

ADVISORY PANEL ON CONSUMER PRICES – TECHNICAL
Calculating a price index for capital mortgage repayments

Status: final

Expected publication: alongside minutes

Purpose:

1. This paper presents two alternative price indices for capital mortgage repayments. The first is based on the methodology used to calculate mortgage interest payments in the Retail Prices Index. The second is based on data from the Understanding Society Survey.

Action:

2. Members of the Panel are invited to:
 - a) advise on the appropriateness of the two indices for inclusion in the HCIs
 - b) advise on the conceptual and practical challenges in implementing them in the Household Cost Indices
 - c) endorse ONS's recommendation to include the capital mortgage repayments index based on the Understanding Society Survey into an alternative variant of HCIs for the early 2019 publication

Background

3. The Household Cost Indices (HCIs) aim to reflect UK households' experience of changing prices and costs. They are intended to measure how much the nominal disposable income of different household groups would need to change, in response to changes in prices and costs, to enable household groups to purchase the same quantities of goods and services at a fixed quality.
4. In December 2017, the first preliminary estimates of the Household Cost Indices were released. The accompanying methodological paper highlighted the development of a price index for capital mortgage repayments as a further component for inclusion in the HCIs. In the following, the "payments" approach to measuring a capital mortgage index for the HCIs is described.
5. The CPIH measures owner-occupier housing costs (OOH) using a "rental equivalence" approach. This estimates the costs of consuming housing services by calculating the price that would need to be paid to rent an equivalent property. The HCIs instead adopt a "payments" approach to measuring OOH which attempts to capture what households pay out as owner occupiers for housing. This approach is currently used for mortgage interest payments, transaction costs (e.g. estate agency and legal fees), and running costs such as repairs and maintenance, ground rent and dwelling insurance. For the HCIs, most of these indices are drawn from the Retail Prices Index (RPI), including the mortgage interest payments index (MIP). Since inclusion of mortgage repayments is limited to interest only, changes in the cost of capital mortgage repayments could also be accounted for in the HCIs, although this is the

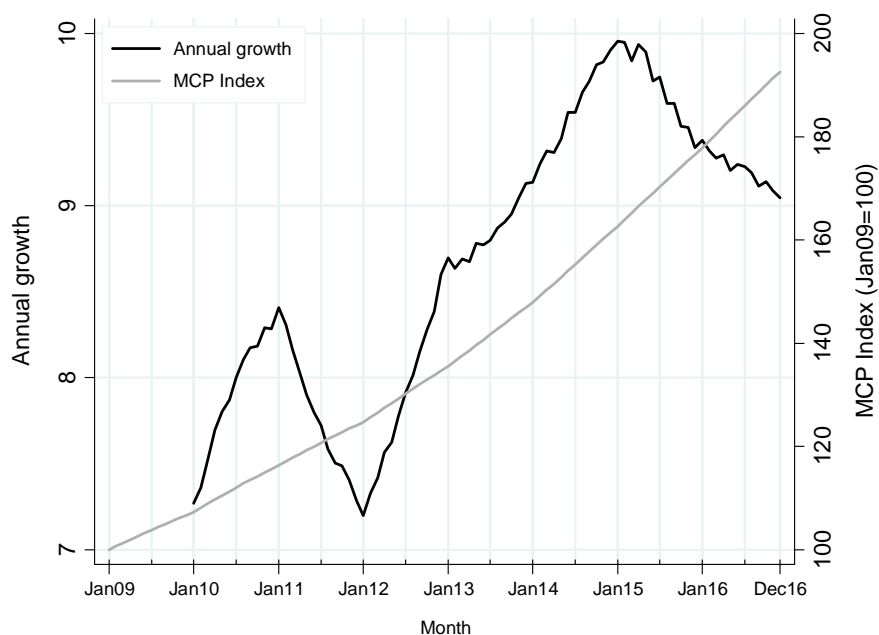
subject of some debate. We therefore propose to produce two variants of the HCIs- both with and without capital costs.

6. This paper thus describes and presents price indices for two alternative mortgage capital payments (MCP) methods:
 - a) a price index that is derived similarly to MIP in the RPI;
 - b) a price index that is derived from survey data.

MCPs indices: Same methodology as MIP in RPI

7. The complex methodology which is deployed for the estimation of the monthly MIPs in the RPI is described in the [2014 CPI Technical Manual](#) (section 10.5.1), and for convenience, is reproduced in Annex C.
8. For this paper, MCP indices were estimated from the tables developed for MIP. At the first stage the average house price, average proportion borrowed, proportion of people with repayment mortgages, and the proportion of capital paid off each month are multiplied together to get the average capital repayment each month, split by when the mortgage was taken out. This is then multiplied by the proportion of the population with mortgages in that year of their mortgage, and summed to give the average amount paid by mortgagor households. This amount is then weighted by the percentage of households which are owner-occupied, the percentage of owner-occupiers under 23 years, and the percentage of 'under 23' owner-occupiers with a mortgage. This gives the average capital mortgage repayment over the population of the UK. For each year the index is then calculated by dividing each month by the January value and multiplying by 100. The indices for each year are then chain-linked.
9. The calculation is restricted to 23 years as MIP is calculated from owner occupied housing stock covering this period. However, it is thought that the number of buyers taking out longer mortgages has increased, and so further work could potentially look at extending this, although it may be challenging to find historical data.
10. Figure 1 shows MCP indices and annual growth. It indicates that capital repayments nearly doubled between January 2009 and December 2016, with annual growth ranging from 7 to 10 per cent.

Figure 1. MCP indices (Jan09=100) and annual growth. Same methodology as MPIs in RPI.



Survey-based MCP indices

11. A price index for capital mortgage repayments could alternatively be estimated from surveys with questions on owner-occupiers' type of mortgage and repayment amount. This information is available from the English Housing Survey (EHS) and in the Understanding Society Survey (formerly called British Household Panel Survey, BHPS).
12. The EHS began in 1993 and is a continuous national survey commissioned by the Ministry of Housing, Communities and Local Government. It collects information about people's housing circumstances and the condition and energy efficiency of housing in England. Information on mortgage repayments is currently available from 2008 to 2016.
13. In the EHS, each year about 13,300 households are interviewed based on samples of private addresses and households in England. Although no sampling frame exists for private households as such, a sampling frame does exist of addresses at which under 50 items of mail are delivered daily by the Post Office. This is the Postcode Address File for Small Users (PAF), which has excellent coverage of private domestic addresses. The PAF is arranged in a geographically hierarchical order, so that addresses are listed within postcodes, postcodes are listed within postal sectors, sectors are listed within postal areas and so on up to the national level. The EHS sampling from the PAF proceeds in two stages. At the first stage the entities selected are postal sectors. At the second stage, addresses are selected within each of the sectors selected at the first stage. Sampling stratification is applied to the selection of sectors, so that the sample distributions of sectors matches the population in terms of allocation to Government Office Regions, proportion of privately rented dwellings and of local authority housing that they contain, and of disadvantaged versus affluent households which is based on area social class indicators. The grossing scheme applied to the raw survey data then combines calibration weighting and adjustments for non-response.

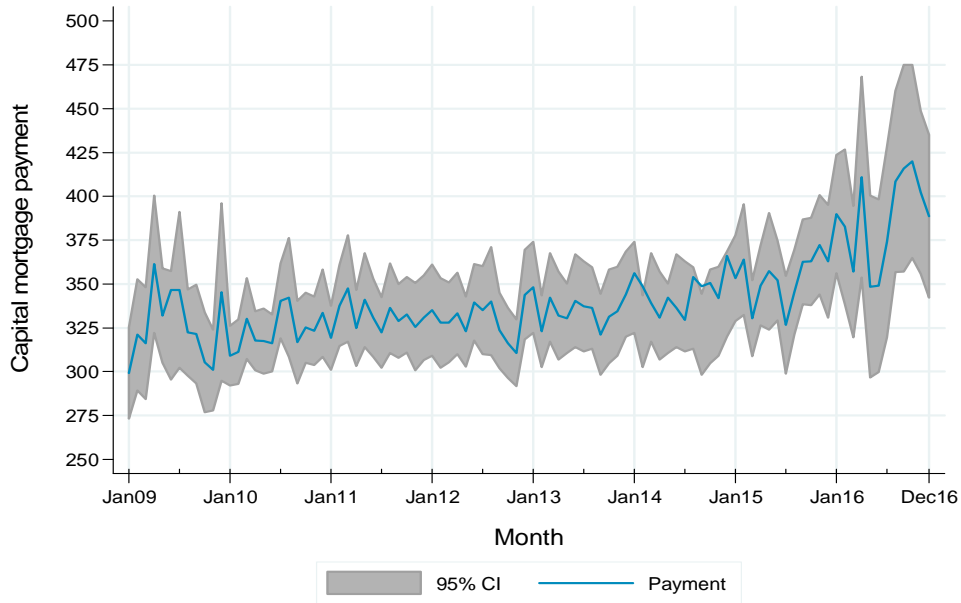
14. The Understanding Society Survey (USS), also known as the UK Household Longitudinal Study, is commissioned by the Economic and Social Research Council and led by the Institute for Social and Economic Research at the University of Essex. The study started in 2008-10 (Wave 1) when about 40,000 households were interviewed and re-visited each year afterward, with the latest available survey run in 2015-17 (Wave 7). Additional cohorts were added through time such as the Immigrant and Ethnic Minority Boost Sample (IEMBS) which was introduced at Wave 6. Each wave covers a triennial period, with most interviews in the middle year and marginal representation of the first and last year (e.g. 2008 and 2010 in Wave 1).
15. The main USS sample consists of a new large General Population Sample (GPS). Three additional components are the Ethnic Minority Boost Sample (EMBS) (about 1000 adults from five ethnic groups), the former BHPS sample, and the IEMBS. The GPS consists of a two-stage sample of residential addresses in England, Scotland and Wales and of a single stage systematic sample of addresses in Northern Ireland. As for Great Britain, the sample was obtained by first randomly selecting postcode sectors as the primary sampling units and then by selecting addresses within each sector. On the other hand, the EMBS was designed to provide representativeness of five ethnic groups (Indian, Pakistani, Bangladeshi, Caribbean and African). The former BHS sample was incorporated into Understanding Society from Wave 2 onward. Weights consist overall of a design weight and a cross-sectional weight.
16. The USS and the EHS provide similar information, with the latter also enabling the identification of first-time buyers which is specifically relevant to address John Astin and Jill Leyland's proposal (2015) of estimating mortgage capital repayments for first-time buyers separately from those who are already owner-occupiers. Since the EHS is only available for England, comparison with the Understanding Society Survey and assumptions will be required to extend the index to the whole UK.
17. For the aim of this paper, the USS was used as it is carried out at the UK level and data are available on the UK Data Archive portal. The questions are reported in Annex B. It should be noted, however, that results are deemed to be informative rather than conclusive. This is due to limitations in the data available to the public in the absence of special license access, such as anonymised household identification codes which did not enable records to be linked across waves and so make the weight fully adjusted.
18. Statistical power was enhanced by pooling annual data across waves. For example, estimates for 2010 were based on Wave 1 (2008-2010), Wave 2 (2009-2011) and Wave 3 (2010-2012). Because of the marginal representation of 2008 and 2017 they have been excluded from the analysis. To a smaller extent, 2016 was also affected by volatility, more markedly in the second part of the year when information related to Wave 7 only¹.
19. As displayed in Figure 2, capital mortgage repayments increased between January 2009 and December 2016. To smooth out fluctuations, a 12-month moving average (MA) was applied which resulted in a time series beginning in July 2009 and ending in July 2016². Derived price indices and annual growth are reported in Figure 3. Also, accounting for differences in the

¹ Full details on sample size are provided in the Appendix (Table 1A).

² Survey estimates with the super-imposed MA series are reported in the Appendix (Figure 1A).

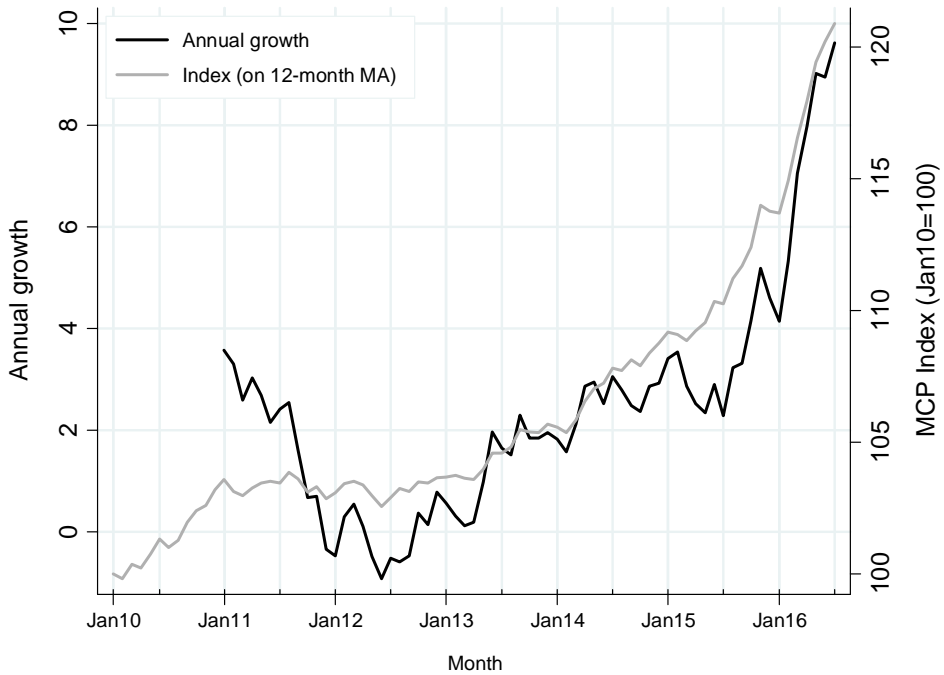
base period, a comparison of Figures 1 and 3 points to a high discrepancy between the proposed MCP indices (i.e. MIP-based and survey-based).

Figure 2. Capital mortgage repayments from January 2009 to December 2016.



Source: Understanding Society Survey (own analysis).

Figure 3. Indices (Jan10=100) and annual growth for survey-based MCPs.



Potential pattern of capital mortgage repayments

20. To evaluate the alternative approaches to calculating MCP indices, they were compared against the [UK House Price Index \(HPI\)](#), published jointly by ONS and the Land Registry. We would not necessarily expect MCP indices to behave in the same way as house prices; however, it could serve as a useful sense check. In both Figures 4 and 5 the HPI has a similar level to the survey-based approach, whereas the MIP-based approach shows much faster growth.

Figure 4. Two alternative MCP indices and Nationwide house price index. January 2010 to July 2016.

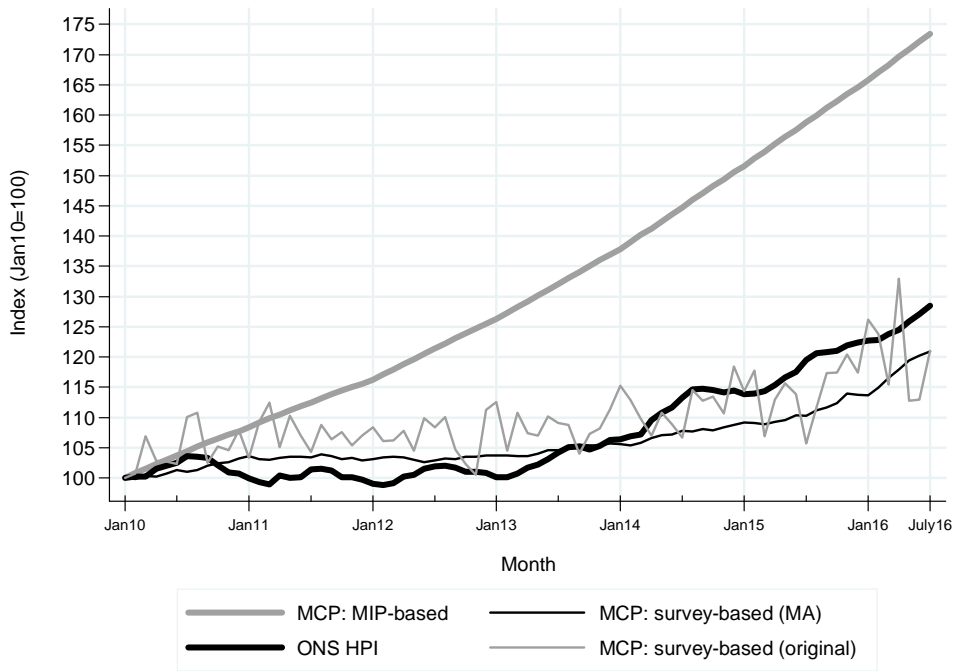
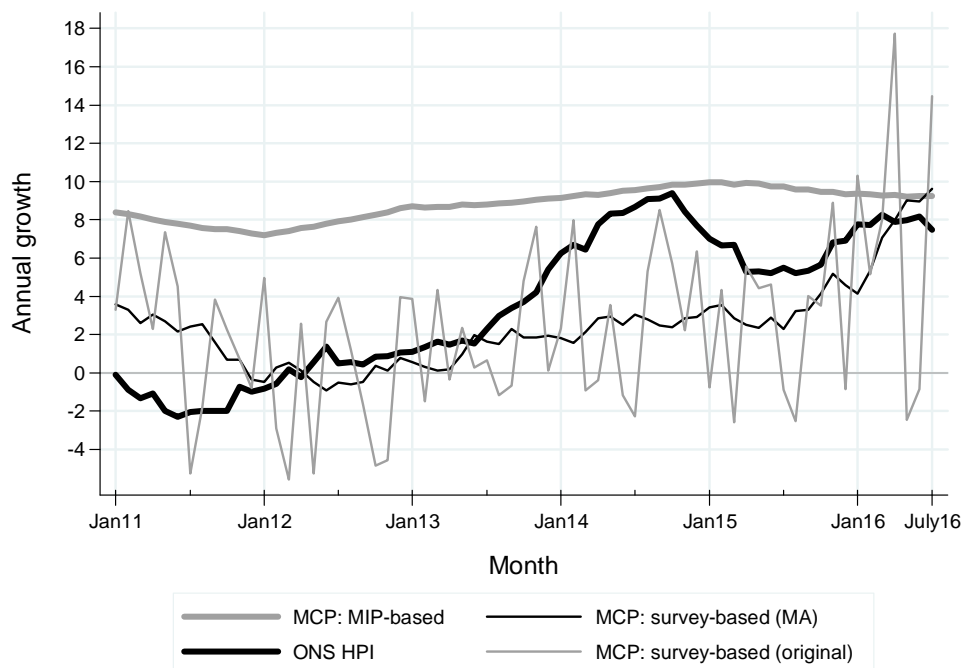


Figure 5. Annual growth rate for two alternative MCP and for house price. January 2011 to July 2016.



Proposed MCP indices: Strengths and limitations

21. The methodology for the estimation of a price index for mortgage interest repayments can be adjusted to derive a corresponding index for mortgage capital repayments. In light of the above, however, the possibility of a bias should be taken into consideration.
22. On the other hand, survey-based estimates face the common limitation of not being timely, which implies the use of forecasting methods in the interim. As the latest data currently refer to quarter 1 in 2017, forecasting may be required from April 2017 onwards. Alternative approaches could be to use the data at a lag or to publish the capital costs variant of the HCIs at a lag. Whilst the adoption of forecasts might imply future revisions of the HCIs, which is not the common approach in Consumer Prices, there is a precedent in MIP, which uses a one-month ahead forecast of the Average Effective interest rate. Here the data are not revised, but there is an implicit correction in subsequent forecasts, which are based on the true rates.
23. While the USS has the advantage of being run at the UK level and has a reasonable sample size, fluctuations in the time series are a drawback. This was overcome by using a smoothing technique. The resulting indices, however, are less straightforward to interpret and may result in underestimating repayments.
24. There is, in addition, a feature of the USS which could not be implemented in the present work. Due to anonymised household identification codes across waves, estimates could not be adjusted for the design weight at baseline. This limitation is partly reduced by results at baseline which showed similar repayment estimates for the full and the partial weight. Clearly, confidence errors would be smaller which, in this paper, relates to Figure 1 only.

25. On a separate issue, as a tool to confirm the pattern of capital mortgage repayments, estimates from the EHS could be compared with those from the USS for English households.
26. A further limitation, both in the EHS and the USS, is that in the presence of other loans on the property, the household is only asked for total repayments, causing information loss in terms of main mortgage. Table 2a, in Annex A, however, suggests that this limitation is minor.
27. In spite of the above drawbacks, the survey-based estimates seemed to produce more intuitive results when compared to the HPI than MIP-based estimates. Hence, once current data limitations have been addressed, we recommend that the estimation of repayments from the USS is the most appropriate approach for incorporating capital costs in HCIs in early 2019.

Further work

28. Further work could be done to investigate the quality of a price index for capital mortgage repayments by comparing the results from Understanding Society Survey with those from the English Housing Survey. It could also look at computing an index for first-time buyers. There may be some value in further exploring the MIP-based model and seeing if it is possible to extend the mortgage length past 23 years.

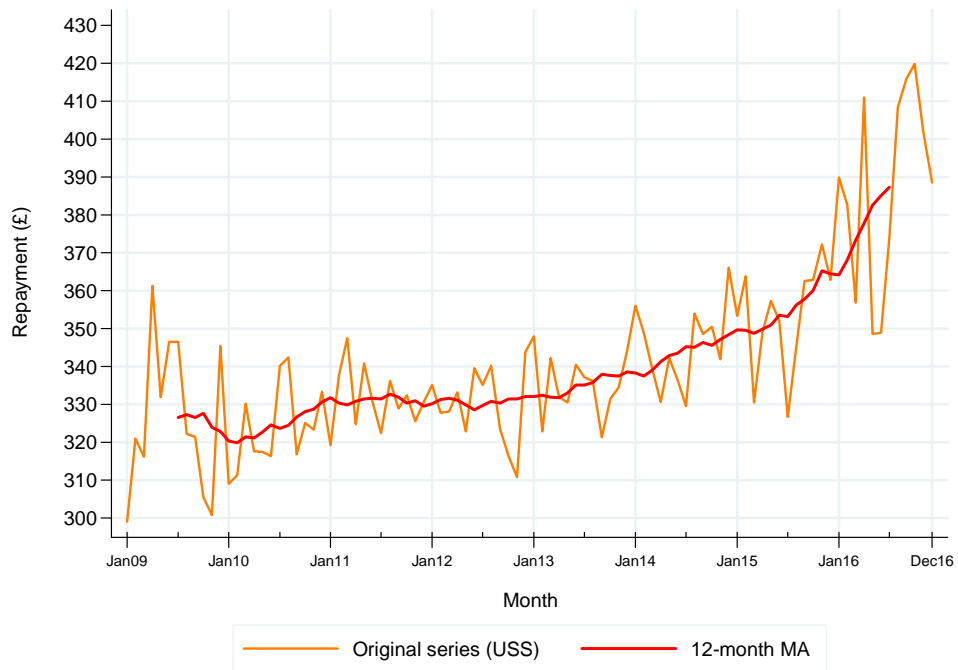
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December 2018

List of Annexes:

Annex A	Additional charts and tables
Annex B	USS mortgage repayment questions

Annex A – Additional charts and tables

Figure 1A. Capital mortgage repayments. Survey data and 12-month moving average.



Source: Understanding Society Survey (own analysis)

Table 1A. Number of households with capital mortgage repayments (excluding those with other loans on the property). Understanding Society Survey.

Month	n	Month	n	Month	n	Month	N
Jan09	315	Jan10	814	Jan11	892	Jan12	527
Feb09	437	Feb10	847	Feb11	777	Feb12	599
March09	395	March10	855	March11	763	March12	681
Apr09	432	Apr10	790	Apr11	647	Apr12	635
May09	370	May10	785	May11	759	May12	685
June09	384	June10	765	June11	672	June12	669
July09	370	July10	852	July11	689	July12	603
Aug09	386	Aug10	699	Aug11	659	Aug12	510
Sept09	399	Sept10	752	Sept11	652	Sept12	601
Oct09	357	Oct10	760	Oct11	657	Oct12	606
Nov09	420	Nov10	767	Nov11	781	Nov12	773
Dec09	217	Dec10	471	Dec11	451	Dec12	438
Month	n	Month	n	Month	n	Month	N
Jan13	599	Jan14	648	Jan15	573	Jan16	417
Feb13	600	Feb14	597	Feb15	523	Feb16	276
March12	532	March14	566	March15	456	March16	258
Apr13	552	Apr14	474	Apr15	528	Apr16	248
May13	571	May14	506	May15	523	May16	180
June13	575	June14	495	June15	490	June16	181
July13	541	July14	462	July15	478	July16	158
Aug13	505	Aug14	480	Aug15	484	Aug16	211
Sept13	569	Sept14	494	Sept15	521	Sep16	169
Oct13	529	Oct14	528	Oct15	567	Oct16	232
Nov13	602	Nov14	511	Nov15	562	Nov16	200
Dec13	505	Dec14	378	Dec15	358	Dec16	145

Table 2A. Number of households with capital mortgage repayments including those with other loans on the property. Understanding Society Survey. Year 2011

Month	No further loans (NFL)	With further loans (FL)	% FL over total (NFL+FL)
Jan11	892	26	2.83
Feb11	777	26	3.24
March11	763	37	4.63
Apr11	647	21	3.14
May11	759	31	3.92
June11	672	32	4.55
July11	689	30	4.17
Aug11	659	19	2.80
Sept11	652	38	5.51
Oct11	657	27	3.95
Nov11	781	26	3.22
Dec11	451	21	4.45

Annex B – USS mortgage repayment questions

USS questions enabling the estimation of capital mortgage repayments:

(1) Does your household own this accommodation outright, is it being bought with a mortgage, is it rented or does it come rent-free?

(2)

Is your mortgage or loan ...

Interviewer Instruction

READ OUT

Options

1	A repayment mortgage or loan	A repayment mortgage or loan
2	An endowment mortgage	An endowment mortgage
3	Part repayment and part endowment	Part repayment and part endowment
4	Interest only	Interest only
5	Part interest only and part repayment	Part interest only and part repayment
6	Flexible mortgage	Flexible mortgage
97	Or some other type of mortgage or loan?	Or some other type of mortgage or loan?

(3) Have you taken out additional mortgage on this flat/house?

(4) Approximately how much is the total amount secured against this property, including your mortgage and any other loans secured on the property?

(5) How much was your last total monthly instalment on all mortgages or loans for this property?