

A Critical Review of the UK Mortgage Default Literature

Current Knowledge and Future Directions

Hollie Cairns and Gwilym Pryce,

*Department of Urban Studies,
University of Glasgow*

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Summary:

- The current literature suggests that mortgage default is driven by a complex set of factors that affect a household's ability and incentive to repay.
- To gauge the importance of a particular driver of default risk, the effects of other factors have to be controlled for. Reliability of current estimates is therefore tempered by the omission of key variables in the underlying analysis.
- Despite the large amount of research on MPPI, its overall impact on reducing arrears has yet to be systematically assessed in the context of a household model of mortgage risk that holds other factors constant.
- More research is also needed at the household level on the effects of savings, income changes, household structure and housing equity.
- Despite these failings, the existing research demonstrates the feasibility and usefulness of constructing household models using current UK data.
- Such models have the potential to assist lenders, insurers and policy makers identify vulnerable borrowers and in predicting the impact of socio-economic changes.
- The economic implications of default risk remain relatively unexplored, such as the labour supply effects of mortgage repayment difficulties and the balancing of risks and returns.

Introduction

What are the main factors that drive arrears and possessions? This article reviews the literature on mortgage repayment difficulties and summarises the evidence that is currently available. We also identify the gaps in the risk analysis literature – where more research needs to be done – and highlight other aspects of mortgage risk which need more attention (such as the consequences of repayment difficulties for household structure and labour supply). Our goal is to set the scene for future research, and offer practical suggestions as to how the current knowledge base could be improved. Our review is largely of the recent UK literature, but we draw lessons also from research carried out in other countries.

The paper is structured as follows: first we briefly consider the classification of factors that affect mortgage default risk. We then summarise the findings and failings of the literature in relation to each driver of default. The final part of the paper briefly considers broader questions related to mortgage risk which are worthy of future research.

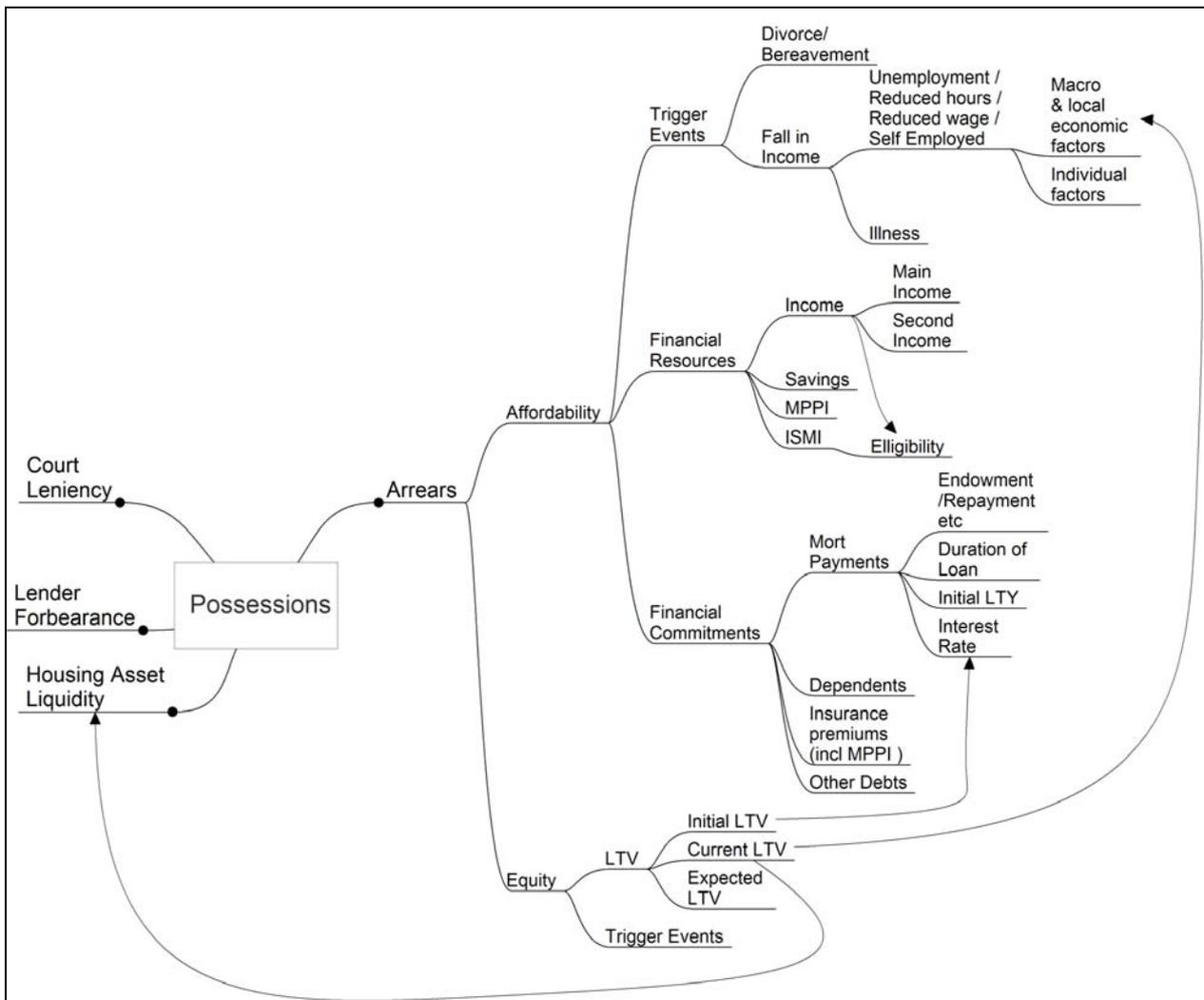
Classifying the Drivers of Arrears and Possessions

Figure 1 sets out the main drivers of mortgage arrears, which in turn result in possessions. (Of course, arrears do not inevitably result in possessions, though one might expect a fairly stable relationship between the two, changing only if there are notable changes in the leniency of the courts and/or lender forbearance). We have broken down the determinants of mortgage default into those that affect affordability (or ‘ability to pay’) and those that effect housing equity, though as we shall discuss below, equity may itself influence ability to pay.

Before discussing each of these drivers in turn, it is worth noting that another way to divide up the drivers of default is into macro and micro factors. The focus of the *macro* approach is not on what causes the incidence of arrears to vary between individuals, but what factors might cause the overall levels of default to vary over time. Very important drivers of arrears and possessions (such as relationship breakdown) may therefore legitimately be omitted from macro models if they do not change much over time. The advantage of the macro approach is that it can utilise published forecasts of future unemployment and interest rates to forecast future changes in headline arrears and possessions.

Consideration of macro models alone, however, will result in an incomplete picture of mortgage risk. First, the factors that drive arrears can vary considerably between regions and even within regions, and so macro estimates can mask large geographical variation. Second, the *sensitivity* of default rates to drivers may also vary geographically. OEF (2001, p.5), for example, found that ‘possessions in the wealthier, southern regions respond less sharply to changes in debt-servicing costs, debt-equity ratios and the rate of business de-registrations than do possessions in the poorer, northern regions’. This means that forecasts can be misleading if they are not computed at the appropriate spatial scale. Third, macro analysis does little to help the mortgage industry and policy makers distinguish between risks at the household level and hence target safety nets to those most in need.

Figure 1 Drivers of Arrears and Possessions



Micro analysis, on the other hand, considers why one household might be more likely to fall into arrears than another. Factors such as the number of dependents and relationship

breakdown might prove important micro drivers, even though they may not be particularly significant at the macro level. The micro approach is less amenable to producing forecasts of future change in the overall rate of arrears and possessions, but is potentially more useful in helping identify those most at risk, and in improving our understanding of the complex set of factors that cause mortgage default. Such analysis can be derived from analysis of existing large-scale surveys (such as the Survey of English Housing or the British Household Panel Survey) or from ad hoc surveys and qualitative studies.

We shall turn now to each of the key categories of drivers of default and summarise how they have been considered in the literature.

Trigger Events

Unemployment

Ford et al's (2004, p.14) analysis of the Survey of English Housing (SEH) reveals that 'throughout 1995-2003, arrears resulted from labour market disruption (unemployment, failure of self-employment or reduced wages) in a majority of cases, constituting the most significant risk'. The simple percentages reported in such surveys, on their own leave many questions unanswered, however. For example, according to the SEH, the proportion of borrowers in arrears who cited redundancy or unemployment as a cause, has halved over the 1995-2003 period from 38% to 16%, and indeed has fallen by nearly forty per cent in one year alone (from 26% in 2001/2002 to 16% in 2002/2003). This raises the question of whether this is due to falling unemployment risks, or due to better safety-net provision or the increased dominance of other factors. Also, the SEH does not ask borrowers to explain the relative importance of the different causes of arrears, so it is difficult to gauge how one cause compares with another.

At the macro level, models have been developed which incorporate the unemployment rate into a multi-determinant framework which allows the researcher to estimate the impact of changes in unemployment while holding other factors constant. Oxford Economic Forecasting (2001), for example, estimate that, holding everything else constant, a rise in the unemployment rate by 10% will eventually raise both arrears and possessions by 30%. A limited number of micro-level multiple-determinant models of default have been developed in the UK, but unfortunately these have either tended not to include the effect of unemployment (Lambrecht *et al* 1997) or

have reported the relationship between the incidence of arrears and the incidence of unemployment without controlling for other factors (such as Ford et al 1995).

An exception is the study by Boheim and Taylor (2000) which develops a comprehensive cross-tenure model of evictions and repossessions in Britain using data for the period 1991 to 1997 from the BHPS. They include both the regional unemployment rate and employment status of the head of household as possible determinants, and find the former to be marginally significant and the latter to be highly significant (though it is questionable whether both should be included in the same model given that they are clearly not independent of each other). Burrows (1998, p.13) also includes employment status of the head of household and finds that, “those employed part-time are almost three times more likely than those employed full-time to be in arrears...”. Moreover, “Those currently unemployed are almost eight times more likely to be in arrears. The unemployment of a head of household has the greatest impact of all factors on the odds of being in arrears”. Burrows concludes that, “This result fundamentally challenges the adequacy of the social ‘safety net’ and its recent weakening can only exacerbate the situation”. However, because unemployment is included here as a discrete event (the head of household is either employed or not employed), it would be difficult to use their results to simulate policy scenarios (such as the sensitivity of arrears to changes in impact of changes in the rate of local employment).

A potentially fruitful avenue for future research would be to incorporate the estimated *probability* of unemployment as a possible determinant of arrears, where this probability of unemployment is determined by both individual factors and local unemployment rates. This would allow policy simulations to be run that allow local unemployment rates to vary while holding individual factors constant (or visa versa).

Change in Income

Unemployment is not the only source of income change. Indeed, 11% of those surveyed in the 2002/2003 Survey of English Housing cited lost overtime, reduced hours or reduced pay as a reason for falling into arrears. However, this does not tell us by what proportion income has to fall in order for arrears to increase by a given percent, nor does it tell us the effect of income changes in relation mortgage repayment costs or other fixed commitments. (Indeed, most lenders, when setting the terms of a mortgage contract, will consider not only total income, but

also the relative value of income when compared to the amount borrowed and other factors). Existing micro studies have struggled to incorporate income changes into models of mortgage default. The Burrows (1998) study omitted income altogether, while Lambrecht *et al* (1997) only have data on salaries at the time of mortgage origination.

Boheim and Taylor (2000) make some headway in this regard. Because they are using a panel data set (one that follows households over time) rather than a cross sectional survey (based on a single snapshot of respondents, such as the SEH), they are able to incorporate changes in household financial circumstances in their model. They use current total income (but find this to be insignificant) and incorporate a range of financial indicators, including whether a household experienced a positive or negative financial surprise over the preceding year and whether a household received Income Support in the previous year. While the results are interesting, with so many variables, it is difficult to derive straightforward conclusions from their results (particularly since receipt of Income Support is not independent of the employment status of the head of household, and is complicated by potential entitlement to ISMI). A useful direction for future research would be to explore the sensitivity of the incidence of arrears to changes in the loan-to-income ratio or similar such measure, where the measure of income is “*equivalised*” to account for variations between households in the number of dependents (*equivalisation* is an internationally recognised method of adjusting income for the varying size and composition of households). While simple relative income measures have been attempted at the macro level (Whitley et al 2004) the micro literature remains relatively undeveloped in this regard.

Divorce/ Bereavement

Households have become increasingly reliant on more than one income to be able to afford homeownership. It is not surprising, then, that a significant proportion (21%) of those that experienced mortgage arrears list the death of a partner or relationship breakdown as a contributory factor (SEH 2002/2003). Quantifying the importance of this effect relative to other effects is not straightforward, however. Both Burrows (1998) and Boheim and Taylor (2000) find that household heads described themselves as “divorced or separated” were more likely to be in arrears. However, Boheim and Taylor (2000) found that the variable did not have a significant effect on eviction (they also found that being widowed actually reduced the

risk of eviction but raised the risk of payment problems), and Burrows concluded that, “although there clearly is an association between relationship breakdown and the odds of being in mortgage arrears, the size and strength of the association does not correspond to the importance consistently attached to it by mortgage lenders’ (Burrows, 1998, p. 13).

These results have to be treated with caution because neither study considers how recently the relationship breakdown occurred and this is obviously crucial to the impact on the households ability to meet current mortgage payments. Although it is not possible to derive a dynamic measure of relationship breakdown from snapshot surveys such as the SEH, it would be possible do this with a longitudinal survey such as the BHPS. It is a potentially important factor since it is currently not one of the risks that the borrower can insure against by purchasing MPPI.

Illness

In contrast to the absence of cover for relationship breakdown, *ill health due to accident or sickness* is one of the standard areas of protection included in MPPI packages (though subject to exclusions, see Kempson et al 1999 and Kemp and Pryce 2001) and one of the main causes of arrears. Since 1998, lost earnings through sickness or injury have accounted for between 18% and 26% mortgage arrears in the SEH (Ford et al 2004). Again, it is a factor that both Burrows (1998) and Boheim and Taylor (2000) try to account for in the current status of head of household variable. However, as with unemployment and relationship breakdown, the timing of the event should also be incorporated, since a respondent may be healthy at the time of interview, but may have accrued substantial arrears following a recent bout of ill health. Once more, longitudinal data (such as the BHPS) should be able to provide the necessary information.

Financial Resources

Savings

How well households cope with the upheavals of the trigger events discussed above depends critically on the financial resources that the household can draw upon. Savings play a crucial role in this regard offering a vital buffer in times of crisis. Unfortunately, those most at risk

of losing their job and other negative events are also the least likely to have accumulated savings (Pryce and Keoghan 2002). Surprisingly, none of the systematic attempts at mortgage risk analysis in the UK (Burrows 1998, Lambrecht 1997, Boheim and Taylor 2000) include savings in their analysis, and so we cannot say what the effect of savings is relative to other factors.

MPPI

An even more surprising omission from both micro and macro models is Mortgage Payment Protection Insurance (MPPI). While there has been no shortage of qualitative and bivariate research on the pros and cons of MPPI, and a fair amount of quantitative analysis examining the take-up of MPPI (Pryce and Keoghan 2001; Pryce 2002; Ford et al 2004), there is an absence of quantitative research on the overall effectiveness of MPPI in preventing arrears. *Holding everything else constant, by what proportion does the purchase of MPPI reduce the odds of arrears?* Failure to answer this most basic of questions is perhaps the greatest shortcoming of the existing UK research.

An important future avenue of research, therefore, would be to include both MPPI and savings in a household level model of arrears in a way that will allow us to understand the relative effectiveness of these two factors in averting mortgage risk. The state safety net, Income Support for Mortgage Interest, is also a potentially important factor though it is unlikely that its effect could adequately be captured in a quantitative micro model because of the complex way eligibility rules interact with other drivers of default risk (such as income and savings).

Financial Commitments

Interest Rates and Mortgage Characteristics

The most obvious factor to affect the ‘outgoings’ side of the household balance sheet are changes to the rate of interest. This has a far greater short-run impact in the UK than many other developed countries because of the prevalence of variable rate and short-term fixed rate mortgages (rather long-term fixed rate mortgages common in the US – see Miles, 2004). As a result, mortgage interest rates, typically captured in the aggregate debt service ratio (total debt interest payments relative to disposable income), have proved to be a key variable in UK macro models of default. OEF (2001, p.12 and 13), for example, find that a ten per cent rise in

the aggregate debt service ratio would result in a 3% rise in arrears and a 9% increase in mortgage possessions.

It should be noted, however, that the impact of changes to the base rate varies enormously between households, depending on the duration, type and size of mortgage, and so it is in fact a very particular subset of borrowers that will likely supply the great proportion of the predicted macro increase in possessions following an interest rate rise. For example, a household with a mature repayment mortgage is likely to be relatively immune to base rate changes, because in the final stages of such a mortgage, the lion's share of monthly mortgage payments are devoted to amortization. Conversely, those with endowment mortgages or newly acquired repayment mortgages will find that their mortgage payments are much more sensitive to interest rate changes. It is surprising then that Burrows (1998) finds that households with interest only mortgages are less likely to be in arrears (he explains this result as the consequence of lenders moving problem borrowers onto repayment mortgages, a hypothesis that has yet to be verified but again could in principle be tested using the BHPS).

It is further surprising that, according to both Burrows and Boehm and Taylor, length of stay does not significantly reduce arrears (neither consider the duration of the mortgage, so length of stay might be considered a proxy), but this is probably due to complications caused by the particular time period considered and the way their models have been constructed. In contrast, the study by Lambrecht et al (1997) adopts a sophisticated "survival analysis" approach to the loan duration issue and finds that for most years the risk of default declines steeply with the maturity of the mortgage (risk of default typically peaks within the first year, holding other factors constant).

Dependents

Another important driver of household expenditure is the number of dependents. Boehm and Taylor (2000) incorporate the number and ages of children with mixed results. They find that 'the probability of eviction falls with the number of children' (p. 312) but the effect is reversed when they look at the probability of arrears; both eviction and arrears risks increase if the household has children aged under six. That the results are contradictory and difficult to interpret is probably due to the fact that it is the number of dependents *relative to income* that is the crucial driver. As noted above, the most appropriate way of addressing this effect is to

use “*equivalised*” income, but this approach has yet to be adopted in UK studies of mortgage risk. As such, there is currently no study that is able to demonstrate that there exists a household structure effect over and above the impact on disposable income.

Other Debts

Servicing of other debts also places a burden on household finances. Again, none of the studies we considered included this factor in their models, though this may be a difficult omission to rectify – survey data on unsecured debt is often limited due to non-response or lack of detail. Macro models, however, can make use of aggregate data to capture this effect (OEF 2001, for example, include non-mortgage debt in their measure of aggregate debt servicing which we discussed earlier).

Other Factors:

Two other factors have been shown to have a link to arrears and possessions: age and Right to Buy purchasers, both of which may have a direct ‘behavioural’ effect on the ability to pay, but may also have an indirect via one of the causes listed above. For example, Burrows (1998) finds that older borrowers (those aged 55 and over) are significantly less likely to fall into arrears. However, because Burrows does not control for equivalised disposable income or outstanding mortgage debt, it is not clear whether this effect arises because older borrowers have fewer financial commitments, or because they have smaller mortgages, or whether it is because they are more skilled at managing their finances. Boehm and Taylor (2000, p.307) find that age has a significant effect on the incidence of arrears (“risk increases until the age of 38 and declines thereafter”) even when mortgage and income factors are controlled for, although the estimation method they adopt does not actually hold other factors constant (in a probit regression, because of the non-linear structure of the estimation routine, all variables interact with each other; one of the advantages of the logit approach adopted by Burrows is that log odds ratios can be used which do indeed allow the researcher to hold other factors constant).

Equity Drivers of Arrears and Possessions

Micro research in the UK has overwhelmingly focussed on “affordability” drivers of possessions, but there is another source of risk which literatures in other countries have considered. Housing equity, the difference between the market value of a property and the outstanding mortgage debt, has the potential to affect a borrower’s incentive to continue with mortgage payments. The equity theory of default states that “borrowers base their default decisions on a rational comparison of the financial costs and returns involved in continuing (or discontinuing) the periodic payments on the mortgage loan obligation” (Jackson and Kaserman 1980, p.678). This contrasts with the underlying assumption of the ability-to-pay literature that “mortgagors, in general, will refrain from defaulting on a loan as long as their income flow remains sufficient to meet the periodic payment without undue financial burden” (*ibid*). In other words, ability-to-pay models of default (such as those adopted in UK micro studies) assume that borrowers will maintain payments as long as financially possible, whereas equity models assume that default will occur if the value of the property falls below the value of the mortgage.

A large US literature has emerged around the latter explanation drawing heavily on insights from the option pricing literature to provide a theoretical foundation (Kau et al 1992, 1995, 1999, Foster and Van Order 1984, 1985). The typical conclusion from such models is that the *current* loan to value ratio will be a key, if not pre-eminent, driver of default risk (Case and Shiller, 1996), the impact of which is only likely to come into effect when combined with a trigger event (such as the decision to take-up a job in another part of the country). The only study to date to consider the equity explanation of default using UK household level data is Lambrecht *et al* (1997). They found that “ability to pay variables are somewhat more important determinants of default times than equity variables. A surprising result is that loan-to-value ratios affect times to default in a counter-intuitive direction in that higher loan-to-value ratios are associated with longer times to default” (Lambrecht et al 1997, p.487).

The Lambrecht et al study, however, has a number of serious data problems: their sample is not random (it is drawn from an insurance claim database) and their measure of equity is the initial loan to value ratio. The only other variables considered are initial salary, marital status and the initial interest rate of the mortgage. Use of the initial loan to value ratio to measure the equity effect is particularly problematic, for three reasons. First, recent US research (Harrison et al

2004) suggests that bad risks may actually choose lower initial LTVs (a “self selection” effect), which complicates the relationship between initial debt gearing and default risk. Second, lenders may restrict the maximum LTV available to a borrower. Whitley et al (2004, p.23), for example, argue that the apparently negative effect of LTV on arrears “is consistent with it being used as a screening mechanism by banks to avoid risky customers”. Third, following periods of rapid house price growth (as recently experienced in the UK), for many borrowers initial loan to value ratios may bear little relation to current housing equity.

Despite the data deficiencies in their study, Lambrecht *et al* (1997) claim that their finding is not unreasonable given the institutional differences in the UK where “... defaulting does not wipe out one’s liability to the mortgage lender. The latter typically continue to pursue delinquent borrowers from repayment. This fact undercuts the apparently simple logic of the equity hypothesis regarding mortgage default.” (p. 486). Whether or not there are real differences in the pursuit of mortgage defaulters between the US and the UK is not a simple proposition to verify (different US states have different debt laws, and UK lenders do not always pursue repossessed borrowers for losses).

Furthermore, there are other possible effects of house price changes on arrears and possessions which are independent of whether or not borrowers respond to motives that encourage default for financial gain. For example, reductions in housing equity may affect household’s ability to cope with financial shocks by “reduc[ing] their opportunity to remortgage to consolidate other debts or to lower their monthly payments” (CML, 2005, p.14). There are also potential macro feedback effects, both through reduced potential for equity conversion, and also through the impact on consumer confidence, both of which will have a negative affect on aggregate consumer demand, unemployment and, by extension, mortgage default. There are also potentially deleterious effects on labour mobility if housing equity is negative or insufficiently large to cover the costs of moving to new job opportunities which could potentially undermine labour market efficiency and exacerbate unemployment rates (Maclennan et al 1997).

The multi-dimensional nature of housing equity probably accounts for the high levels of sensitivity of mortgage default to housing equity reported in macro studies. OEF (2001), for example, estimate that a ten per cent rise in the housing debt-equity ratio would result in a 13% (19%) increase in arrears (possessions) in the first 18 months and a 33% (60%) increase after five years. Similarly, a recent simulation reported in the Financial Risk Outlook (2005),

suggests that a 30% reduction in house prices could ultimately lead to an increase in the ratio of mortgages in arrears to the total number of loans from its current rate of 0.5% to 3%).

Note, though, that these macro estimates do not account for the large discrepancies in housing market performance at the sub-regional level and do not disentangle the different explanations for the housing market effect. A thoroughgoing household level analysis of the equity effect is needed to tackle these conundrums, and would potentially be much more useful than macro analysis in helping lenders and policy makers identify those most vulnerable to equity-related causes of default. Such research would be possible using a panel data set such as the BHPS where household behaviour and housing equity could potentially be followed over time (see Henley 2004 for an attempt at estimating current equity using the BHPS – though his approach could probably be improved upon by making use of the many dwelling attributes and location quality variables available in the BHPS).

Liquidity of Housing Assets

Another potentially important way in which the state of the housing market can affect arrears and possessions is the impact of housing market buoyancy on average sale times, which in turn has a profound effect on asset liquidity – the ability of home owners to translate their housing assets into cash. In principle, a borrower in arrears could “sell their way” out of repayment difficulties. That is, they could avoid repossession by selling their home to repay the outstanding mortgage debt and move to a more affordable property or into rented accommodation, and hence avoid impairing their credit rating. If the market is flat, however, this is much more difficult to achieve within a time frame that would avoid further arrears and possession. And if market has fallen to the extent that the borrower faces negative equity, selling the house to avoid possession may be no alternative at all. To our knowledge, no estimates currently exist on the importance of liquidity in avoiding repossession, but may be an important component of what macro models are currently interpreting as an ‘equity’ effect. Given the large variation in housing liquidity between housing submarkets (see Pryce and Gibb 2004) this would again require analysis at the sub-regional or household level (a prospect now made feasible by the regular collection of time on the market data by automatic valuation companies such as Hometrack).

Further Avenues for Research

Comparing Risks and Returns:

A great deal of the research and debate on the transition to home ownership in the UK has focussed on the downside risks associated with reliance on mortgage finance (for example, the “Half the Poor” publications by Janet Ford and colleagues). The dominance of home ownership as the tenure of choice for those at the lower end of the income scale is often explained as a consequence of limited alternative tenures. There are, however, potentially substantial financial gains and other benefits associated with home ownership and so the choice of owner occupation as the preferred tenure may not be one that arises out of constrained choice but of a rational consideration of risks versus returns. The return on home ownership (particularly equity gains) therefore have to be considered when judging whether the risks that home owners face are unwarranted and worthy of greater state intervention.

Such an analysis would entail estimating the risk of default for particular types of borrower and comparing this with estimates of the returns in terms of gains in equity to each type of home ownership. It may be that poorer households are set to gain least from homeownership because capital gains may be lower on average in smaller and lower quality dwellings (see Thomas and Dorling 2004), and because the risks are also higher for such households (due to higher risk of unemployment and ill health). Nevertheless, the net gains may still compare favourably with those associated with renting.

Note also that difficulties in meeting housing costs are not peculiar to mortgage borrowers. Boheim and Taylor (2000, p.306, 308), for example, find that, holding everything else equal, ‘both social and private renters are significantly more likely to experience housing payment problems than those with a mortgage’ and that “borrowers and private tenants face similar eviction probabilities”. A balanced programme of research aimed at extending the existing UK mortgage risk literature would therefore consider both the risks of all tenures and the returns of all tenures.

Labour supply implications of mortgages

Such an extension of the literature is complicated by the fact that housing finance variables can affect the fundamental economic decisions of the household. As such, there are risks and returns of home ownership to the economy as a whole, not just the individual. We do not have

space to properly expand on this here, but it is worth mentioning one particularly important under-researched aspect: the impact of mortgage indebtedness on household labour supply decisions. In Canada, for example, it has been shown that higher loan to value ratios increase female participation in the labour market (Fortin 1996 based on data from 1986). Although recent research by Andrew Henley has considered the link between a number of mortgage related variables and labour supply in the UK (finding in particular that women reduce hours in response to real housing gains), researchers in the UK have yet to consider the “Fortin effect” (that is, the impact of loan to value ratios on the female labour supply decision). There is currently very little empirical literature in the UK on household adjustment to mortgage repayment problems. The only research to date is a qualitative study by Christie (2000) based on a sample of 20 defaulting households which found significant gender differences in household adjustment to repayment problems.

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