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"Modelling and forecasting mortgage delinquency and foreclosure in the UK."

Janine Aron[a], John Muellbauer[b,*]

[a] Department of Economics, Manor Road Building, Oxford OX1 3UQ, UK and Institute for New Economic Thinking, Oxford Martin School, University of Oxford, Oxford, UK

[b] Nuffield College, Oxford. OX1 1NF, UK and Institute for New Economic Thinking, Oxford Martin School, University of Oxford, Oxford, UK

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ABSTRACT

In the absence of micro-data in the public domain, new aggregate models for the UK's mortgage repossessions and arrears are estimated using quarterly data over 1983–2014, motivated by a conceptual double trigger frame framework for foreclosures and payment delinquencies. An innovation to improve on the flawed but widespread use of loan-to-value measures, is to estimate difficult-to-observe variations in loan quality and access to refinancing, and shifts in lenders' forbearance policy, by common latent variables in a system of equations for arrears and repossessions. We introduce, for the first time in the literature, a theory-justified estimate of the proportion of mortgages in negative equity as a key driver of aggregate repossessions and arrears. This is based on an average debt–equity ratio, corrected for regional deviations, and uses a functional form for the distribution of the debt–equity ratio checked on Irish micro-data from the Bank of Ireland, and Bank of England snapshots of negative equity. We systematically address serious measurement bias in the 'months-in-arrears' measures, neglected in previous UK studies. Highly significant effects on aggregate rates of repossessions and arrears are found for the aggregate debt–service ratio, the proportion of mortgages in negative equity and the unemployment rate. Economic forecast scenarios to 2020 highlight risks faced by the UK and its mortgage lenders, illustrating the usefulness of the approach for bank stress-testing. For macroeconomics, our model traces an important part of the financial accelerator: the feedback from the housing market to bad loans and hence banks' ability to extend credit.

1. Introduction

A record number of UK households (cumulatively 3% of mortgage borrowers, containing perhaps one million individuals) suffered mortgage repossessions (foreclosures) in the 1990 s, following the house price and credit boom of the 1980 s. Payment arrears (delinquencies) also reached record proportions. A subsequent boom ending in mid-2007 again increased the proportion of households with overstretched budgets and over-extended debts relative to their assets. At its peak in early 2009, however, the UK repossessions rate reached only about half that of the 1990 s repossessions peak. By comparison, the US foreclosure rate[1] peaked at 4.6% in 2010, around ten times the 2009 UK rate and far above previous US peaks. A deeper UK repossessions crisis was avoided mainly through dramatic monetary policy interventions, lenders' forbearance policy and increased government income support for those with payment difficulties. With low inflation and a flexible exchange rate, a key difference from 1990 to 1992, the Bank of England's policy interest rate (base rate) was brought down rapidly to half a percentage point. This lowered mortgage rates given the predominance of adjustable rate mortgages in the UK.

Fluctuations in UK repossessions (annualised) and arrears rates are shown in Fig. 1, using data from the Council of Mortgage Lenders[2]. The flow into repossessions peaked in 1991, at an annual equivalent rate of 0.8 of 1% of the number of mortgages. The arrears rates peaked in 1993 (proportions of mortgages with greater than 6 months or greater than 12 months payment arrears), 2 years after the repossessions peak of 1991. The lag can

* Corresponding author.
E-mail addresses: janine.aron@economics.ox.ac.uk (J. Aron), john.muellbauer@nuffield.ox.ac.uk (J. Muellbauer).

[1] The US data measure the total number of mortgage loans in the foreclosure process at year-end, not quite comparable to the UK measure. It exceeds the number of households affected as one household can have several mortgages and not all foreclosure proceedings end in the loss of the home.

[2] Characteristics of the available data on UK mortgage repossessions and arrears are documented in an appendix table in Aron and Muellbauer (2010).

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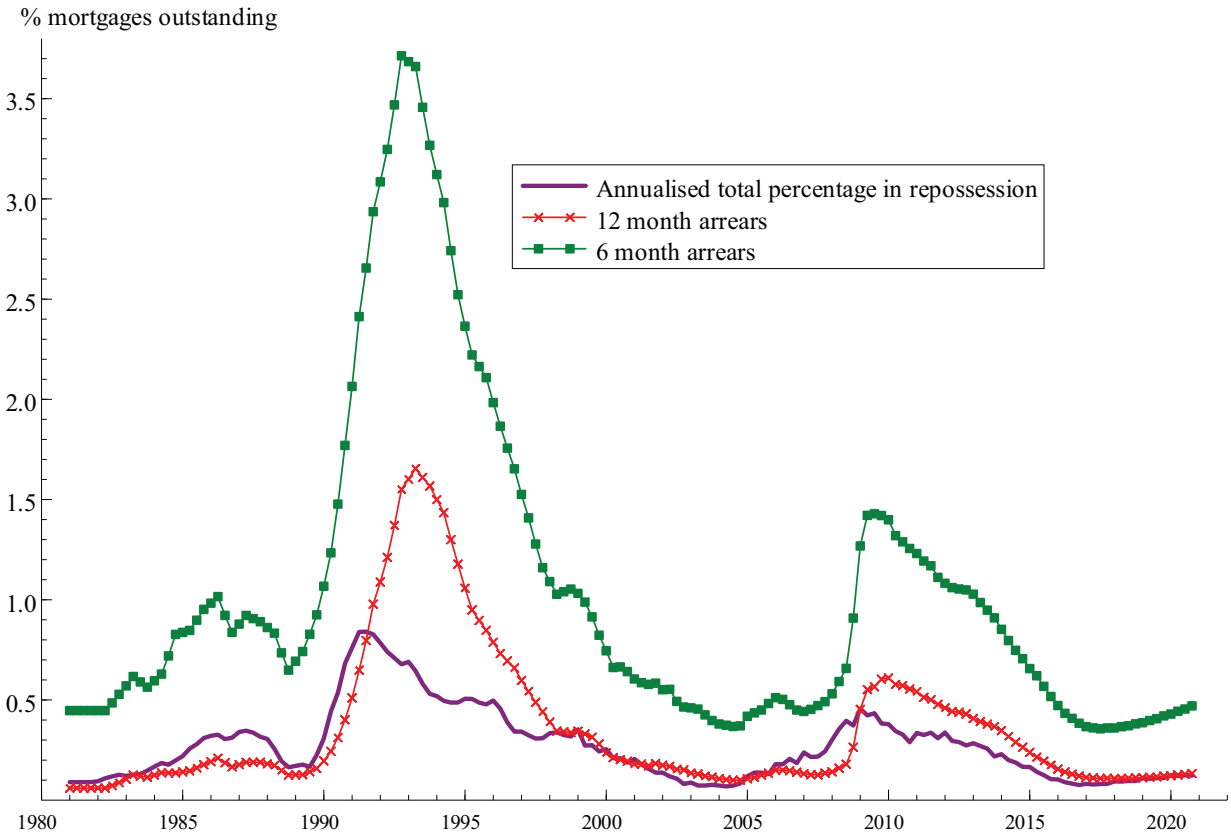

Fig. 1. Repossessions and 6- and 12-month arrears in the UK.

partly be attributed to a shift in government policy and coordinated efforts by mortgage lenders from the end of 1991 to exercise forbearance (Muellbauer and Cameron, 1997).[3] The policy shift reduced the repossessions rate, but the count of mortgages in arrears rose. There are strong parallels between these earlier and the later (2008-9) government interventions and suasion on lenders towards leniency.[4]

A careful study of the aggregate data is pertinent in the UK given the paucity of micro data on mortgage defaults in the public domain. By contrast with a long history of US empirical literature on borrower mortgage default or lender foreclosure, the set of UK empirical studies on repossession and arrears is strikingly limited. Reviews of the US literature into the 1990s on mortgage default and delinquency (e.g. Quercia and Stegman, 1992) and a special focus on empirical testing of option theoretic models of default (Vandell, 1995), reveal even then a wealth of micro-data[5] based studies from both lender and borrower perspectives. The limited quality and availability of corresponding micro-data sets in the UK has constrained the possible analyses. The only micro-candidate for a random sample is the British Household Panel Study (BHPS), but these data are sparse and untimely, and there are problems drawing aggregate implications from them (Section 2.2). This accounts for the small number of (predominantly macro-based) empirical studies, employing a hybrid of the recent default/delinquency theories in reduced form regression models (Table 1).

Even in the US, despite the now widespread availability of loan level data, it can be argued that analysis of aggregate data is useful.[6] Loan level datasets in the US do not equal the universe of all loans. Securities data cover only a subset of the market, which before 2002 was a small subset; service data are broader, but are only reliable from 2005, and cover only two-thirds of the market. For a long national time series, the only option is the Mortgage Bankers Association National Delinquency Survey (NDS), from the early 1970s, but which only provides the sort of aggregates we use for the UK. With a combination of Federal Housing Finance Agency (FHFA) price indices (back to the 1970s), the Federal Reserve Financial Obligations Ratio (back to 1980) and the NDS, one could construct a model of delinquency for the US going back at least as far back as 1980. There are, however, limits with aggregated data. The stability of national house price indices can conceal dramatic regional variation.

Using UK data on aggregate mortgage repossessions and mortgage arrears, we present new quarterly models for forecast simulations. The fundamental economic drivers in our models are the debt–service ratio (the product of the mortgage interest rate and the level of debt divided by disposable income), negative equity and the unemployment rate. We devise an innovative "latent variables" method for modelling lending standards and forbearance policy as a type of "residual" (i.e. going beyond what is measurable such as the extent of negative equity and unemployment rates). Arrears and repossessions are estimated jointly in a system of

[3] Policies then included the shift to direct payment of income support to mortgage lenders and a Stamp Duty holiday, in return for a collective agreement by lenders to exercise leniency.

[4] Later policy shifts included more generous support for Mortgage Interest, the Mortgage Pre-action Protocol from November 2008, and other measures (Wilson, 2014).

[5] The underlying data sets include individual/family loans and their characteristics from Freddie Mac, Federal Housing Administration, Department of Veteran Affairs, Federal Home Loan Bank Board, Morgan Guarantee Insurance Corporation and other banking institutions or institutional bodies (e.g. Mortgage Bankers Association) or Savings and Loans by US states. Panel data sets of income dynamics e.g. by the University of Michigan have also been employed.

[6] We are grateful to a referee for this point.