The Housing Market and Monetary Policy: Extended Abstract*

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1 Introduction

The recent financial crisis has brought the housing market to centre stage of modern business cycle analysis. Understanding the way economic policies, and monetary policy in particular, can stabilize macroeconomic fluctuations through the direct and indirect effects on the housing market is therefore of paramount importance for policymakers and academics alike. By affecting interest rates, monetary policy inherently alters the incentives between borrowers and savers. In addition, in a variety of heterogeneous agent models the housing market can act as a financial accelerator for the transmission of monetary policy.

These are important and much debated elements of the monetary policy transmission, yet little is known empirically about how monetary policy affects different groups of households according to their housing market status. We fill this significant gap by examining the impact of monetary policy shocks on a range of aggregate macroeconomic variables, housing market and credit indicators. While our main focus will be on the UK, due to the availability of both household survey expenditure and mortgage data over a longer period of time, we will also present aggregate results for the U.S. More specifically, we first show that an increase in the policy rate lowers house prices and loan to income ratios significantly, but the response of loan to value ratios is statistically indistinguishable from zero. We then explore the transmission mechanism at a more disaggregated level using a novel grouping strategy of

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households in the UK Family Expenditure Survey. In particular, our goal is to study how changes in monetary policy affect the consumption and income of mortgagors, outright home owners and renters.

In the majority of advanced economies, most household debt is secured on housing and outright owners are, on average, net savers. Furthermore, various housing market heterogeneous agent DSGE models feature both savers and home owners with secured debt. We are therefore able to explore the heterogeneous effects of monetary policy through the lens of a structural housing market model such as Iacoviello (2005). Estimation of the model using micro data from our household groups shows that our empirical results are consistent with a housing collateral mechanism. Two novel aspects of our approach are (i) the use of micro data and (ii) the modelling of a narrative monetary policy shock in the estimation of an otherwise standard DSGE model framework. In terms of theoretical developments, we are currently working on an extension of the financial accelerator mechanism in which loan to income and loan to value ratios play a meaningful role, allowing an interpretation of their shocks as movements in credit supply and credit demand.

2 Our approach

We consider the effect of changes in monetary policy on aggregate housing market variables, as well as the consumption and income responses for different groups of households. We therefore face the usual macroeconomic identification problem that monetary policy responds countercyclically but also affects the economy. To identify movements in monetary policy we need a monetary policy shock series which can be used for estimation. For the United States we use the Romer and Romer (2004) narrative-identified shock series, extended by Cloyne and Huertgen (2014) to 2007. For the UK, we use the Cloyne and Huertgen (2014) shock measure, also constructed in the spirit of Romer and Romer (2004). This method uses information about the target policy rate, together with forecast data available to the policymaker around each policy decision to identify monetary innovations. Our econometric specification then follows Romer and Romer (2004) where we regress the variable of interest on the lags of the shock series.[1]

We first confirm the effect the monetary policy shocks on aggregate consumption, income and housing market variables for the US and the UK. We also then examine the effect on average loan to income and loan to value ratios using aggregated data from a UK database of mortgage loan originations.

To examine how different households respond to monetary policy according to their balance sheet and housing market positions, we use micro data from the UK

[1]We also include the lagged dependent variable and, when we consider disaggregated groups of households we include a range of demographic controls that are common in the micro-econometric literature such as average age and education. For more information see Cloyne and Surico (2013).

Living Costs and Food Survey, previously known as the Family Expenditure Survey. As noted in Cloyne and Surico (2013), there are few datasets that contain information about both the balance sheet position of households and which have detailed consumption and income micro data over a sufficiently long period of time for macro policy analysis. One significant advantage of the LCFS is that it has detailed expenditure and income data that helps form the basis for the National Accounts, as well as information on the households' housing market positions. Unfortunately, however, the LCFS only features repeated cross-sections (rather than a genuine panel of households followed through time). In keeping with the tradition of Browning et al. (1985), we employ a grouping estimator to aggregate individual observations into pseudo-cohorts. To focus on the housing market, the three cohorts we consider are the mortgagors, owners and renters.[2]

The grouping strategy allows us to obtain information about both households housing market positions and their income and expenditure activities. But investigating the effects of monetary policy by housing tenure also has a further advantage. As can be seen in Table 1 from Cloyne and Surico (2013), the mortgagor group tends to have few liquid assets. In contrast, the owner group tends to have sizable net savings. These two groups — borrowers with housing debt and savers — have close parallels in common macroeconomic models of the housing market. For example many models, such as Iacoviello (2005), have followed Kiyotaki and Moore (1997) in constructing heterogeneous agent frameworks which feature patient and impatient households. Differences in discount factors lead some agents to be borrowers and some to be savers. Impatient households are credit constrained but can increase their borrowing capacity by exploiting the collateral value of their housing assets. While it is hard to identify credit constrained households in the data, our mortgagor group has a close mapping to the constrained households in these models. In addition, recent work by Kaplan and Violante (2014), using a different mechanism, has argued that many households could still be 'wealthy hand to mouth' in the sense that they own illiquid assets but are still liquidity constrained.

While typical housing DSGE models produce predications for the consumption response of borrowers and savers, little is known empirically about how reasonable these effects are at a disaggregate level and whether the theoretical channels can explain what is observed in reality. To further explore our empirical results, we estimate a relatively standard housing market DSGE model in the spirit of Iacoviello (2005) but make two innovations over previous contributions. First we directly use micro data on the consumption and income behaviour of mortgagors and owners.

[2]A potential drawback of grouping by housing tenure is the selection effect associated with the possible transition from one tenure status to another over time. However, the very gradual rate at which home ownership has risen in the United Kingdom suggests this may be less of a concern. Indeed, we intend to verify the robustness of our estimates to using the grouping strategy proposed by Attanasio et al. (2002), which directly addresses the possibility of compositional changes. In Figure 7 we also show that the response of the share of different groups to the monetary policy shock is insignificant.

Combining micro data with macro estimation is also appealing because it allows us to estimate some the parameters governing the behaviour of borrowers and savers directly. We can then interrogate whether the mechanisms in the model are consistent with our empirical findings. Second, we show how to use the Romer and Romer (2004) narrative shocks as observable additional information in the estimation process.

Our sample period spans 1975 to 2007 and we stop just prior to the recession when interest rates hit the zero lower bound. In the Figures we also report results from the earlier half of the sample, finding that the full sample results are driven by this earlier period. In the more recent period the effects are much harder to identify with wide standard errors (which is true for both the UK and the US). This mirrors other work in the literature arguing that it is harder to identify shocks during the Great Moderation.

3 Results

In keeping with other studies on the aggregate effects of monetary policy, we find that a contractionary one percentage point increase in the policy rate lowers durable consumption, non-durable consumption and income, both in the UK and the US. This can be seen in Figures 1 and 2. Monetary policy contractions lead to a fall in non-durable consumption, a larger fall in durable consumption and fall in household income. These magnitudes are very similar to the overall effects found in Romer and Romer (2004) and Cloyne and Huertgen (2014).[3]

Before investigating the response of different housing tenure groups, a natural question is what effect monetary policy has on the housing market more generally. We show that a one percentage point increase in interest rates lowers house prices in both the US and the UK, as can be seen in Figure 3. For the UK, we also have detailed information on the behaviour of average LTV and LTI ratios. We find that loan to income ratios fall quickly and significantly, as shown in Figure 8. In contrast, over the first few years the response of loan to value ratios is not statistically different from zero (before rising), as seen in Figure 9. This implies that house prices fall by more than loan values, but loan values fall by more income during the contractionary period. These results suggest that monetary policy may well have different implications for our housing tenure groups. In fact, in many housing market models the response of consumption relative to income is known to differ for impatient and patient households.

We now move to the main results of the paper and examine the response of household consumption and income by tenure status.[4] The results can be seen in Figures 4 to 6. We find that net household income tends to fall for all three tenure

[3]For a reconciliation of these larger magnitudes with the more traditional VAR literature, see Coibion (2012) and Cloyne and Huertgen (2014).

[4]Before proceeding, we confirm that these aggregate results are broadly consistent with those obtained using aggregated micro data from the Family Expenditure Survey for the UK.

groups. However, only the consumption (non-durable and durable) of the mortgagor group significantly falls. In fact, for mortgagors non-durable consumption falls in line with income (with a larger response of durable consumption). But for outright owners, the consumption responses are insignificant.[5] This seems to be direct evidence of credit constraints for the mortgagor group. The larger response of mortgagors than owners also seems consistent with the result above that monetary contractions lead to smaller loans relative to income. We therefore investigate how well common theoretical channels, such as the collateral channel mentioned above, can explain our empirical findings.

We therefore estimate a model in the spirit of Iacoviello (2005). We show that this model has the potential to match stylised features of our empirical results: that impatient households cut consumption much more than patient households, that house prices decline, and the loan to income ratios fall. That said, as noted in Justiniano et al. (2014), lending constraints may also be important and in ongoing work we examine richer models that will allow us to use our evidence to discriminate between different transmission mechanisms.

4 Contribution and summary

This work contributes to at least three strands of the wider literature. First, we contribute to the large body of work on the relationship between the housing market, consumption and the transmission mechanism of monetary policy. As noted above, key older papers include Kiyotaki and Moore (1997) and Iacoviello (2005), as well are more recent work such as Guerrieri and Iacoviello (2013) and Justiniano et al. (2014). However less is known empirically about the strength of the mechanisms and the implications for different types of households. Second, we contribute to the wider literature on the sensitivity of consumption to income changes and the relationship between house prices and consumption. There is obviously a wide literature on these issues, both further back (for example Campbell and Mankiw (1989), Attanasio and Weber (1993)) and more recently (for example, Campbell and Cocco (2007), Li and Yao (2007), Attanasio et al. (2011), Eggertsson and Krugman (2012), Misra and Surico (2014), Jappelli and Pistaferri (2014), Kaplan and Violante (2014)). Third, we contribute to a growing literature using micro data to examine macro-economic issues, for example Coibion et al. (2012) who study the distribution effects of monetary policy.

[5]In our estimation we control for common demographic variables of each group such as age and education. Furthermore, we have also looked at the response of households grouped by birth cohort and education (as is common in the micro econometric literature), although evidence of heterogeneity is far weaker. In related work Cloyne and Surico (2013), show that the household responses to an exogenous income tax changes in the United Kingdom are significantly larger and more heterogeneous across housing tenures than across more traditional sample splits based, for instance, on age and education.

In summary, monetary policy contractions seem to have a larger effect on the consumption of mortgagors than of outright owners or renters. Monetary policy shocks lower income, but it is the mortgagors' consumption that is particularly sensitive. We interpret these findings in the context of the housing market and find that house prices and loan to income ratios fall quickly and significantly following monetary contractions. In contract, loan to value ratios are not significantly affected for the first few years, but then tend to increase. To understand what might be driving these results, we estimate a relatively standard housing market DSGE model featuring patient and impatient households and a collateral constraint on borrowing, following Iacoviello (2005). We find that our empirical results are broadly consistent with the predictions of the estimated model, although understanding the precise channels of transmission is still ongoing research.

5 Figures

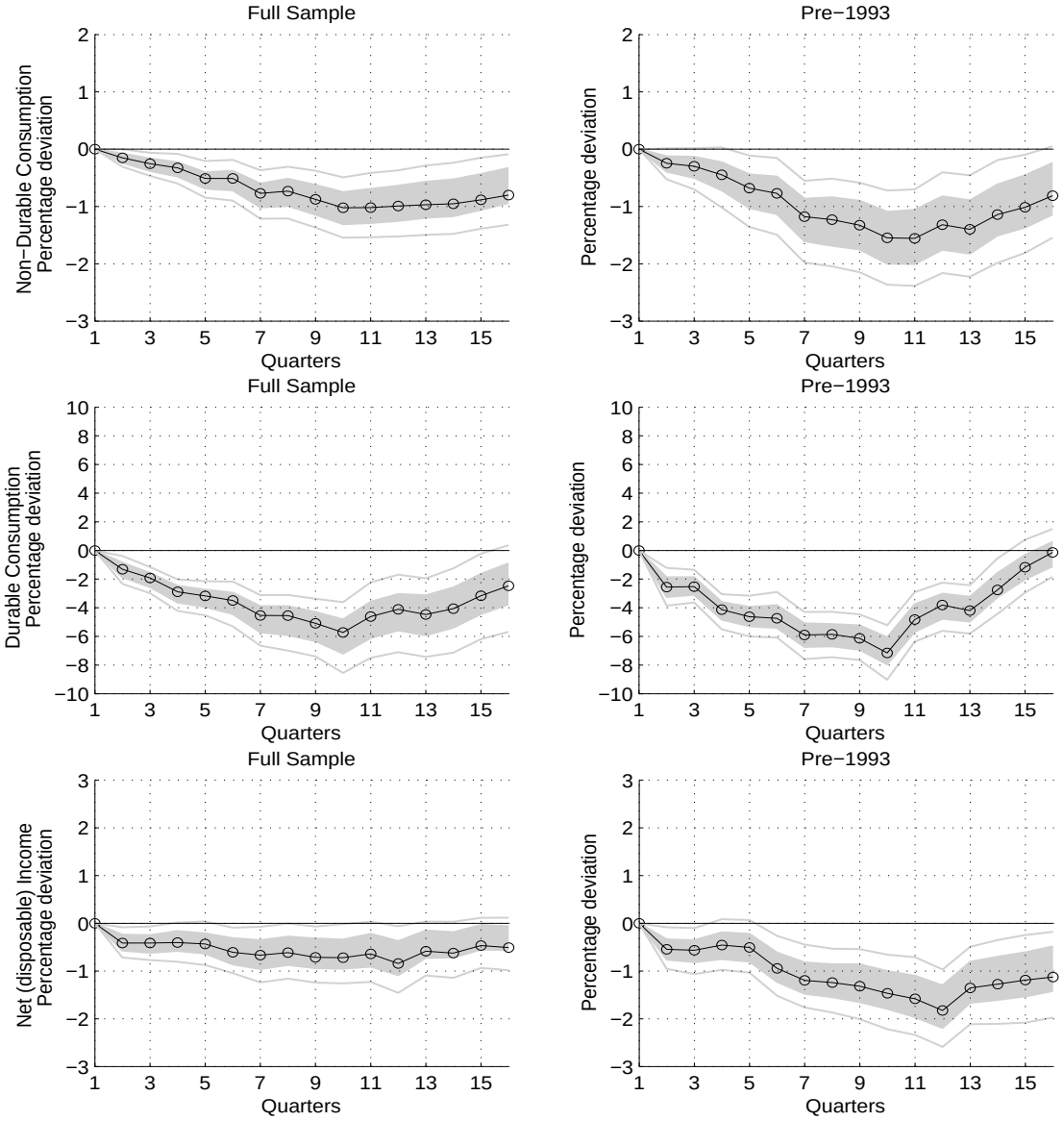


Figure 1: Response of consumption and income to a one percentage point increase in the policy rate UK results

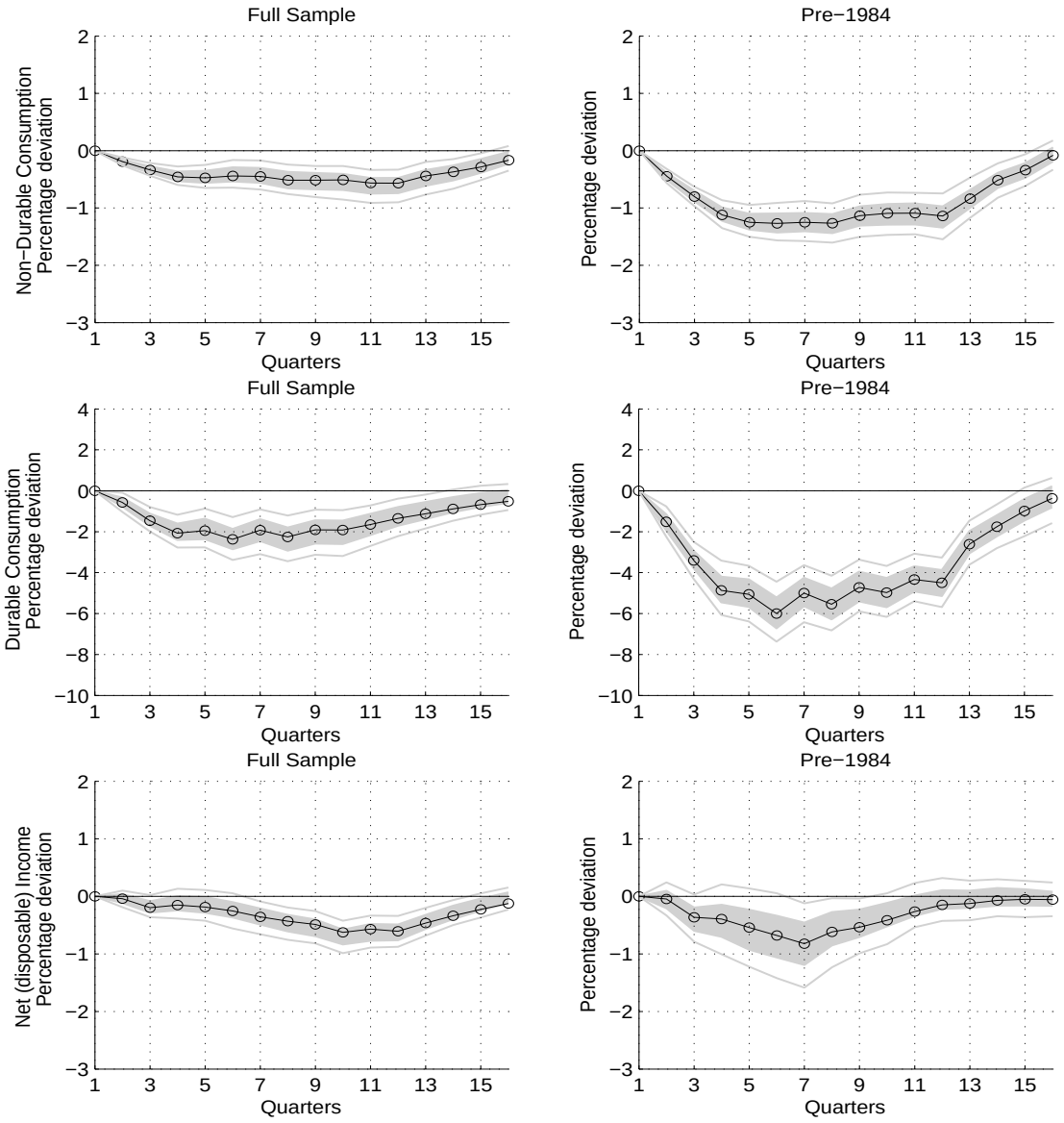


Figure 2: Response of consumption and income to a one percentage point increase in the policy rate US results

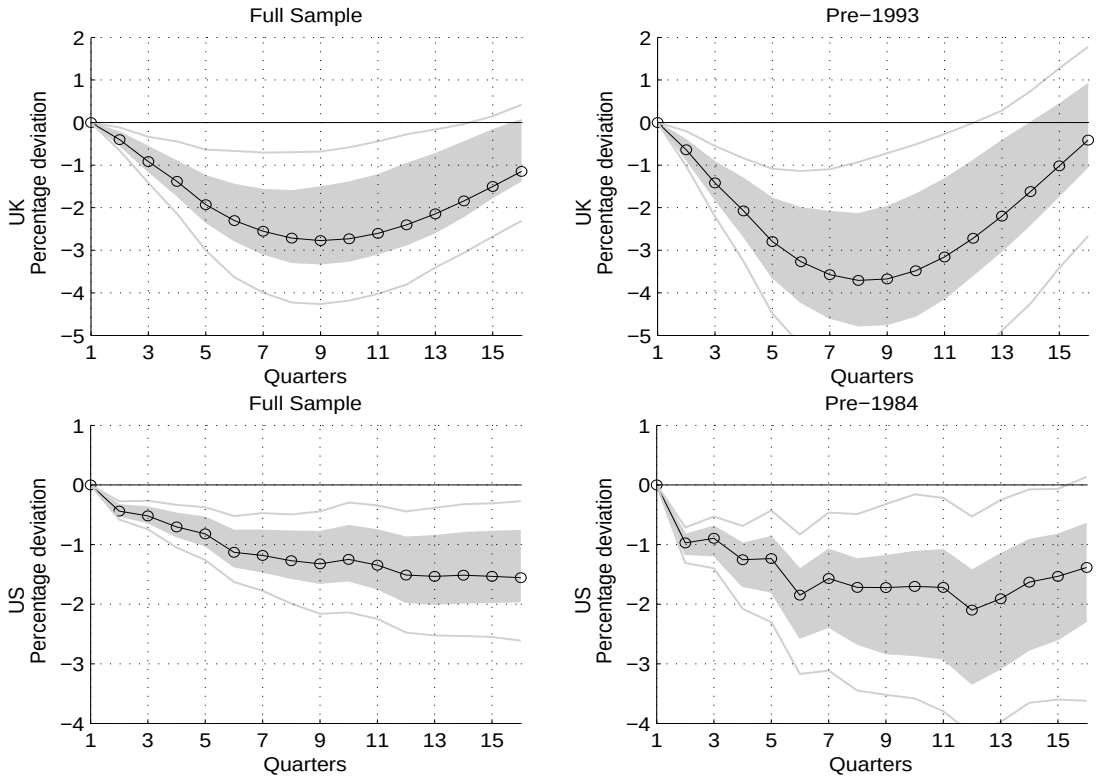


Figure 3: Response of house prices in the UK (top) and the US (bottom)

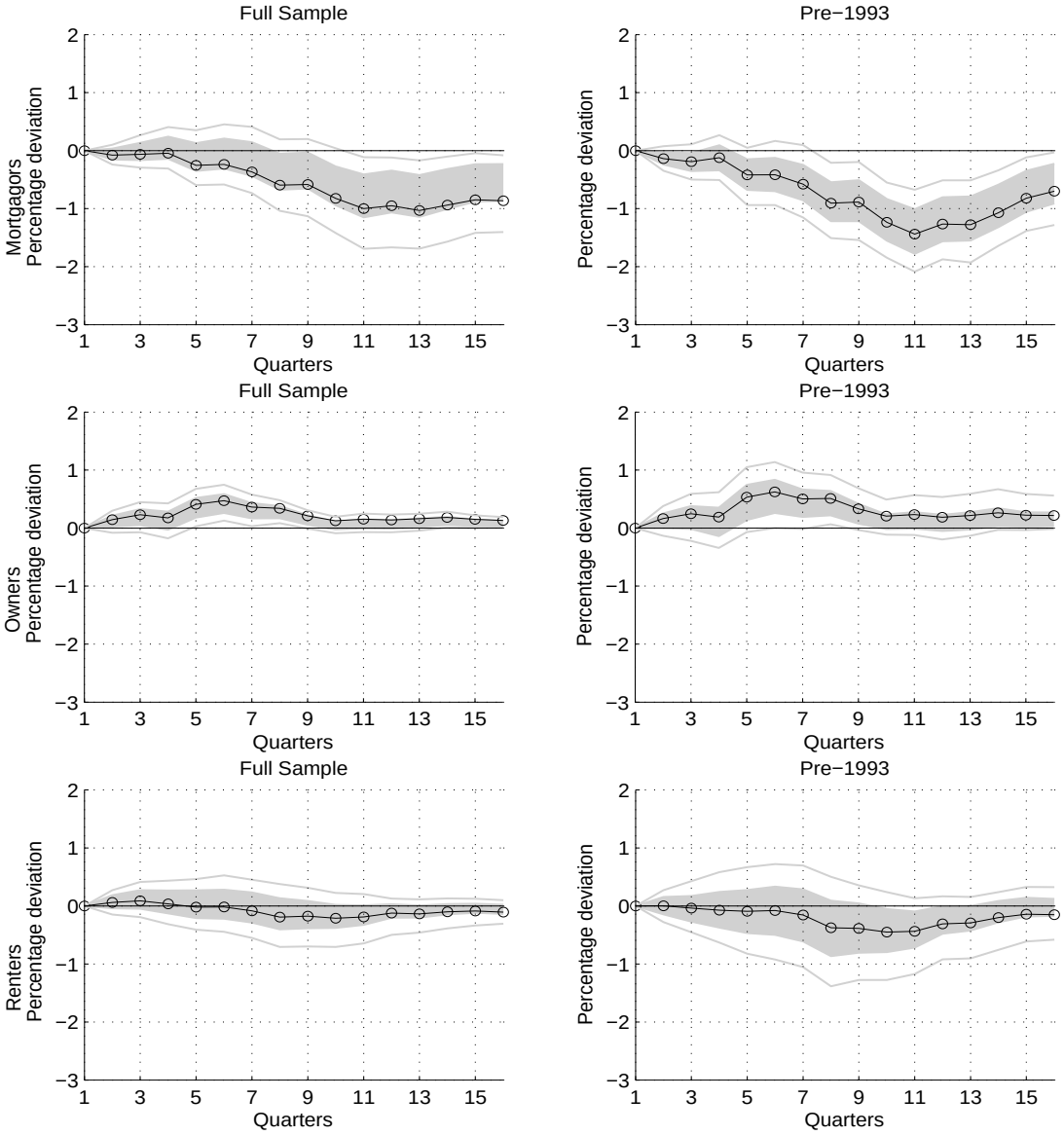


Figure 4: Response of non-durable consumption by housing tenure (UK data)

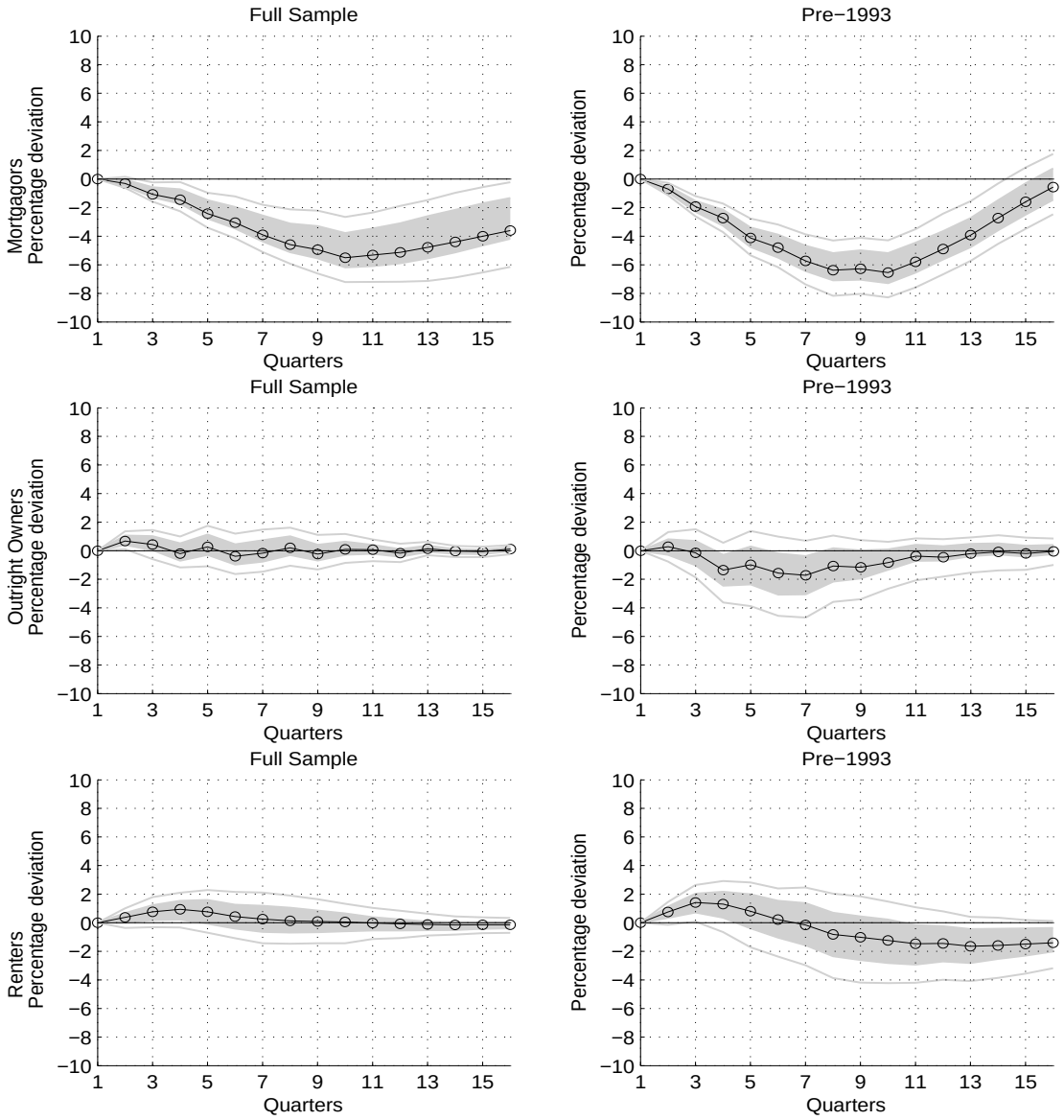


Figure 5: Response of durable consumption by housing tenure (UK data)

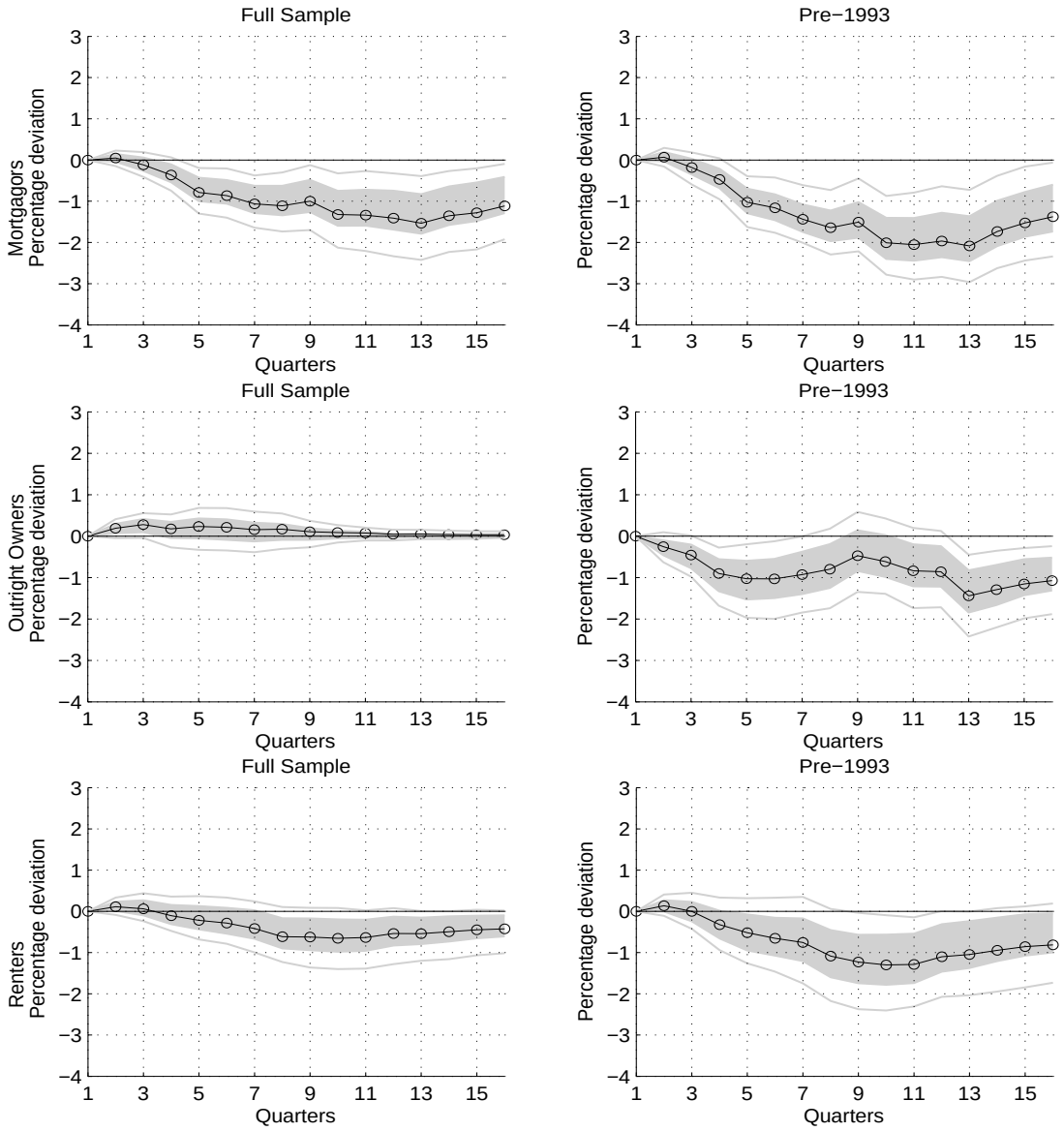


Figure 6: Response of net income by housing tenure (UK data)

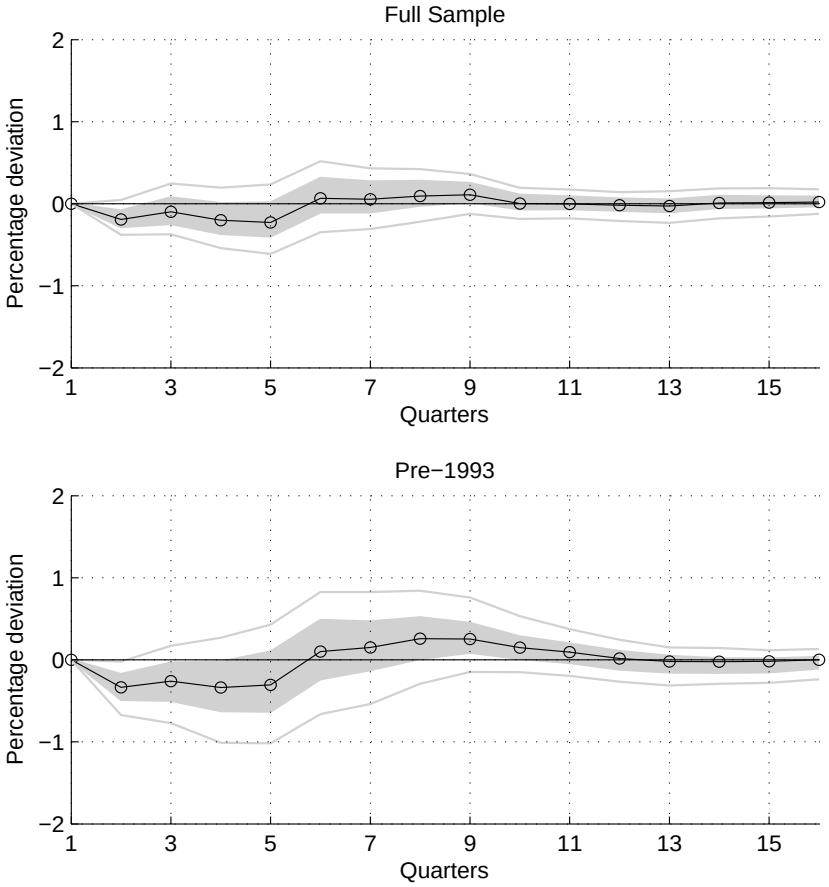


Figure 7: Response of the share of mortgagors to a monetary policy shock

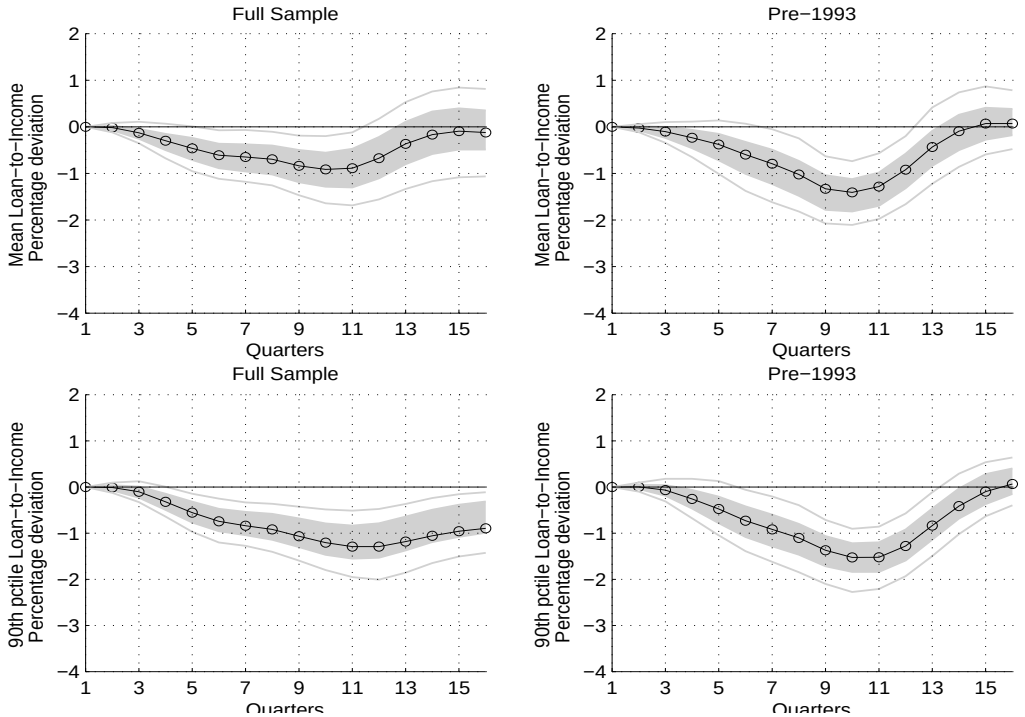


Figure 8: Response of LTI ratios (using CML data up to 2005)

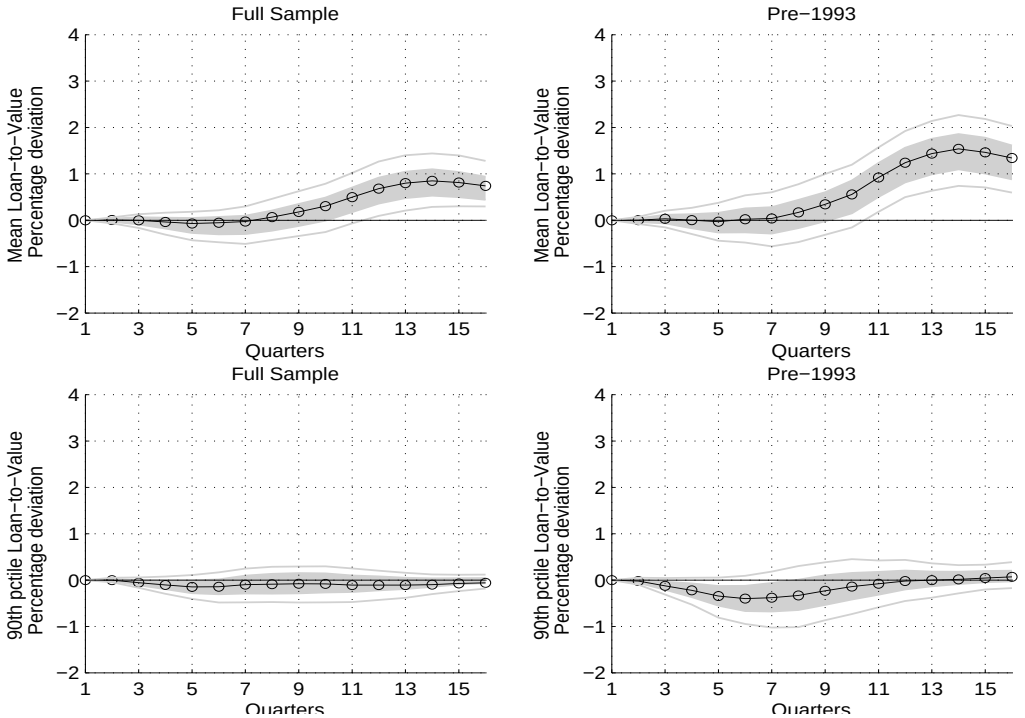


Figure 9: Response of LTV ratios (using CML data up to 2005)

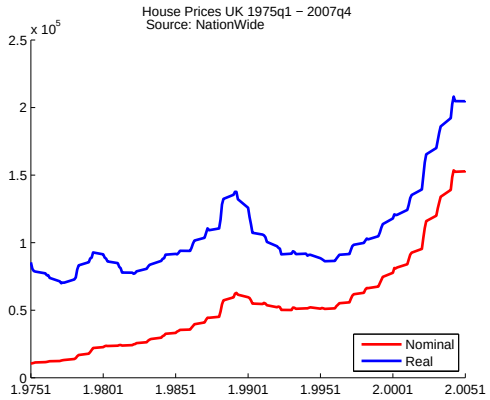


Figure 10: UK house prices over time

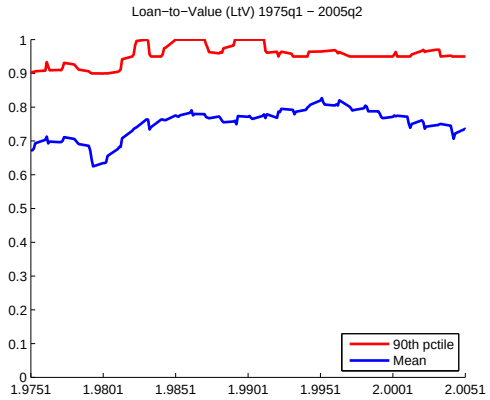


Figure 11: LTV ratios over time (using CML data up to 2005)

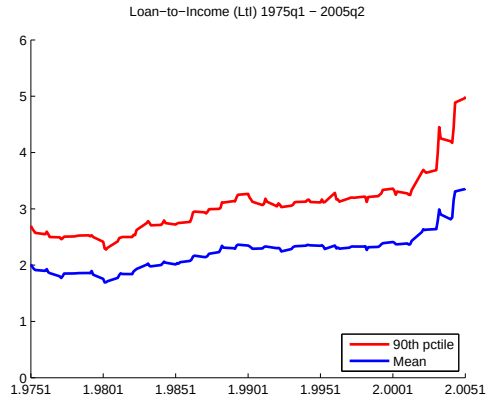


Figure 12: LTI ratios over time (using CML data up to 2005)

Table 1: Net Wealth Position by Housing Tenure

Panel A: 2005 British Household Panel Survey at 2005 pounds

	p25	*median*	*p75*	*mean*	*obs*
Net Financial Wealth					
social renters	-400	0	150	470	1,337
mortgagors	-3,250	0	4,600	3,014	3,179
owners outright	0	3,000	21,540	18,293	2,385
Net Housing Wealth					
social renters	0	0	0	0	1,337
mortgagors	55,000	95,000	150,000	113,257	3,179
owners outright	100,000	150,000	230,000	189,385	2,385

Panel B: 2000 British Household Panel Survey at 2000 pounds

	p25	*median*	*p75*	*mean*	*obs*
Net Financial Wealth					
social renters	-300	0	250	959	1,959
mortgagors	-2,000	82	5,500	4,197	3,234
owners outright	0	3,500	20,000	15,889	2,009
Net Housing Wealth					
social renters	0	0	0	0	1,959
mortgagors	16,000	38,000	71,400	54,572	3,234
owners outright	50,000	75,000	120,000	97,284	2,009

Panel C: 1995 British Household Panel Survey at 1995 pounds

	p25	*median*	*p75*	*mean*	*obs*
Net Financial Wealth					
social renters	-50	0	400	1,185	944
mortgagors	-750	193	3,690	4,209	2,024
owners outright	25	3,000	16,540	15,711	1,054
Net Housing Wealth					
social renters	0	0	0	0	944
mortgagors	29,000	10,000	55,000	37,162	2,024
owners outright	44,000	60,000	85,000	72,069	1,054

Note: Net financial wealth is the value of savings and investments less outstanding non-mortgage debt. Housing wealth is the household's estimate of the property value net of any outstanding mortgage. $p25$ is 25^{th} percentile and $p75$ is 75^{th} percentile.

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