of the ratio measure. Ultimately, though, they adopted the ratio measure and its variations for convenience.

Finally, Kutty (2005) has forcefully restated the case for the residual income approach, alluding to the work of Stone and others. Most notably, she has operationalised a residual income standard with the non-housing standard set at two-thirds of the federal poverty threshold and applied it to compute what she calls 'housing induced poverty'. As she acknowledges, her choice of a non-shelter standard is lower than the BLS Lower Budget standard utilised by Stone and other authors.

A Shelter Poverty Scale for the UK

The residual income approach to affordability, including the shelter poverty standard that is the focus of this paper, arises from the recognition that housing costs tend to be inflexible and make the first claim on after-tax income for most households, i.e. that non-housing expenditures are limited by how much income is left after paying for housing. This means that a household is 'shelter poor' if it cannot meet its non-housing needs at some minimum level of adequacy after paying for housing. That is, shelter poverty is a form of poverty that results from the squeeze between incomes and housing costs rather than just limited incomes. On this basis, only if a household would still be unable to meet its non-shelter needs if shelter cost were reduced to *zero* should its condition be regarded as *absolute* poverty rather than *shelter* poverty (the latter situation being Hancock's "minimal definition of affordability" (1993, pp. 129–130)). Even in the latter circumstance, as long as housing costs are in fact not zero and do make the first claim on such a household's meagre income, the depth of their absolute poverty is determined by the squeeze between their income and housing costs.

Operationalising the shelter poverty scale involves use of a conservative, socially defined minimum standard of adequacy for non-shelter necessities, scaled for differences in household size and type. It takes into account the actual cost of a standardised, basic 'market basket' of non-shelter necessities in determining the maximum amount of money households can afford to spend for housing and still have enough left to pay for this basic market basket of non-shelter necessities. Thus, while the logic of shelter poverty has broad validity, a particular shelter poverty scale is not universal; it is socially grounded in space and time.

The practical challenge in translating the shelter poverty concept into an operational affordability scale is how to specify the monetary level of a minimum standard of adequacy for non-shelter items. Although every household has its own unique conditions of life, there do exist historically and socially determined notions of what constitutes a minimum adequate or decent standard of living. They represent norms around which a range of variations can be recognised and about which there certainly may be some philosophical debate. Whilst the experience of 'poverty' is recognised as more than just the inability to secure a socially determined minimum quantity and/or quality of essential goods and services, measurable material deprivation is certainly a central element

in poverty. Furthermore, in societies where most basic goods and services are commodities, it is possible (at least in principle) to determine the monetary cost of achieving such a basic material level.

In the UK there is a long history and continuing interest in quantity-based normative budgets. Alcock (1997) and Funken & Cooper (1995), for example, discuss various definitions of poverty, including quantity-based budgets, in the UK at earlier and more recent times. They also make some mention of the work of the Child Poverty Action Group (CPAG) in this area (Oldfield & Yu, 1993), as well as that of Piachaud (1987). In addition, in a report for Catalyst, Spicker (2002) mentions various poverty concepts, including a brief mention of the market basket approach, with reference to Townsend's early work (1979, 1987) and that of Gordon & Pantazis (1997). These sources, as well as some work by Veit-Wilson (1998) and Gordon & Townsend (2000), have provided interesting background and appropriate caveats about perceiving poverty only in quantitative monetary terms, but for the most part, they have not proven to be directly applicable to the purposes of this paper, as they do not provide any quantity-based budgets. By contrast, the budget standards approach, especially that of Bradshaw and his colleagues in the Family Budget Unit (FBU), is directly relevant (Bradshaw *et al.*, 1987; Bradshaw, 1993; Bradshaw & Sainsbury, 2000).

Methodological Issues

The 'Low Cost Budget', originally computed by Yu (1993), and since refined and updated as the 'Low Cost but Acceptable' (LCA) Budget by Parker and her colleagues at the FBU (Family Budget Unit, 2002a, 2002b, 2004a, 2004b; Parker, 1998; Parker *et al.*, 2001a, 2001b, 2002), provides the ingredients for an appropriate residual income (i.e., non-shelter) standard needed to operationalise the shelter poverty affordability model for the UK.

However, in order to proceed three practical issues have had to be confronted: geography, equivalence scales, and gross vs. net income. First, data from the UK Family Expenditure Survey by geography reveal that there is far more inter-regional variation in average shelter (housing, Council Tax, and fuel) expenditures than in average non-shelter expenditures. Subsequent examination of FBU budgets to ascertain which geographical units have been used in deriving them has revealed that, while actual pricing has been carried out in specific locales, there is only marginal variation in total non-shelter costs, suggesting that it is not necessary to devise shelter poverty scales varying by region.

Second, the standard budgets are available only for a few household types, so that it has been necessary to consider how to scale for different sizes and types. Equivalence scales received attention in Bradshaw's early work (1993, pp. 174–176), and Alcock (1997, pp. 103–104) discussed equivalence scales and some of the UK literature on this issue, so some realistic resolution seemed likely. Indeed, recent research on equivalence scales by the UK Department of Work and Pensions (2002) has provided an essential element for establishing the equivalent monetary magnitudes of the non-shelter standard for household types other than the FBU prototypes.

Third, given the structure and complexity of UK personal taxes and social insurance deductions, it certainly seemed preferable to derive the shelter poverty standard for disposable incomes rather than gross incomes. Following Hancock (1993, p. 137), this is the approach that has been taken here to deriving an operational residual income scale. An important issue

in this regard is whether available and appropriate datasets with housing expenditures by social and geographical characteristics include household net incomes or only gross incomes. Since the UK Family Resources Survey does have relevant data by disposable income, it would be possible to estimate the extent and distribution of shelter poverty in Britain using a residual income affordability standard based on disposable incomes.

Computing a Shelter Poverty Scale

With the preceding methodological issues having been satisfactorily resolved, the following steps have been carried out to operationalise the shelter poverty standard for the UK:

(1) Definition of Shelter Cost (SC)
(2) Definition of Income (I)
(3) Specification of standard for Non-Shelter items (NS) for prototypical household types
(4) Specification of Equivalence Scales for other household types
(5) Computation of Maximum Affordable Shelter Cost as a function of income and household type.

Shelter Cost Definitions

Two shelter cost definitions are used, differing as to whether the costs of household fuel (electricity, gas and/or other heating fuel) are included or not. Logically and experientially it is appropriate to consider household fuel expenses as part of the cost of shelter. Fuels are of course physically essential for a dwelling to be functional, and the systems that actually deliver and utilise fuel are integral parts of a building.

Furthermore, of particular significance for the logic of affordability, fuel expenditures show substantial variation as a result of varying physical characteristics of dwellings and climate, variation that to a considerable degree is beyond the control of residents. Whilst the FBU LCA budgets include standardised amounts for fuel, the costs of household utilities and fuels are not only logically part of shelter costs, but vary so considerably that it is hard to justify including them as part of a relatively fixed normative standard for residual incomes. That is, even if basic normative standards of room temperature and cooking time were established, the amount of fuel required to meet these basic standards would have enormous variation. It is therefore problematical to try to establish a uniform normative standard for fuel expenses, even at a regional or local level (see also London Research Centre, 1996, pp. 10–11, on heating costs in affordability standards). This is quite different from non-shelter items such as food, clothing etc., for which specified material standards can be met through quite precise expenditures.

Thus, it is most appropriate to define shelter poverty to mean that after paying for its shelter costs, including fuel, a household has insufficient resources left to meet its non-shelter needs (excluding fuel) at the specified minimum standard of adequacy. The shelter poverty scale represented in the graphs and tables in this paper is based on this definition. Throughout this section, such a preferred definition of shelter poverty and its associated elements will be designated by the capital letter ‘A’.

Whilst such a definition would be sufficient for purposes of the argument in this paper, it is not sufficient for the analysis of housing affordability utilising available data. The Family

Resources Survey (FRS), which is the largest UK sample survey that obtains detailed data on household characteristics, incomes and housing costs, does not collect information on fuel expenditures. It has therefore seemed appropriate to construct an alternative, weaker shelter poverty scale for which the definition of shelter cost does not include fuel expenses; instead the non-shelter standard includes a specified monetary fuel cost amount. The alternative shelter poverty scale and associated elements are designated by capital letter 'B'.

With these specifications, the precise operational definitions are as follows:

SC-A: Average Shelter Cost per week *After* (i.e. including) payment for household fuel:

for Renters:

Actual rent paid by the household (i.e., net of any Housing Benefit and contributions made by someone outside the household)
plus
Council Tax (net of any Council Tax Benefit)
plus
Water and sewerage charges (unless included in rent), including Council Tax Water Charge in Scotland
plus
Average (over a year) payments for household fuel (electricity, gas or other heating fuel):

for Owner occupiers:

Mortgage interest payment (net of any interest subsidy)
plus
Council Tax (net of any Council Tax Benefit)
plus
Water and sewerage charges, including Council Tax Water Charge in Scotland
plus
Premiums paid on structural insurance
plus
Other charges for owner occupiers (ground rent, fuel duties, service charges, etc.)
plus
Average (over a year) weekly payments for household fuel (electricity, gas or other heating fuel)

SC-B: Shelter Cost *Before* (i.e., excluding) payment for household fuel:
SC-A minus payments for household fuel.

Income Definition

Disposable weekly household income has been defined as follows: cash income from all sources, including all state benefits and tax credits other than Housing Benefit and Council Tax Benefit, net of personal taxes and social insurance contributions.

Note that Housing Benefit and Council Tax Benefit are not part of the definition of income because the definition of 'shelter cost' is net of these benefits. Since Housing Benefit is paid on behalf of an eligible tenant, is not fungible and cannot exceed the amount of the rent, it is logically a housing subsidy not an income supplement (see Hancock, 1993, p. 137). In residual income approaches to affordability, the computed residual income is, of course, exactly the same whether Housing Benefit is added to income or subtracted from housing cost. A household's financial position would be unchanged if these benefits were

to be included in income but not netted from shelter cost. It is just important not to double-count the benefits by both adding them to income and netting from shelter cost.

It is also worth noting that, whilst a household's residual income is the same whether the benefits are included as part of income or netted from shelter cost, the shelter cost to income ratio differs very substantially depending upon how the benefits are treated. That is, in ratio approaches to affordability, the computed ratio is very different depending upon how Housing Benefit is treated, even though a household's objective circumstance clearly is unaffected by how such a computation is carried out.

Non-Shelter Standards

The Family Budget Unit computes 'Low Cost but Acceptable' Budgets for several prototypical household types, as follows:

Non-Elderly Local Authority Tenants with two children 10 and 4 years old:

Couple:
- Two earners (38.5 hrs + 17 hrs)
- One earner (38.5 hrs)
- One earner (17 hrs)

Lone mother:
- One earner (38.5 hrs)
- One earner (17 hrs)

Elderly 65–74 years:

Local Authority Tenants:
- Single woman
- Single man
- Couple

Owner Occupiers with no Mortgage:
- Single woman
- Single man
- Couple

Utilising these LCA budgets, for each prototypical household type, two standards for non-shelter costs (NS-A and NS-B) have been computed corresponding to the two definitions of shelter cost, i.e.:

NS-A: LCA Budget costs *excluding* rent, Council Tax, water and sewerage, house contents insurance, and fuel; i.e. this corresponds to SC-A, where shelter cost *includes* fuel;

NS-B: NS-A plus LCA Budget cost for fuel; i.e. this corresponds to SC-B, where shelter cost *does not include* fuel.

Tables 1 and 2 show the results of this analysis based on FBU LCA budgets for 2004.

For non-elderly households of each type, the differences in the amount needed to meet non-shelter costs at the LCA standard are due entirely to the cost of childcare. The FBU makes very conservative assumptions regarding childcare, so the costs in the budgets are

Table 1. FBU Low Cost but Acceptable Budget estimates UK. April 2004 prices, £ per week, Non-Elderly Households

	Two-Earner Couple with children 10 and 4 years old	Working Lone Parent with children 10 and 4 years old
Food	£64.22	£41.19
Clothing	£22.01	£18.06
Personal care	£4.40	£3.69
Household goods	£16.64	£15.72
Household services	£5.88	£5.60
Leisure	£25.10	£22.64
Transport (no car)	£8.21	£5.71
NHS charges	£3.32	£1.66
Insurance (contents)	£2.11	£2.11
Job-related costs	£66.34	£54.88
of which: childcare[a]	£44.18	£44.18
Pets (one cat)	£3.57	£3.57
Alcohol	£8.86	£4.13
Charitable donations	£0.87	£0.87
Shelter costs:		
Housing, incl. Water and sewerage	£56.54	£56.54
Council Tax	£16.02	£12.01
Fuel (gas + electricity)	£12.92	£12.31
Shelter Cost A (including fuel)	£85.48	£80.86
Shelter Cost B (excluding fuel)	£72.56	£68.55
Total Budget Cost (excl. taxes)	£317.02	£260.69
Non-Shelter Cost A (excluding Fuel)	£231.54	£179.83
Non-Shelter Cost B (including Fuel)	£244.46	£192.14

[a]Assumes paid childcare for 17 hours per week of work; childcare cost if 38.5 hours per week of work: £108.95.
Source: Family Budget Unit (FBU), 2004a.

relatively low for this essential service for working parents (Parker *et al.*, 2001b, p. 13; 2002, p. 24). Nonetheless, childcare costs are a very sizable element in the non-shelter standard and hence have a significant impact on how much working parents can afford for housing.

For elderly households of each type, for each household type the non-shelter standards show only very small differences between local authority tenants and owner occupiers. These differences are due to slight differences in the figures for household goods and for insurance/pension contributions.

Whilst a shelter poverty scale could then be computed as a function of income for each of the FBU prototypical households, this would involve a level of precision and complexity beyond the purpose of this paper. Therefore, just four modal types have been selected as the basis for further exposition, as follows:

Non-Elderly Couple with one full-time earner and one half-time earner (i.e. with half-time childcare);

Table 2. FBU Low Cost but Acceptable Budget estimates UK. April 2004 prices, £ per week, Elderly, Age 65–74

	Local Authority Tenants			Owner Occupiers with No Mortgage		
	Single Woman	Single Man	Couple	Single Woman	Single Man	Couple
Food (including alcohol in the diet)	£23.56	£26.05	£43.34	£23.56	£26.05	£43.34
Clothing	£4.41	£3.85	£8.22	£4.41	£3.85	£8.22
Personal care	£2.93	£2.10	£4.62	£2.93	£2.10	£4.62
Household goods	£8.89	£8.89	£11.23	£10.71	£10.71	£11.80
Household services	£5.66	£5.65	£6.13	£5.66	£5.65	£6.13
Leisure	£13.98	£13.93	£23.77	£13.86	£13.81	£23.77
Transport (no car)	£5.63	£5.63	£11.11	£5.63	£5.63	£11.11
NHS charges	£0.86	£0.86	£1.73	£0.86	£0.86	£1.73
Insurance/Pension contributions	£4.60	£4.60	£8.74	£7.08	£7.08	£11.03
Pets (one cat)	£3.53	£3.53	£3.53	£3.53	£3.53	£3.53
Alcohol	£2.24	£5.67	£7.37	£2.24	£5.67	£7.37
Charitable donations	£1.24	£1.24	£1.24	£1.24	£1.24	£1.24
Shelter Costs:						
Housing, incl. Water and sewerage	£43.63	£43.63	£53.41	£7.65	£7.65	£7.65
Council Tax	£9.90	£9.90	£15.39	£11.55	£11.55	£15.39
Fuel (gas + electricity)	£7.06	£7.06	£10.37	£12.59	£12.59	£13.04
Shelter Cost A (including fuel)	£60.59	£60.59	£79.17	£31.79	£31.79	£36.08
Shelter Cost B (excluding fuel)	£53.53	£53.53	£68.80	£19.20	£19.20	£23.04
Total Budget Cost (excl. taxes)	£138.12	£142.59	£210.20	£113.50	£117.97	£169.97
Non-Shelter Cost A (excluding fuel)	£77.53	£82.00	£131.03	£81.71	£86.18	£133.89
Non-Shelter Cost B (including fuel)	£84.59	£89.06	£141.40	£94.30	£98.77	£146.93

Source: Family Budget Unit (FBU) 2004b. *Low Cost but Acceptable Budget for Pensioners, April 2004*.

Non-Elderly Lone Parent half-time earner (i.e. with half-time childcare);
Elderly Single Woman Local Authority Tenant;
Elderly Couple Owner Occupiers without Mortgage.

Equivalence Scale

The LCA non-shelter cost standards computed for the two modal types of elderly households are then sufficient to compute prototypical shelter poverty scales for elderly one and two-person households. However, for non-elderly it is still necessary to estimate equivalent non-shelter cost standards for households with fewer and more than two children. In order to do so, appropriate equivalence scales must be used, since FBU has not computed budgets for households with other than two children.

As mentioned earlier, the issue of equivalence has received considerable attention by various UK analysts of poverty and income adequacy, including Bradshaw and colleagues, and the Department of Work and Pensions (UK DWP, 2002, Table 2.1, p. 246). Since it is necessary to scale the amount needed to cover non-shelter costs, the After Housing Cost (AHC) equivalence scales are the ones to consider.

Initially it seemed appropriate to use the HBAI (AHC) equivalence scale, as this is the widely used McClement's AHC scale, and there seemed to be no rational basis for selecting any other. However, it then became apparent that the non-shelter standards computed from the LCA budgets for the two types and sizes of non-elderly households contain an implicit partial AHC equivalence scale. It thus should be possible to compare this implicit partial scale with the AHC variants to determine which variant, if any, closely matches. The procedure was as follows:

Let x denote the non-shelter cost or scale factor for a couple with children of ages 10 and 4;
Let y denote the non-shelter cost or scale factor for a lone parent with children of ages 10 and 4;
Let z denote the non-shelter cost or scale factor of a spouse, i.e. $x - y$, the difference between the two costs or scale factors.

It is then possible to compute two ratios, z/x and z/y, for the LCA non-shelter costs and the equivalence scale variants. Carrying out the analysis using LCA total non-shelter costs including childcare yielded no close fit with any of the DWP AHC equivalence scale variants. For each variant, the two ratios were considerably higher than those for the non-shelter budget costs, although Variant 4 was rather closer than any other.

This finding led to the suspicion that the inclusion of childcare costs in the LCA budgets might yield an implicit equivalence scale inconsistent with the assumptions of the DWP variants. Inclusion of childcare costs in the LCA standard makes x and y larger than they would be otherwise, and hence makes the ratios smaller. Following this hunch, childcare costs were subtracted out and the ratios recomputed, resulting in a near perfect match with DWP AHC Variant 4 (0.263 vs. 0.260 for z/x, 0.357 vs. 0.351 for z/y). Variant 4 gives the highest weight to the first adult in a household and thus the smallest to the second adult. This is consistent with the social situation implicit in comparing the two LCA budgets: the incremental difference between the two budgets is equivalent to an established household of one adult with two children adding an adult partner to the household.

The analysis also demonstrates that existing equivalence scales, in whichever variant, do not properly account for childcare costs. The procedure devised for scaling LCA non-shelter costs to other household sizes has thus involved: (a) subtracting childcare costs from the LCA non-shelter standard for the two prototypical households; (b) applying DWP AHC Variant 4 to the results from the preceding step, in order to determine for other household sizes the standard for non-shelter costs without childcare; (c) adding the product of the number of children times the childcare cost per child to the corresponding standard for non-shelter without childcare, to determine the total non-shelter standard for non-prototypical household sizes.

Table 3 presents the results of the analysis, with the total non-shelter cost for the prototypical elderly households included for completeness. Note that the total non-shelter costs for one-adult and two-adult households of the same size differ very little. That is, when childcare costs are taken into account (even at a quite conservative level) the marginal cost of a child is not less than the marginal cost of an adult, in contrast with the prevailing assumptions regarding equivalence scales.

The UK Shelter Poverty Scale

A shelter poverty scale has been computed for a set of prototypical household types: non-elderly two-adult households with zero to three children; non-elderly one-adult households with zero to three children; and elderly singles and couples. All of the non-elderly households are assumed to have employed adults so that the non-shelter standard includes job-related costs, most especially childcare, albeit at a conservative level.

The shelter poverty scale that has been derived for the UK in 2004 is presented in Figures 1 to 6 and Tables 4 to 6. They show the shelter poverty standard for maximum affordable shelter cost as a function of disposable income, in both monetary terms and a percentage of income, for the selected prototypical household types and sizes. They demonstrate quite clearly that there is no single percentage of income, nor even a small set of percentages, that can approximate what households of various types and incomes can realistically afford.

It should be noted that 'shelter cost' as used here means the sum of rent (net of any Housing Benefit) or mortgage payment, plus Council Tax (net of any Council Tax Benefit), plus household utilities and fuels, plus other possible homeowner costs, as explained above. It should also be noted that 'income' means disposable income, i.e. after income tax and social insurance payments, net of direct and indirect income assistance other than Housing Benefit and Council Tax Benefit.

Five principal features stand out in the results, quite apart from the specific numbers. First, for each type of household the maximum affordable shelter cost increases steeply with income, both as a percentage of income and in monetary amount. For example, in 2004 a non-elderly two-adult household with two children and a disposable income of £250 per week could afford only about £18.50 a week, little over 7 per cent of their income, for shelter (including fuel), in order to be able to meet their non-shelter needs at the level represented by the LCA budget for such items. With an income of £300 they could afford about £68.50 (close to 23 per cent of their income), and with an income of £350 they could afford about £118.50 (nearly 34 per cent). An employed non-elderly one-adult household with two children and a disposable income of £200 a week could afford about £20 (10 per cent of their income) a week for shelter; with an income of £250 they

Table 3. FBU Low Cost but Acceptable Budget Estimates UK. 2004 prices, £ per week Non-Elderly and Elderly

Household type	Equivalence factor (1)	Non-Shelter Cost-A (excluding fuel)		Non-Shelter Cost-B (including fuel)	
		Total (3)	Without Childcare (2)	Total (3)	Without Childcare (2)
Elderly:					
Single Woman		£77.53	£77.53	£84.59	£84.59
Couple		£133.89	£133.89	£146.93	£146.93
Non-Elderly:					
Single Person	0.66	£92.30	£92.30	£100.67	£100.67
Lone Parent:					
2 persons, 1 child (<10)	0.81	£135.36	£113.27	£145.64	£123.55
3 persons, 2 children (4 and 10)	0.97	£179.83	£135.65	£192.14	£147.96
4 persons, 3 children (4, 10 and 14)	1.18	£231.29	£165.02	£246.26	£179.99
Couple:					
2 persons, no children	1.00	£143.02	£143.02	£152.88	£152.88
3 persons, 1 child (<10)	1.15	£186.56	£164.47	£197.90	£175.81
4 persons, 2 children (4 and 10)	1.31	£231.53	£187.35	£244.45	£200.27
5 persons, 3 children (4, 10 and 14)	1.52	£283.65	£217.38	£298.64	£232.37

Note 1: For non-elderly, Equivalence Factors are DWP Variant 4 Equivalence Factors. For various households types of given size, from DWP, 2002, HBAI, Table 2.1 (AHC).
Note 2: For each household type and size, Non-Shelter Cost *excluding Childcare* is equal to the LCA Non-Shelter Cost *excluding Childcare* of the prototypical household of that type times the ratio of Equivalence Factors.
Note 3: For each household type with children, *total non-shelter cost* is equal to the Non-Shelter Cost *excluding Childcare* plus the standardised Childcare Cost of £22.09 per child per week.

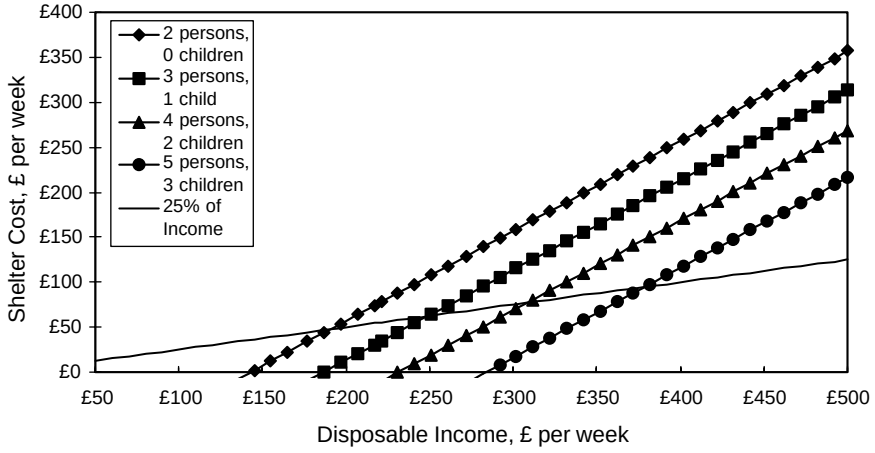

Figure 1. Shelter Poverty Affordability, UK, 2004. Maximum affordable shelter cost, £ per week, Non-Elderly two-adult households, by income level and household size

could afford £70 (28 per cent). An elderly couple with an income of £150 a week could afford about £16 a week (11 per cent of income); with an income of £200 a week they could afford about £66 (33 per cent).

Second, the maximum affordable shelter cost varies substantially with household size: smaller households are able to afford much more in monetary amount and as a percentage of income than larger households with the same income. For example, an employed single parent with a disposable income of £240 a week could afford nearly £105 a week (almost 44 per cent of income) if she has one child, but £60 a week (25 per cent) if she has two children and only £9 (less than 4 per cent) if she has three children.

Third, for each household type and size there is a level of income below which they cannot afford to pay anything for shelter and achieve the FBU LCA standard for non-shelter items. Households below the zero point of affordability would not have enough

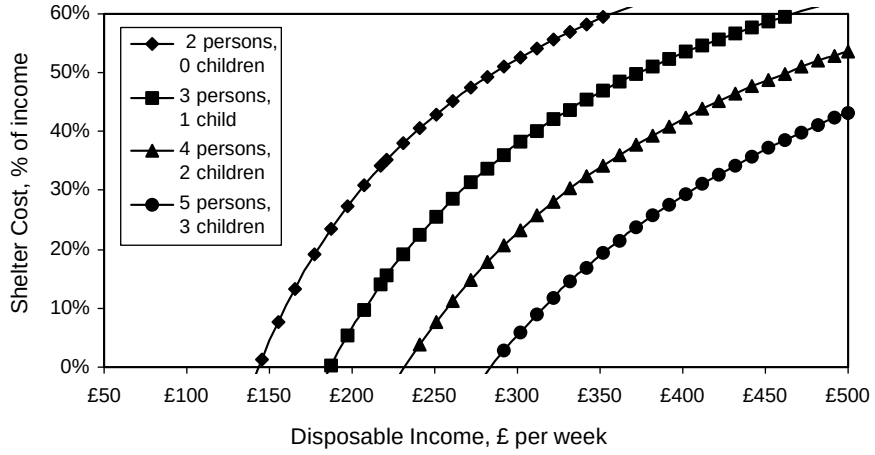

Figure 2. Shelter Poverty Affordability, UK, 2004. Maximum affordable shelter cost, % of income, Non-Elderly two-adult households, by income level and household size

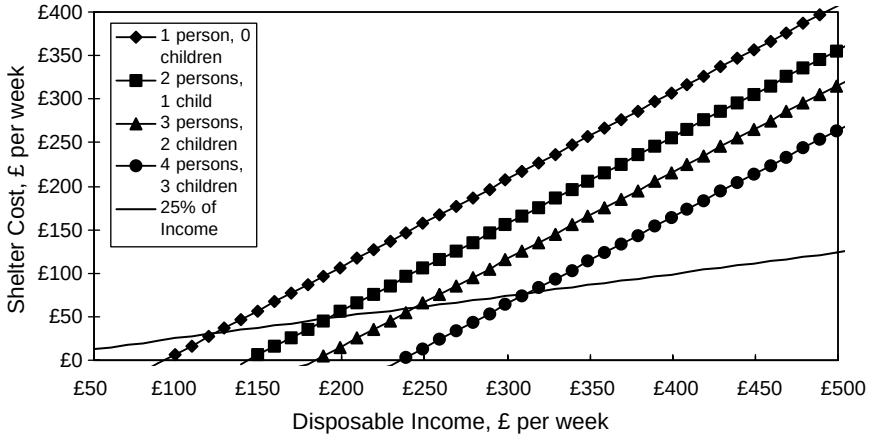

Figure 3. Shelter Poverty Affordability, UK, 2004. Maximum affordable shelter cost, £ per week, Non-Elderly one-adult households, by income level and household size

income to meet their non-shelter needs at the FBU LCA standard even if their housing were free. The zero points of affordability vary by household type, and for each type of household increase most dramatically by household size (see Tables 4–6). For example, a two-adult household with no children could afford nothing for shelter if their income were below £143 a week, but if they have three children they could afford nothing if their income were below £284 a week.

Fourth, there is a level of income above which a household of a given type could afford to pay more than the conventional 25 per cent of income for shelter, or any other arbitrary percentage. Not surprisingly, the minimum income needed to break the conventional affordability barrier is much greater for larger households than smaller (see Tables 4–6). For example, a non-elderly one-adult household with no children would need a weekly

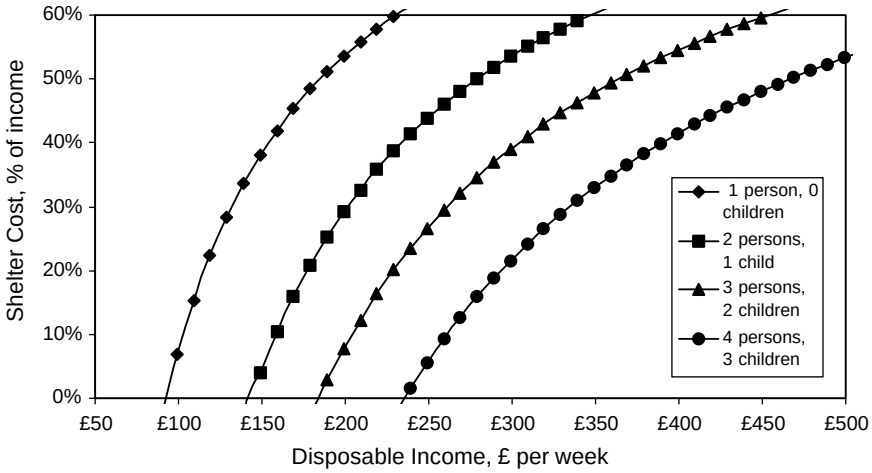

Figure 4. Shelter Poverty Affordability, UK, 2004. Maximum affordable shelter cost, % of income, Non-Elderly one-adult households, by income level and household size

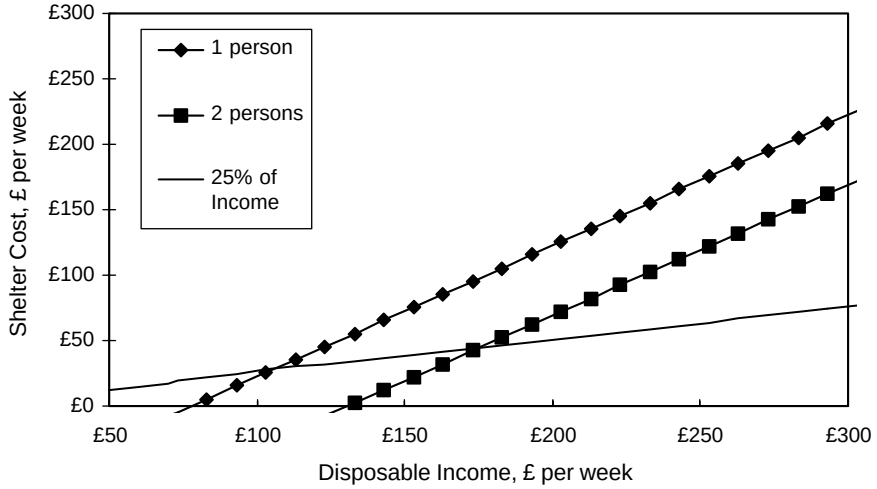

Figure 5. Shelter Poverty Affordability, UK, 2004. Maximum affordable shelter cost, £ per week, Elderly households, by income level and household size

income of at least £123 to be able to afford 25 per cent of income for shelter, but would need at least £189 with one child, at least £240 with two children, and at least £308 a week with three children. To be able to afford 30 per cent of income, such households would need, respectively, an additional £9, £12, £17 and £22 a week of disposable income.

Finally, and not revealed by the graphs and tables, the shelter poverty scale is time dependent. As the costs of the standard market basket of non-shelter items changes with price changes (and over much longer historical spans the market basket itself may change), so will the maximum affordable shelter cost at a given level of income for a household of a given type. That is, the affordability situation of a particular household will change not

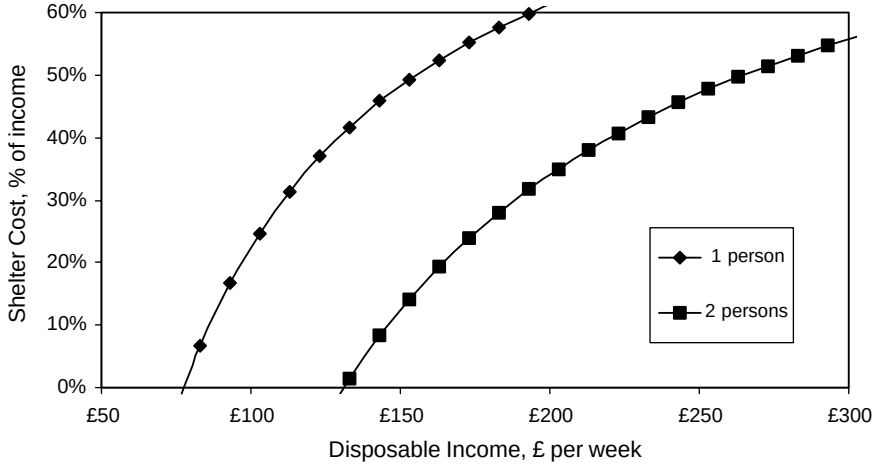

Figure 6. Shelter Poverty Affordability. Maximum affordable shelter cost, % of income, Elderly households, by income level and household size

Table 4. Shelter Poverty Affordability Scale. Minimum Income to Afford Specified Housing Payments. UK 2004, Non-Elderly Two-Adult Households

		Household size					
Housing cost		2-Pers	3-Pers	4-Pers	5-Pers	25% of income	30% of income
	0	£143	£187	£232	£284	0	0
% of income:							
	10%	£158	£208	£257	£316		
	25%	£191	£249	£309	£379		
	30%	£204	£267	£331	£406		
	35%	£220	£287	£356	£437		
	50%	£286	£373	£463			
£ per week:							
	£25	£168	£212	£257	£309	£100	£83
	£50	£193	£237	£282	£334	£200	£167
	£75	£218	£262	£307	£359	£300	£250
	£100	£243	£287	£332	£384	£400	£333
	£125	£268	£312	£357	£409	£500	£417
	£150	£293	£337	£382	£434	£600	£500
	£175	£318	£362	£407	£459	£700	£583
	£200	£343	£387	£432	£484	£800	£667
	£225	£368	£412	£457	£509	£900	£750
	£250	£393	£437	£482		£1000	£833
	£275	£418	£462	£507		£1100	£917
	£300	£443	£487			£1200	£1000
	£325	£468				£1300	£1083
	£350	£493				£1400	£1167

only in response to changes in its income, tax liability and shelter costs, but also in relation to the cost of non-shelter items.

Potential Implications for Assessing Housing Problems and Needs

It is not possible to make any quantitative statements about what the extent and distribution of shelter poverty might be in the UK until it is applied to actual data on household incomes, housing costs and social characteristics. Nonetheless, some plausible qualitative inferences can be drawn from the characteristics of the shelter poverty scale and from US application of a similar scale. Most notably, due to the greater sensitivity of affordability to household size and income on the shelter poverty standard compared with the ratio standard, one would predict that shelter poverty would be rather more extensive and severe among larger and lower income households than affordability problems suggested by the ratio approach; conversely, one would predict that shelter poverty would be somewhat less extensive among smaller and higher income households than affordability based on the ratio standard. Stone's (1990, 1993, 2006) work on shelter poverty in the US reveals that such differences are quite substantial and significant.

What cannot be inferred from the characteristics of the shelter poverty standard itself is how the aggregate incidence of housing affordability problems in the UK would compare on the residual income and ratio approaches. This depends on the particular choice of normative standard for residual income and the distribution of household characteristics in the population. For the US, Stone (1993, 2006) has found that in the aggregate the two

Table 5. Shelter Poverty Affordability Scale. Minimum Income to Afford Specified Housing Payments. UK 2004, Non-Elderly One-Adult Households

		Household size					
Housing cost		1-Pers	2-Pers	3-Pers	4-Pers	25% of income	30% of income
	0	£92	£144	£180	£231	£0	£0
% of income:							
	10%	£103	£158	£200	£257		
	25%	£123	£189	£240	£308		
	30%	£132	£201	£257	£330		
	35%	£142	£216	£277	£356		
	50%	£185	£279	£360	£463		
£ per week:							
	£25	£117	£168	£205	£256	£100	£83
	£50	£142	£193	£230	£281	£200	£167
	£75	£167	£228	£255	£306	£300	£250
	£100	£192	£253	£280	£331	£400	£333
	£125	£217	£268	£305	£356	£500	£417
	£150	£242	£293	£330	£381	£600	£500
	£175	£267	£318	£355	£406	£700	£583
	£200	£292	£343	£380	£431	£800	£667
	£225	£317	£368	£405	£456	£900	£750
	£250	£342	£393	£430	£481	£1000	£833
	£275	£367	£418	£455		£1100	£917
	£300	£392	£453	£480		£1200	£1000
	£325	£417	£468	£505		£1300	£1083
	£350	£442	£493			£1400	£1167

approaches yield quite similar results, although the incidence of shelter poverty is somewhat more sensitive to the business cycle. Kutty's (2005) choice of a residual income standard that is much more conservative than Stone's has yielded considerably lower numbers for what she calls 'housing induced poverty' in the US, but still rather more than the incidence of conventionally defined poverty.

Conclusion

It is striking that explicit affordability standards have arisen only for housing and not for such other necessities as food, clothing, medical care and transportation. It is also interesting that affordability has been defined in terms of a social standard, rather than through each household defining for itself whether it is allocating a reasonable or excessive portion of its income to housing. However, the traditional ratio or percentage-of-income concept is logically unsound and gives a misleading picture of the way in which households experience the squeeze between housing costs and incomes. A more realistic, residual income concept of affordability can be crafted from an understanding of the unique features of housing costs. Such a concept highlights the interaction among incomes, housing costs and the costs of non-shelter necessities, and recognises that true affordability is sensitive to differences in household composition and income.

This paper has shown how the residual income concept can be operationalised utilising the non-housing elements of the Family Budget Unit's Low Cost but Adequate Budgets. On this shelter poverty standard some households can afford less than the traditional

Table 6. Shelter Poverty Affordability Scale. Minimum Income to Afford Specified Housing Payments. UK 2004, Elderly Households

		Household size			
Housing cost		1-Pers	2-Pers	25% of income	30% of income
	0	£78	£131	0	0
% of income:					
	10%	£85	£146		
	25%	£101	£176		
	30%	£111	£188		
	35%	£119	£203		
	50%	£155	£265		
£ per week:					
	£25	£103	£156	£100	£83
	£50	£128	£181	£200	£167
	£75	£153	£216	£300	£250
	£100	£178	£231	£400	£333
	£125	£203	£256	£500	£417
	£150	£228	£281	£600	£500
	£175	£253	£306	£700	£583
	£200	£278	£331	£800	£667
	£225	£303	£356	£900	£750
	£250	£328	£381	£1000	£833
	£275	£353	£406	£1100	£917
	£300	£378	£431	£1200	£1000
	£325	£403	£456	£1300	£1083
	£350	£428	£481	£1400	£1167

25 per cent of income, indeed some can afford nothing for housing, while others can afford more than 25 per cent without hardship. The standard implies that larger and lower income households can afford rather less for housing than is implied by the conventional ratio standard, whilst smaller and higher income households can afford rather more.

Indeed, the ratio approach will continue to have its adherents, if for no other reason than that it is so well established and widely applied to specific policies and practices, such as rent setting, mortgage lending conditions and the design of allowances. Furthermore, some might argue that a theoretical case can be made based on demand theory, bolstered by arguments of horizontal equity (although the same theoretical arguments actually give at least as much credence to the residual income framework). What is to be hoped is that the formulation of an operational residual income standard will enable it to emerge as a practical complement to the ratio paradigm, if not a robust competitor that might eventually become the prevailing approach.

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