‘AFFORDABILITY, POVERTY AND HOUSING NEED: TRIANGULATING MEASURES AND STANDARDS’

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Abstract

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1. Introduction

Over the last 25 years ‘Affordability’ has become a more commonly-used, even ubiquitous, term in housing policy discourse. For example, the massive real terms rise in house prices in many countries between the late 1990s and the late 2000s was widely seen as posing a problem of ‘affordability’, particularly for would-be first-time buyers. It has been argued that ‘affordability’ should an important criterion in planning for new housing provision (Barker 2004). At the same time, it has become increasingly accepted in a number of countries that planned provision of new housing should include a proportion of ‘affordable housing’ alongside market housing. Policies for subsidies and rents in the social rented housing sectors are generally premised on arguments about whether rents will be affordable, in general or for certain groups (e.g. working households). Certain policies/systems appear to directly

address ‘affordability’, as with the Housing Benefit (HB) and Local Housing Allowance (LHA) systems in the UK. Correspondingly, when cutbacks are proposed in these schemes it is argued that this could have very sensitive adverse consequences for certain groups and areas. Problems with the affordability of mortgages for homeowners may lead to crises in both mortgage markets and housing markets (as in the. UK c.1991 and the USA c. 2006-07) accompanied by spiking levels of repossessions, negative equity, and bank losses (which themselves may threaten the stability of the banking system). Reviews of regulation responding to such crises inevitably focus attention on the industry norms for assessing potential loans in terms of their ‘affordability’ (FSA 2010).

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These examples suggest that affordability is invoked in wide variety of contexts with different meanings and connotations. Bramley (1994, 2006, also echoing Linneman & Megbolugbe 1992) suggested that different policy uses of the term were really focusing on different levels of problem affecting different groups in different circumstances. Other authors have drawn distinctions between problems of access (typically to home-ownership), problems of the general burden of housing payments, and problems of 'housing-induced poverty' (Thalman 2003, Kutty 2005, Chen et al 2010).

There has been a long-running but not wholly resolved debate between different approaches to measuring affordability and setting standards or norms: 'affordability ratios' (housing cost to income) versus 'residual income' alias 'shelter poverty' (income left after housing costs, relative to a poverty standard for non-housing consumption) (see Grigsby & Rosenburg 1975, Hancock 1993, Bramley 1990, 1994 and 2006, Chaplin & Freeman 999, Yip & Lau 2002, Stone 2006a and b). This unresolved theoretical debate is compounded by a surprising lack of consensus (across time periods, countries, or sectors) on what the right normative ratio standards are, whichever approach is in use. Within recent literature one can see references to affordability ratio norms varying between 25% and 50% of income (Chen et al 2010, Kearns 1992, Stone 2006b), and of residual income poverty standards from well below to well above official (social security-based) poverty lines (Stone 2006a & b).

It is particularly apparent in the residual income approach that affordability is rooted in normative standards, for housing and non-housing consumption. There is a firm basis for housing standards, using in the UK context quality standards such as 'Decent Homes' (CLG 2006) combined with the size requirements implicit in normal social housing 'fitting standards' (e.g. the 'bedroom standard'). The standards for non-housing consumption are more open to debate. Earlier US work using the 'shelter poverty' approach tended to use very conservative absolute poverty standards (Armenoff 1998, Kutty 2005). Stone (2006b) proposed that for the UK use should be made of Bradshaw's budget standards approach (Bradshaw 1993, Family Budget Unit 2002), which estimates a 'modest but adequate' budget for target households. However, these levels are significantly above minimum incomes guaranteed by the social security benefits system. There is a stronger UK tradition in poverty research, generally attributed to Townsend (1979), which argues for a relative equivalent income standard on the basis that this is necessary to ensure participation in the normal life of the community. The central targets used in current UK policy and legislation relating to child poverty are of this form (60% of median equivalised income). A further influential strand in UK and European poverty research has been to identify consensus-based criteria of material deprivation and to define as poor households which lack several of these goods (Gordon & Pantazis 1997, Pantazis et al 2006). These authors argue that the combination of low income and material

deprivations provides the best discriminator poverty and further European evidence supporting this may be found in Guio (2010; see also Brewer et al 2009, Atkinson & Marlier 2010, Giuo 2010).

There is less apparent emphasis in this literature on subjective measures of self-reported affordability problems, even though a growing range of surveys collect evidence of this kind.

The main aims of this paper, , are to

1. establish the validity of key measures used, including both ratio measures and 'subjective' measures

2. demonstrate the extent to which affordability problems actually lead to adverse housing need outcomes or material hardship outcomes

3. highlight the main problem areas for affordability in England, and

4. identify the main drivers of affordability problems

The focus of this empirical investigation is the UK (specifically, England). The general principles and some lessons may be transferable, and some reference is made to literature on affordability measurement in a number of different countries. The main data source for detailed investigation is the British Household Panel Survey (BHPS), using data over seven years (1997-2003).

The paper proceeds by introducing the data (s.2), and then assessing 'validity' primarily by relating self-reported payment problems to the ratio measures, and secondly by relating wider self-reported material hardship/deprivation indicators to the ratio and self-reported payment indicators, singly or in combination (s.3). 'Outcomes' associated with unaffordability are addressed in s.4, partly through the relationship with these wider material deprivations, and partly through evidence on relationships with other housing need problems and transitions. A descriptive profile is presented in s.5 on where within the English housing system, in terms of household type, tenure and region, affordability problems are most pronounced. This is complemented in s.6 by a multivariate modelling analysis which highlights the key drivers.. Section 7 reviews conclusions.

2. Empirical Data

The primary dataset used to develop an empirical approach to validation of affordability measures, the exploration of outcomes of affordability problems, and the mapping of their incidence, is the British Household Panel Survey (BHPS). A version of this dataset covering seven pairs of annual waves between 1997 and 2003 was compiled for research on housing needs and housing tenure flows in England. The key advantages of this dataset are that (a) it enables the construction of both types of affordability ratio measures, (b) it contains subjective or self-reported indicators of housing payment problems, (c) it also contains wider indicators of material hardship, (d) it also enables a number of housing need and housing transition outcomes to be identified for the same households, (e) it is longitudinal and therefore enables persistence of problems to be established, while (f) through including both individual

and area-based measures of a suitable range of causal factors, it enables modelling of the drivers of affordability problems to be undertaken. The limitations of the dataset include its relatively modest sample size (c. 5000 households in each wave), sample attrition which may affect lower income/deprived households disproportionately, and some limitations in the measurement of Housing Benefit, housing costs and incomes. For the purposes of the analysis reported here the data for up to seven successive pairs of waves are pooled, so that in effect we have a set of repeat observations on the same set of households.

Housing costs (primarily rent and mortgage payment) are recorded gross, before any deduction of HB/LHA. Both household and individual income are recorded, but this study uses household income, which is also recorded gross, that is before deduction of tax or national insurance contributions. Incomes include income from all sources, including state benefits and that includes Housing Benefit/Allowance. There is varying practice in different studies over whether affordability ratios are measured net or gross, and this does have an effect on the resulting values (Stone 2006b); in this instance we primarily use a gross basis because of the form of data available, official guidance (CLG 2007) and because these seem to work better. However, to obtain residual income it is necessary to estimate tax and national insurance deductions and derive an estimate of net income; this involves some approximation and assumptions about the number of personal or other tax allowances available. The dataset includes an equivalisation scale value (modified OECD Scale) for calculating after housing costs poverty (as shown in col.1 of Table 1), and this is combined with the Income Support/Housing Benefit scale rate for a couple household (equivalisation factor of 1.0) to give an absolute financial value to this (at 2006 prices). The ratio between estimated residual income and this 'standard' level of minimum income then provides the second ratio measure. Absolute values of all financial variables are adjusted to a 2006 price base using the UK GDP deflator.

BHPS has questions specifically on housing payment difficulties in the recent period, and wider questions about material standards of living, as discussed further in the next section.

The Survey data contain the usual range of household demographics (household type, number of adults, children, age and gender of HRP, employment status and recent history, ethnicity, migrancy) and information about the housing unit (tenure, dwelling type and size in rooms). These information are compiled for successive pairs of waves so we can also identify transitions in individual or household status in the preceding annual time period.

Additional data relating to the local market area context have been attached to the dataset for this study. These include measures of house prices, social and private sector rents, housing vacancies and supply (stock and flow) by tenure, as well as key labour market indicators (unemployment, average incomes and income poverty rates). These area measures are compiled for either Local Authority Districts or groupings of Districts, and are attached at the level of 'SAR' Local Authorities (larger individual authorities or groups of contiguous districts with smaller populations N=237).

3. The Validity of Ratio and Subjective Measures

The first key objective is to attempt to validate the preferred affordability measures. This is undertaken in two steps. The first step is to look at the subjective/self-reported housing payment problem indicators and to establish how strongly these are related to (predicted by) the ratio measures. Within this step, we explore the specific issue of thresholds in the ratio measures (much debated in the past literature) and how these may best be combined. The second step is to take the combination of objective ratios and subjective payment problems and see how far these appear to be valid on the basis of their relationship with wider measures of material hardship. These wider measures are independent and themselves have been validated in previous research on poverty, particularly work based on the consensual approach exemplified by Gordon et al (1997) and Pantazis et al (2006).

BHPS asks a specific question about housing payment difficulties.

> H37. Many people these days are finding it difficult to keep up with their housing payments. In the last twelve months would you say you have had any difficulties paying for your accommodation?

If the household respondent answers positively to this question, they are asked follow-up questions about whether they had to borrow money, or cut back on other household spending in order to make the payments; and also whether they have ever been more than two months behind with rent/mortgage within the last 12 months. We thus have one main indicator and three supplementary indicators of 'self-reported housing payment poblems', with the supplementary indicators being capable of being used in combination to give gradations of severity. These problems are coded at three levels: (1) any difficulty; (2) at least one specific problem; (3) two or more specific problems. It is argued that this question has good 'face validity' as a measure of the phenomenon we are concerned about. We can also track the persistence of problems by identifying households reporting such problems in successive years.

As mentioned in the s.1, there remains disagreement about the critical threshold level for either or both of the commonly-used ratio measures. This exercise therefore has involved testing of different thresholds, individually or in combination, to see which give a best match to the self-reported payment problems measures. This also entails testing of hybrid ratio measures, (a) giving different values to different household types, and (b) allowing higher ratios for higher income levels, both approaches which would find some support in the published literature. Further tests were conducted using net cost to net income ratios but these did not perform better than the gross ratios.

In examining the relationships between ratio measures and self-reported payment problems we are simultaneously both assessing the validity of the ratios and seeking the best thresholds, or combinations of thresholds, which discriminate between households who report significant payment problems and those who do not. Both bivariate descriptive tabular analyses and multivariate regression and logistic regression models have been used for this purpose, as summarised in Tables 2 and 3 respectively.

Table 1 shows in the first block of columns the percentage of all households reporting payment problems at the three levels (1)-(3), overall and for households exceeding different affordability thresholds based on ratios. So for example, 5.1% of all

households reported some payment difficulty (level (1)), while for households with affordability ratios above 25% this was 14.1%. Most of the households reporting any difficulty (4.3% within the 5.1%) cited one of the specific manifestations (i.e. level (2)); fewer cited two or more (1.5%). Running one's eye down this block of columns, it does not appear to make a massive difference which of the affordability thresholds is used, in that the overall incidence of payment problems seems quite similar (around 14-16%).

[TABLE 1 ABOUT HERE]

However, this conceals a more interesting finding, which is more apparent from the second block of columns. This shows the ratio between the percent citing problems among those above the ratio threshold and the percent with problems among those below the threshold. This gives a better impression of the ability of the indicator to discriminate. These ratios are highest for the traditional affordability ratio with its threshold at the lowest level (25%). Next highest comes the combination of the two ratios in 'either/or' mode with both set at their lowest (most generous) level. Third best tend to be the affordability ratios adjusted for either household composition or income ratio. Next are the combined either/or ratios at their intermediate thresholds.

What the data seem to be saying is that there is a big upward hike in payment problems associated with having moderately adverse affordability and/or residual income ratios, based on rather generous thresholds; but that the expected intensification of payment problems with more extreme levels of these ratios does not materialise. These conclusions broadly apply across the three different levels of payment problem.

The other not wholly expected finding is that the highest problem ratios (best discrimination) are associated with the traditional affordability ratio, rather than the residual income ratio. Thus, while the bulk of the academic literature which has argued from first principles has tended to favour residual income, this validation test seems to say that the traditional affordability ratio is better aligned with people's reported payment problems.

The regression and logistic regression tests broadly support these conclusions. The procedures followed included (1) turning the three-level payment problem indicators into a score and running a stepwise OLS regression on the bundle of ratio-based indicator dummies plus a range of control variables; (2) running logistic regression on the two types of indicators separately at different threshold levels, and weeding out those with insignificant or negative coefficients; (3) running logistic regressions with combined (either/or and both/and versions) affordability indicators at different thresehold levels; (4) testing remaining combinations with control variables as well.

The 'best' parsimonious models emerging from this procedure (shown in Table 3) predict payment problems on the basis of two ratio threshold indicators – having an affordability ratio over 25% (dmodar) and having a residual income of less than 140% of the Income Support minimum standard (dmodrir). The coefficient on the former variable is two- to three times larger than that on the latter and the statistical significance is much greater. In some instances, when control variables are included, the second variable becomes non-significant. The model can also be expressed through two composite variables: having *either* an affordability ratio above 25% or a

residual income ratio below 140% (daffprob0) or having *both* of these conditions (daffprob0b), with again the former variable having a larger and more significant coefficient. It may be noted that the residual income variable has a slightly stronger effect in the model for level 3 payment problems.

[TABLE 2 ABOUT HERE]

We can speculate a little about the possible reasons for the poorer performance of the Residual Income ratio measures, and of the limited tendency for payment problems to rise as this falls to low levels. As with official poverty measures, there are some doubts about whether all the households recorded with very low residual incomes in a particular year are really poor, for a variety of reasons including incomplete income data, household assets, and transitional situations affecting particular groups like the self-employed (Brewer et al 2009). In addition, in a British housing context it is important to recognise that many of these households will be on full Housing Benefit (HB), and this effectively neutralises the affordability issue defined narrowly in terms of difficulties with *housing* payments.

To conclude on the first step of the validation process, it has been shown that ratio measures, particularly the traditional affordability ratio at a moderate threshold (25% in gross terms), predict self-reported payment problems quite well. On the basis of this evidence one is still justified in using such ratios as rule-of-thumb tools for policy, at least as indicators of heightened risk of problems. Clearly, at the same time these ratios do not fully predict problems, in the sense that only a minority of households with adverse ratios report difficulties, and some with acceptable ratios still report difficulties. The regressions with control factors indicate that many other individual factors play a part and considerable individual variance remains unexplained. The fact that the two approaches do not fully match suggests that the emerging preferred approach should be to combine the ratio and self-reported measures into composite indicators for further analysis, at least when using survey datasets where both types of measure are available..

The second step towards validation is to take these composite indicators and see how they relate to independent measures of material hardship for households in the BHPS sample. The most useful measures are a set of six items derived from UK poverty research including Townsend (1979) and the Millenium Poverty (PSE) Survey studies (Pantazis et al 2006), similar to measures now being used in the UK Family Resources Survey and the European Indicators of Living Conditions (EU-SILC) (Atkinson & Marlier, Ch.6). Households are asked to indicate which of the following items are things they would like to have or do but cannot afford: (a) keep home adequately warm; (b) a week's annual holiday away from home; (c) replace worn furniture; (d) buy new, rather than second hand, clothes (e) eat meat, chicken or fish at least every second day; (f) have friends or family for a drink or meal at least once a month. One can compute a score for the number of such items identified; inspection of the data suggests that a reasonable threshold for material hardship would be a score of two or more from this list, which affects 14.3% of households in the sample (see also Fahmy et al 2009, Table 2.2).

Table 3 shows the incidence of material hardship at this 'two or more' threshold level for households with and without housing affordability problems, as indicated firstly by ratio measures, secondly by self-reported payment difficulties, and thirdly by

composite indicators based on both ratios and self-reporting, at three levels. Broadly the table confirms the expectation that material hardships are much more common for households experiencing housing affordability problems. Such a level of hardship is more than three times more likely for households with adverse ratios than for those with acceptable ratios; between 4.4 and 4.7 times more likely for those reporting housing payment difficulties; and similarly higher (4.3 to 4.9 times) for those with composite housing affordability indications at three levels. On the basis of this evidence, it is argued that this approach to affordability measurement, particularly using self-reported measures or the composites, is further validated by independent criteria relating to material hardship.

[TABLE 3 ABOUT HERE]

4. Affordability Problems and Adverse Outcomes

A further important step in the argument is to consider the consequences of affordability problems, by asking what happens if the burden of housing costs is excessive. Clearly, a number of possibilities arise:

- the household may move and trade to an acceptable position (more likely if income is higher)
- the household may 'choose' to infringe the residual income poverty standard (but thereby risking significant material hardship, with possible adverse effects on other social outcomes such as health)
- the household may 'choose' to infringe the housing standard (i.e. to be in 'housing need')
- the household may hope that the situation is only temporary, and run down savings or run up debt levels (risking potential future problems of over-indebtedness, and possible 'financial exclusion')
- the household may miss payments on rent or mortgage and risk loss of home through eviction or repossession (so triggering more extreme housing need, including homelessness, as well as impairing their credit rating)
- the household may apply for social housing or some other form of subsidy (probably at the same time as following one of the above courses of action, pending actually gaining access to subsidised housing)
- the household may dissolve, going to live with others (itself a need, on some definitions, or contributing to other needs)

Which options are followed, and how far they have adverse consequences, is much affected by whether the situation of 'unaffordability' is expected to be temporary or transitional, rather than permanent or of indefinite duration.

This range of potential consequences of affordability problems underlines the point that there is not necessarily a single outcome or pathway, that outcomes may reflect choices, and also that affordability problems may be either temporary/transitional or

more persistent. We now go on to review evidence on some of these consequences, primarily drawing on evidence from within the BHPS dataset.

The preceding analysis relied upon 'snapshot' measures of affordability problems at a point in time. Yet we have already noted the point that transitional problems may be less of a concern than persistent problems. We can measure persistence in relation to both of the components of the composite measures, ratios and self-reported housing payment difficulties. It is clear from these data that there is quite a lot of 'churn' in individual affordability problems, with only a minority of households displaying the same problem in successive years. Looking at the basic ratio measures the proportions are 60% for the either AR>25%/or RIR<140% indicator, 42% for the indicator of having both these problems at this level, and 36% for having both problems at the higher level of AR>35%/RIR<120%. For the self-reported payment difficulties, persistence is somewhat less, with 37% at the first level, 35% at the second level, and 26% at the third level. For the composite indicators, persistence at the same level is unsurprisingly rather lower, 27%, 20% and 12% at the three key levels.

The fact that most affordability problems (and particularly the more severe or dual-criterion problems) are apparently transitional goes a considerable way to explaining why there is not a complete match between the different measures, or between the affordability measures and wider consequences such as material hardship, problem debt or housing needs. However, the point should not be overstated or used to argue that affordability problems are unimportant. In some cases the problems may be recurrent over a run of years. The measures people take to get out of these difficulties may be themselves problematic, giving rise to other forms of housing need or social problems (e.g. forced moves creating other problems with education, jobs or health). And because snapshot affordability problems are quite common, then if only a proportion of them lead to adverse outcomes then these may still be of considerable concern.

If affordability problems are not purely transitional, then they will tend to lead to material hardship, unless people have other resources (e.g. savings/assets, family support) to draw on, or some change of housing circumstances. We have already presented evidence in Table 3 on the strong relationship between current affordability problems and material hardship indicators. There is a continuing relationship between affordability problems in a previous year and current material hardship, although this is slightly less strong (with roughly three-and-a-half times the rate of hardship, compared with four-and-a-half times for the contemporaneous affordability link). We can also somewhat widen the range of indicators of material hardship within the BHPS data. For example, households with a current affordability problem (based on our middle level composite measure) are five times more likely to find hire purchase repayments a heavy burden, four times more likely to spend more than 40% of their net weekly income on food, and 1.7 times more likely to have no car. They are also slightly more likely to say that they have not bought any of a list of consumer durables over the last year (see Fahmy et al 2009 and Brewer et al 2009 for discussion of the role of wider measures such as these in the context of poverty).

We can get further insight into the role of housing affordability in contributing to material hardship by using a logistic regression model to help explain variations in this key indicator, incorporating a range of individual socio-demographic factors, individual change factors, and area-based market and access factors. Table 4 shows

the resulting model retaining all significant variables tested. Two affordability measures are included: our first level composite measure, and the indicator of persistent payment difficulties (experiencing level 2 payment difficulties in two successive years). Both of these are highly significant. The first indicator increases the log-odds of material hardship by 3.25 times, while the second indicator raises the log-odds by 4.14 times. Other variables contributing very significantly to the explanation include wealth (savings and investments and housing equity, which reduces hardship), being a social renter, being a lone parent household, being sick or disabled, and having more children. More modest effects are associated with living in a generally low income area, unemployment (individual), being a single person household or a student. Having higher qualifications or being a mover household slightly reduce hardship.

[TABLE 4 ABOUT HERE]

Households with affordability problems may be expected in some cases to respond by changing their housing situation, or by experiencing some level of housing need. One can use the BHPS data to examine some aspects of such housing changes or transitions, and some types of housing need, to see whether there is a heightened probability of such changes in households which experienced affordability problems in the recent past. This is tested in a limited way by using lagged versions of the composite affordability measures, and looking at the ratio between the incidence of these transitions or needs for households with the affordability problem and that for other households. Table 5 presents the results of this exercise, using four levels of previous year affordability problems. With this particular dataset we can look at four housing transitions of interest – moving, migrating, reconstituting the household, and moving to the social rented sector - and one specific need category (overcrowding). The last of the four transitions (move to SRS) may itself be taken as indicative of a level of need recognised in social housing allocation systems.

In general the results in Table 6 confirm the hypothesis that these housing changes and need situations are positively associated with previous housing affordability problems. The evidence is least clear for reconstitution of households, which is only more likely with the level (3) affordability problem level, which itself is relatively rare (shown by the small number of cases). Otherwise, we do find heightened incidence of these changes and needs. For example, those with affordability problems at the first level are 1.4 times more likely than other households to move home, and this rises to 2,25 times at the highest affordability problem level. Migration between areas is also more likely, with ratios ranging between 1.57 and 3.30. Movement into the social rented sector is twice as likely or more in affordability cases at levels (1) and (2), with somewhat lower ratio in the case of level (3), where the sample is quite small (moving to social renting is relatively infrequent at 1.1% of the whole sample). Overcrowding, a widely-accepted criterion of need, is between 1.6 and 2.7 times more likely for households experiencing affordability problems at levels (1) to (3); for level (4) the ratio is lower but the sample is very small.

[TABLE 5 ABOUT HERE]

These indicative findings on the association of household transitions and housing needs with affordability problems are in line with expectations. However, they do not cover all of the types of housing need which might be considered policy relevant. We

can refer, though, at this point to evidence reported in Bramley et al (2010) from an official national study which developed predictive models for a range of specific needs. This generally found positive associations between a range of needs (concealed and sharing households, overcrowding, homelessness and unsuitability problems) and affordability ratio measures and/or component measures of rents and house prices as well as incomes (negative relationships in this case).

5. Where are the Main Affordability Problems?

Having developed and validated composite housing affordability indicators and presented evidence on their association with material hardships, housing needs and changes of circumstance, we are now in a position to map out the actual patterns of these problems in England over the period 1997-2003, based on the same BHPS dataset. Table 6 presents a summary using four composite indicators reflecting different levels of problem. This table breaks incidence down in four ways: by tenure, geographical region, household age-type composition and year of survey.

There is a clear 'pecking order' of tenures in terms of affordability problems, whichever level of measure is used. Private renting has the highest incidence of problems, and owner occupation the lowest, with social renting occupying an intermediate position. Private renting is characterized by relatively high market rents and a lack of long term security of tenure, and its tenants tend to be younger; the analysis by household age-type shows generally higher problems for the under-30 age group, so there is an interaction here. This tenure is expanding and governments are placing greater reliance upon it to meet housing needs, but this affordability evidence suggests that this may be a risky strategy. That social renting has significant problems is of concern, suggesting that this tenure is not always 'the solution' for its predominantly low income population. Owner occupiers are much less likely to face problems, and this reflects that fact that many older owners are outright owners without mortgages, while those with mortgages tend to be on higher incomes with more wealth and assets. Also, their housing costs tend to be fixed at the time of purchase, and limited by mortgage lending affordability criteria, and thereafter to fall in real terms and relative to incomes.

The variation across regions is less than that between tenures or household age-types. There is some polarisation with relatively greater problems in both the South East and London, at one end of the scale, and also in the North East and Yorkshire-Humber. The former cases have higher incomes but markedly higher housing costs, whereas the latter cases have lower incomes. Affordability problems are least marked in the North West, East Midlands and East of England, and this is mainly driven by lower housing prices and rents.

The household age-type analysis shows that there is a particularly high incidence for lone parent families, who tend to be on very low incomes. Otherwise, couple households tend to have a low incidence of problems, couple families slightly higher, and single person households quite a bit higher incidence. Singles obviously only have access to one income yet their housing costs are not necessarily markedly lower than other groups. There is also a tendency, for most groups, for problems to be more common among younger households (under-30s). This reflects their lower incomes earlier in their work careers and limited asset accumulation, and also their greater reliance on the private rented sector.

While there is some fluctuation from year to year within this sample, the general trend over the period from 1997 to 2003 was for affordability problem incidence to reduce. This was a relatively benign period of rising incomes and employment, with house prices only rising significantly towards the end of the period, particularly in the south.

[TABLE 6 ABOUT HERE]

6. Demographic, Market and Policy Drivers of Affordability Problems

The final substantive question addressed in this paper is to establish the more important drivers of affordability problems. The motivation is to gain greater insight into the causes of affordability problems in the context of the operation of the housing system in England; The analysis in this paper would provide the basis for applying consistent, validated measures across the tenures combining both objective and subjective elements. Since recent and prospective trends and policy changes suggest that affordability problems may be more significant in the coming period, the importance of getting this part of any system modelling right is heightened.

A priori there is a general expectation that affordability problems will reflect housing market conditions, with areas that have high house prices and rents seeing costs pushed up relative to incomes. The data in Table 6 suggests that the story may not be quite so simple, and that, in addition to price/income ratios, the model may also need to reflect low income and factors causing low income, or loss of income, such as unemployment or sickness/disability.

The literature on mortgage arrears and possessions places particular emphasis on change of circumstances leading to loss of income, for example divorce/separation, illness, accident, redundancy (Ford et al 2001) We are able to represent some of these 'adverse events' using the longitudinal element of the BHPS, while proxying others through variables based on economic activity and other questions The preceding descriptive analyses suggest that demographic factors are also important, particularly being in one of the more vulnerable household type categories (lone parent, single adult), or having more 'mouths to feed' (e.g. number of children). As with the case of material hardship, wealth or assets provide a key buffer which can help smooth out periods of affordability pressure (Kempson et al 2004), and we use a number of variables to proxy these.

The preferred logistic regression model for mortgaged owners is shown in Table 7. In addition to the usual outputs there is an elasticity computed at the mean to give an additional perspective on the relative size of different effects. Variables which are clearly statistically insignificant have been omitted; variables which are of some interest and of marginal significance are retained in the model as reported.

Most effects in this model are as expected. The most significant variables are household income (-ve), the lagged composite affordability status (i.e. the persistence factor), and area house price (lower quartile) interacted with the mortgage interest rate. The latter variable may be thought of as typical outgoings for a new first time buyer without significant equity. These variables also appear to have quite sizeable effects on the odds ratio, according to the exp(B) measure, but it should be remembered that these are in different unit; the elasticity at the mean standardises for units. On this basis, the lagged affordability effect is actually rather small, but the

effects of income and interest rate times house price are quite strong (elasticities of -0.98 and 2.27 respectively).

Area unemployment rate has a sizeable effect (elasticity of 0.48) while the individual level working status variable has an expected negative effect (-0.27), although the individual unemployment and sick/disabled variables are not significant. Wealth is quite significant, but there is an unexpected positive sign on the variable for savings and equity. This may highlight households who have invested heavily in housing, so increasing their equity but at the same time requiring high debt servicing from current income. This may be somewhat offset by the effects of cars (-0.20) and higher qualifications (-0.09) which are in line with expectations.

The demographic household type effects are as expected (positive for lone parents and singles, and for number of children), but the age effects are somewhat less expected – negative for both under-30s and over-60s. It may be that in this period younger households were less likely to enter home-ownership, and those who did were more likely to have significant capital or income growth prospects. One demographic event, divorce/separation, has the expected positive effect.

The equivalent model for private renters is shown in Table 8. This model fits somewhat less well and is based on a much smaller sample of observations. There are some broad similarities in the model, including the positive effect of previous affordability problems, and the quite strong negative effect of income (elasticity -0.67) as well as the modest negative effect of wealth. In addition low income deprivation at area level has a positive effect (elas 0.26), although area unemployment is not statistically significant. However, both high qualifications and number of cars have an unexpected positive effect. This could reflect the higher income expectations of younger qualified people, taking on more housing costs, and possibly the costs of running cars.

A problematic feature of this model is the lack of any very significant relationship with measures of housing cost at market area level. The available data on private rents are not very satisfactory and this variable is not at all significant. The house price variable is not statistically significant but is left in the model with some positive effect (elas 0.24). This lack of a well-defined relationship with market rents or prices would somewhat limit the value of this model for policy simulations. Rather more significant is the positive effect of the indicator of receiving partial Housing Benefit. This picks up households in the marginal position of having a low enough income to be eligible for benefit but still having to pay some housing costs. It also tends to be among this group (low paid working households) that problems frequently arise with changing circumstances and time lags in the adjustment of benefit. An indicator of households likely to be eligible for HB but not receiving it also has a significant positive effect when included (not in the version of the model reported in Table 8).

Demographic factors in this model are less prominent. As with owners, older households have less problems, but the under-30 group does not have a significant effect. Lone parent households have slightly higher incidence of problems.

Various housing transitions and flows play a role in explaining variations in affordability problems for private renters. Households moving within the previous year are more likely to have problems, but newly forming households are less likely

to. The former effect may reflect the tendency for new private lettings to charge higher rents, as well as people moving in situations of difficulty (we showed earlier the link with previous affordability problems). The level of availability of social lettings in the locality has a significant and quite strong negative effect on affordability problems in the private rented sector (elasticity -0.46). Higher social renting supply enables poorer and struggling households to move from or avoid going into the private rented sector – that is its function. This element in the model would be important in policy simulations.

A rather similar model can be fitted for social renters; this is not shown here to save space. Key findings include a strong income effect (elasticity -0.9), a similar positive effect for households on partial HB, and a surprisingly strong effect from social rent levels (elasticity 2.2), despite the generally low level of these rents.

Affordability problem prediction functions such as those reported here could be included in wider simulation models for the housing system. An example of such a model is the 'Estimating Housing Need' (EHN) model developed for the Government in England (Bramley et al 2010). This embeds predictions for mortgaged owner and private renter problems within a broader system for predicting a wider range of needs, household changes and tenure flows at regional level. The affordability components of this model were estimated on a different dataset (Survey of English Housing) using less consistent measures, as noted earlier. Nevertheless, the model gives a reasonable picture of the likely impact of different scenarios for economic and market conditions and policies affecting housing supply and access. These specific affordability problems are greater where general market affordability is worse, compounded by credit rationing, but are alleviated by greater housing supply, particularly in the social rented sector.

7. Conclusions

Affordability has become a more important issue in housing policy, with key examples of its role in social housing rent and subsidy issues, housing benefits/allowances systems, and mortgage regulation, as well as in the planning of new housing supply of all kinds. However, affordability is still not fully accepted and enshrined in agreed standards, partly due to different views about how it should be measured and at what thresholds..

This paper argues that subjective evidence of payment problems and material hardship can be used to validate ratio measures and points to the best thresholds to use. Using household panel survey evidence it is shown that traditional affordability ratios are still probably the better single ratio measure, with residual income ratios used in a supporting role; and that relatively generous thresholds are better. However, the best measures are composites of ratios and subjective payment problems. These are well validated by independent evidence on material hardship, although it is acknowledged that affordability problems are often transitional. We find that as expected affordability problems are associated in the subsequent period with higher incidence of moves, migrations, moves into social renting, and overcrowding, the latter two cases being clearly indicative of housing need.

Composite affordability problems at a basic level affected 2.6% of all households in England in the study period (1997-2003), with marked variation between owner

occupation (1.2%) and private renting (7.9%). Geographical variation was less striking than that between household types and age groups.

A multivariate model for mortgaged owner problems shows strong effects from income and prices interacted with interest rates, significant effects from unemployment and work status, but lower problem incidence for both young and old groups. The model for private renters is somewhat less good, with relatively weaker, effects from prices and rents, although the income effects are in line with expectations, and there are clear links with mobility and access to social rented sector lettings.

The findings may surprise some by rehabilitating the role of traditional affordability ratios as a basic rule of thumb, while suggesting that combining this with residual income ratios and subjective reported payment problems will yield more accurate identification of problems within micro survey-based datasets. The use of the traditional ratio of housing costs to gross income of 25% is justified, in the context of local and regional assessments of housing need as well as in the regulation of mortgage lending. This ratio could also play a role in guidelines for social rent-setting for households in lower-paid employment. More broadly, affordability criteria in planning for total housing supply are justified because market affordability is a strong driver of specific affordability problems as well as a wider range of housing needs.

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Table 1: Absolute and Relative Incidence of Subjective Housing Payment Problems by whether below affordability ratio thresholds

Affordability Criterion and threshold	% with pay't prob Level (1)	% with pay't prob Level (2)	% with pay't prob Level (3)	Ratio Prob/Not Level (1)	Ratio Prob/Not Level (2)	Ratio Prob/Not Level (3)
Overall Incidence	5.1%	4.3%	1.5%			
Afford'y Ratio >25%	14.1%	11.8%	4.0%	4.34	4.29	4.44
Afford'y Ratio >35%	15.1%	12.6%	4.5%	3.77	3.75	4.06
Afford'y Ratio >50%	16.0%	13.1%	4.5%	3.52	3.42	3.53
Resid Income<140% IS	14.2%	12.0%	4.2%	3.40	3.43	3.65
Resid Income<120% IS	14.5%	12.2%	4.5%	3.33	3.35	3.74
Resid Income<100% IS	14.1%	11.8%	4.7%	3.08	3.04	3.77
Either AR>25 or RIR<140	13.4%	11.2%	3.8%	4.24	4.17	4.31
Both AR>25 & RIR<140	15.8%	13.4%	4.8%	3.76	3.80	4.09
Either AR>35 or RIR<120	14.3%	12.0%	4.3%	3.66	3.64	4.04
Both AR>35 & RIR<120	15.9%	13.4%	4.8%	3.58	3.60	3.94
Either AR>50 or RIR<100	15.1%	12.6%	4.6%	3.40	3.37	3.77
Both AR>50 & RIR<100	14.9%	12.1%	4.6%	3.19	3.07	3.50
Aff Rate Adj for Hhd Comp	16.0%	13.3%	4.9%	3.80	3.76	4.32
Aff Rate Adj for Income	14.2%	11.8%	4.0%	3.96	3.90	3.92

Notes: Problem levels: (1) any difficulty; (2) at least one specific problem; (3) two or more specific problems.
Affordability Ratios (AR) are of rent/mortgage payment as % of gross income.
Residual Income Ratios (RIR) are of income less tax/NI less housing cost over Income Support allowance equivalised for household composition.

Table 2: Logistic Regression Models for Self-Reported Payment Problems using Affordability Ratio Measures

Model & Explan Variables	Coeff b	Wald	Signif	Exp(B)
Level 1: dprobpay1				
Dmodar	1.20	614.3	0.000	3.33
dmodrir	0.39	46.8	0.000	1.48
daffprob0	1.28	755.9	0.000	3.61
daffprob0b	0.23	14.5	0.000	1.26
Level 2: dprobpay2				
Dmodar	1.20	533.0	0.000	3.33
dmodrir	0.41	44.7	0.000	1.50
daffprob0	1.26	627.1	0.000	3.53
daffprob0b	0.28	19.1	0.000	1.33
Level 3: dprobpay3				
Dmodar	1.17	171.2	0.000	3.24
dmodrir	0.59	34.4	0.000	1.80
daffprob0	1.28	219.0	0.000	3.60
daffprob0b	0.43	17.1	0.000	1.54

Notes: dmodar means AR>25%; dmodrir means RIR<140%; daffprob0 means either of these conditions applies; daffprob0b means both conditions apply.

Table 3: Having Two or More Material Hardships by Housing Affordability Measures

Affordability Indicator	Not Mat Hardship	Mater Hardship	Ratio M H/ Not M H
Either AR>25 or RIR<140	10.1%	32.0%	3.17
Both AR>25 & RIR<140	12.2%	38.2%	3.13
Any Payment Difficulty	12.2%	53.7%	4.40
One Specific Consequence	12.4%	56.2%	4.53
Two+ Specific Conseq	13.6%	63.6%	4.68
Either Ratio + Any Diffic	13.2%	56.4%	4.27
Both Ratios + One Specif	13.8%	60.3%	4.37
AR35&RIR120 + Two Specif	14.2%	69.5%	4.89

Table 4: Logistic Regression Model for Experiencing Two or More Material Hardships

Variable Description	Coeffic B	Wald	Signif.	Exp(B)
Composite Affordy	1.180	268.4	0.000	3.254
Persistent Pay Diffic	1.420	324.1	0.000	4.137
Wealth £000 inc equity	-0.006	507.7	0.000	0.994
Low Income Depriv Dcl	0.051	22.3	0.000	1.053
Area Unemployment %	-0.028	6.1	0.014	0.972
New Household	0.205	5.2	0.022	1.228
Moving Household	-0.147	7.9	0.005	0.864
Social Renter	0.746	438.1	0.000	2.109
Single Person Hhd	0.324	70.1	0.000	1.383
Lone Parent Hhd	1.057	420.8	0.000	2.879
Indiv Unemployed	0.599	53.2	0.000	1.821
Weeks Unemployed in yr	0.018	82.6	0.000	1.018
Sick/disabled	0.864	222.2	0.000	2.373
Student	0.505	73.3	0.000	1.657
High Educ Qualifs	-0.228	24.4	0.000	0.796
Number Children	0.166	127.3	0.000	1.180
Extra Child this yr	0.125	2.8	0.095	1.133
	-1.940	1984.5	0.000	0.144

	Chi-square	df	Sig.
Model	6613.862	17.000	0.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	33929.7	0.127	0.225

Classification Table(a)

		Predicted		
Observed		0	1	% correct
	0	40499	875	97.9
	1	5903	1239	17.3
	Overall Percentage			86.0

Table 5: Relative Incidence of Selected Housing Transitions and Needs by Lagged Composite Affordability Problems (Ratios of incidence for those with affordability problem vs those without)

Housing Transition/ Need Indicator	Base % rate	Ratio Compos Afford (1)	Ratio Compos Afford (2)	Ratio Compos Afford (3)	Ratio Compos Afford (4)
All Tenures					
Moved	10.7%	1.40	1.61	1.83	2.25
Migrated	4.5%	1.57	1.77	2.34	3.30
Reconstituted hhd	4.9%	0.88	0.78	1.28	0.38
Moved to SRS	1.1%	2.00	2.27	1.18	1.64
Overcrowded	3.4%	1.62	2.15	2.73	0.56
N of Cases	31156	613	197	68	38

Note on affordability problem levels: (1) either AR>25% or RIR<140% and level 1 payment problem; (2) both AR>25% and RIR<140% and level 2 payment problem; (3) both AR>35% and RIR<120% and level 3 payment problem; (4) both AR>50% and RIR<100% and level 3 payment problem.

Table 6: Incidence Rates for Composite Affordability Problem Indicators by Tenure, Region, Household Age-Type and Year

Categories	Rate Compos Afford (1)	Rate Compos Afford (2)	Rate Compos Afford (3)	Rate Compos Afford (4)	Rank Compos Afford (1)
Total	2.62%	1.09%	0.30%	0.21%	
Tenure					
Own	1.22%	0.45%	0.12%	0.08%	3
SocRent	5.68%	2.31%	0.41%	0.30%	2
PrivRent	7.86%	3.83%	1.57%	1.12%	1
Region					
North East	3.36%	1.74%	0.64%	0.58%	2
Yorks & Humber	2.80%	1.40%	0.43%	0.19%	4
North West	1.82%	0.82%	0.13%	0.11%	9
East Midlands	1.96%	0.85%	0.32%	0.14%	8
West Midlands	2.65%	0.94%	0.41%	0.38%	5
South West	2.24%	0.96%	0.22%	0.14%	6
East England	2.17%	0.79%	0.25%	0.15%	7
South East	3.41%	1.42%	0.24%	0.20%	1
Gtr London	3.14%	1.15%	0.33%	0.19%	3
Household Age-Type					
u30 Sing	7.50%	3.42%	1.26%	1.26%	3
u30 CplMult	2.34%	0.82%	0.62%	0.45%	7
u30 LPF	7.62%	4.80%	2.19%	0.54%	2
u30 CFam	4.58%	2.04%	0.40%	0.26%	5
3059 Sing	5.59%	2.03%	0.74%	0.65%	4
3059 Cpl	1.27%	0.33%	0.00%	0.00%	9
3059 LPF	8.68%	5.13%	1.89%	0.96%	1
3059 CFam	1.57%	0.73%	0.14%	0.05%	8
3059 Mult	0.50%	0.08%	0.00%	0.00%	12
o60 Sing	3.01%	1.05%	0.09%	0.09%	6
o60 Cpl	0.87%	0.34%	0.03%	0.00%	10
o60 Oth	0.58%	0.00%	0.00%	0.00%	11
Year					
1997	3.41%	1.68%	0.68%	0.42%	1
1998	2.83%	1.41%	0.22%	0.13%	3
1999	2.53%	0.95%	0.23%	0.20%	4
2000	2.93%	1.10%	0.19%	0.11%	2
2001	2.08%	0.63%	0.21%	0.13%	7
2002	2.35%	1.12%	0.39%	0.32%	5
2003	2.10%	0.76%	0.19%	0.15%	6

Note: Affordability problem levels are as in Table 5.

Table 7: Logistic Regression Model for Affordability Problem for Mortgaged Home Owners in England (Level 1 composite affordability problem, BHPS, 1997-2003

Variable Description	Coeff B	Wald	Signif	Exp(B)	Elasticity @ mean
Int Rate x Hse Price (LQ)*	0.284	48.8	0.000	1.33	2.27
Household Income £k pa	-0.106	324.4	0.000	0.90	-0.98
Wealth £k inc equity	0.001	12.8	0.000	1.00	0.13
Area Unemployment %*	0.146	12.2	0.000	1.16	0.48
Aged over 60 (HRP)	-0.450	4.6	0.033	0.64	-0.03
Aged under 30 (HRP)	-0.243	1.4	0.231	0.78	-0.02
Single Person Hhd	0.570	10.7	0.001	1.77	0.08
Lone Parent Hhd	0.639	13.2	0.000	1.89	0.03
No. of Children	0.212	19.1	0.000	1.24	0.16
Divorce/separation	0.604	3.4	0.065	1.83	0.01
Working	-0.401	8.6	0.003	0.67	-0.27
Unemployed (indiv)	0.129	0.2	0.657	1.14	0.00
Sick/Disabled	0.238	0.9	0.340	1.27	0.01
High Educ Qualifs	-0.370	4.5	0.034	0.69	-0.09
Number of Cars	-0.153	2.9	0.088	0.86	-0.20
London *	-0.863	10.3	0.001	0.42	-0.09
Lagged Compos Affordy	2.363	233.7	0.000	10.62	0.05
	-3.034	87.9	0.000	0.05	

Model Summary	-2 Log Likelihood	Cox & Snell R Sq		Nagelkerke R Sq	
	2679.5	0.052		0.332	
Classification Table				Predicted	Percent
	Observed		0	1	correct
	dcombaff0	0	22565	35	99.8
		1	344	40	10.4
		Overall Percentage			98.4

Note: * denotes variables which are characteristics of aggregated areas; remaining variables are individual household level; model is weighted by composite household weight.

Table 8: Logistic Regression Model for Affordability Problem for Private Renters in England (Level 1 composite affordability problem, BHPS, 1997-2003

Variable Description	Coeff B	Wald	Signif	Exp(B)	Elasticity @ mean
House Price (Lwr Qtl) £k *	0.003	0.9	0.348	1.00	0.24
Household Income £k pa	-0.061	41.3	0.000	0.94	-0.67
Wealth £k inc equity	-0.011	2.5	0.111	0.99	-0.10
Receive Partial Hsg Ben	1.112	20.6	0.000	3.04	0.10
Low Income Depriv Dcl*	0.209	14.1	0.000	1.23	0.26
Area Unemployment %*	0.045	0.4	0.503	1.05	0.12
New Household	-0.321	1.5	0.219	0.73	-0.04
Moving Household	0.410	4.2	0.041	1.51	0.15
Aged under 30 (HRP)	-0.163	0.7	0.411	0.85	-0.05
Aged over 60 (HRP)	-1.471	17.8	0.000	0.23	-0.24
Lone Parent Hhd	0.470	3.3	0.068	1.60	0.03
High Educ Qualifs	0.247	1.7	0.189	1.28	0.06
Number of Cars	0.380	8.7	0.003	1.46	0.31
Social Lettings % hhds*	-0.422	6.9	0.009	0.66	-0.46
Lagged Composite Affordy	1.431	37.8	0.000	4.18	0.07
Constant	-1.997	21.5	0.000	0.14	
Model Summary	-2 Log Likelihood	Cox & Snell R Sq		Nagelkerke R Sq	
	1082.1	0.093		0.216	
Classification Table				Predicted	Percent
	Observed		0	1	correct
	dcombaff0	0	2121	12	99.5
		1	173	16	8.3
		Overall Percentage			92.0

Note: * denotes variables which are characteristics of aggregated areas; remaining variables are individual household level; model is weighted by composite household weight.