Why house prices matter

By Kosuke Aoki, James Proudman and Gertjan Vlieghe of the Bank's Monetary Assessment and Strategy Division.[1]

This article analyses the role of house prices in the transmission mechanism of monetary policy. It is argued that house prices matter because houses can be used as collateral, against which households borrow to finance housing investment and consumption. The implication of structural change in UK retail credit markets is also considered, as this may have changed the relationship between house prices and consumption.

Introduction

House prices in the United Kingdom have received a great deal of attention from policy-makers and economic commentators. It is often assumed that if house prices are growing rapidly, consumption growth will be strong too. But the economic links between house prices and economic activity are complex. Houses are different from other assets for two reasons. First, people usually live in their houses and value directly the services provided by their home. So the benefit of an increase in house prices is directly offset by an increase in the opportunity cost of housing services. Second, UK houses are not widely traded internationally. So UK homeowners in aggregate cannot realise their capital gains on houses to increase consumption. All UK homeowners cannot simultaneously move out of homeownership. The gain to a last-time seller is therefore also a loss to a first-time buyer, who will usually be a UK consumer too. This contrasts with capital gains on financial assets, which can be realised in aggregate in the United Kingdom, if overseas agents are willing to buy the assets. So there is no traditional 'wealth effect' on consumption from housing in the way that we think of a wealth effect arising from a change in the value of households' financial assets.

But there are other reasons why house prices and consumption may move together. First, if consumers are optimistic about economic prospects, they are likely to increase their consumption of housing and non-housing goods alike. Second, if house price increases are accompanied by an increase in housing transactions, as they often are, these transactions may have a direct effect on consumption as people buy furniture, carpets and major appliances for their new home. Third, house prices may have a direct impact on consumption via credit market effects. Houses represent collateral for homeowners, and borrowing on a secured basis against housing collateral is generally cheaper than borrowing on an unsecured basis (via a personal loan or credit card). So an increase in house prices makes more collateral available to homeowners, which in turn may encourage them to borrow more, in the form of mortgage equity withdrawal (MEW), to finance desired levels of consumption and housing investment. The increase in house prices may be caused by a variety of shocks, including an unanticipated reduction in interest rates, which will lower the rate at which future housing services are discounted.

This article describes in detail how this credit market channel may form part of the monetary transmission mechanism. It also considers the implications for monetary policy of recent structural changes in the United Kingdom's retail financial markets. Increased competition has widened the availability of retail credit and reduced its price. In the mortgage market, there is now a wider range of products, and it has become easier for consumers to withdraw housing equity to finance consumption. Other consumer credit products are also more widely available, so that credit constraints in the United Kingdom may be lower now regardless of the level of house prices.

The article shows that these structural changes are likely to have opposing effects on consumption, house prices, and housing investment. Better access to mortgage equity means that, for a given house price increase, more additional borrowing will be devoted to consumption relative to housing investment. The response of consumption to an unanticipated change in interest rates will therefore be larger, and the response of house prices and housing investment will be smaller. But an increase in the availability of credit unrelated to housing means that consumers do not have to reduce consumption as much in the face of a temporary income reduction. This change in the availability of credit unrelated to housing therefore has the opposite effect: the response of consumption to an unanticipated change in interest rates is smaller, because consumers are less dependent on current income. We estimate that the aggregate effect of the financial innovations combined is that the magnitude of house price responses to an unanticipated change in interest rates has fallen relative to consumption responses. This has important implications for the information content of house prices, because it implies that, even for similar economic shocks, the relationship between house prices and consumption is changing over time.

The UK housing market

Stylised facts

Charts 1.1 to 1.3 show the changes in the key housing variables (house prices and housing investment) and GDP over the period since 1970. House prices move strongly with GDP, though with a slight time lag. Housing investment, on the other hand, clearly leads the output cycle. Housing investment and house prices also move closely together, with housing investment leading house prices.

Chart 1.4 shows the changes in house prices and consumption. Breaking down consumption into durables and non-durables, the strongest relationship seems to be that between house prices and consumption of durable goods (see Charts 1.5 and 1.6). This is consistent with a household credit channel, as purchases of durable goods are more likely to be financed by

borrowing, and so will be more sensitive to changes in interest rates if there are frictions in the market for credit. If changes in the extent of credit frictions are in turn correlated with fluctuations in house prices—for example if house prices proxy the availability of housing collateral—then this could generate a strong correlation between house prices and durable goods consumption.[1]

The effect of monetary policy on house prices: some initial econometric results

As the relationship between consumption and house prices suggests that a household credit channel may be part of the monetary transmission mechanism, we investigate how house prices are affected by monetary policy. We estimate a small econometric model for the period 1975 to 1999 to provide a rough guide to the effects of an unexpected increase in the short-term interest rate.[2] Output falls, and the price level falls after a lag. House prices, housing investment and consumption also fall. Housing investment responds more quickly than house prices, and falls by more. Durable goods consumption falls by more than non-durables consumption.[3]

We also analyse the relationship between housing variables and inflation (see Chart 1.7). We conducted a series of regressions that test the significance of house prices and housing investment in explaining inflation, output and consumption. We find that when real interest rates are included in the regression, house prices have no marginal predictive power for inflation, output or consumption, though housing investment is significant for output. So house prices appear to affect consumption only via their effect on the transmission of monetary policy, but house prices have no marginal predictive power for inflation outside this mechanism.

These results are informative but need to be interpreted with some care. The sample spans a period of considerable change in the UK financial markets, which is likely to have altered the empirical relationships between the variables. The box on page 464 discusses these changes in detail.

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(1) Note that a strong correlation between house prices and durable goods consumption could also arise because both goods are 'lumpy', ie they provide services that last several years. So when consumers learn about an increase in their lifetime income, they are likely to increase their immediate demand for durable goods, including housing, more than for non-durable goods. Nevertheless, it is difficult to achieve the observed amplitude of house prices in a model without credit frictions.
(2) See Aoki, Proudman and Vlieghe (2001) for details of the econometric results in this and the following section.
(3) The results are all measured relative to the variables' underlying trends.
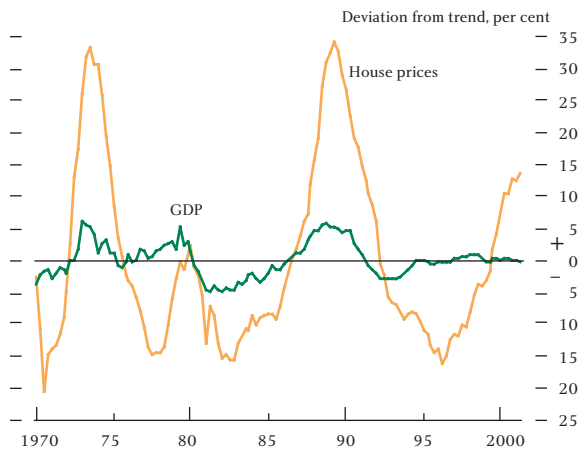
Chart 1.1
House prices and output

Deviation from trend, per cent

Chart 1.2
Housing investment and output

Deviation from trend, per cent
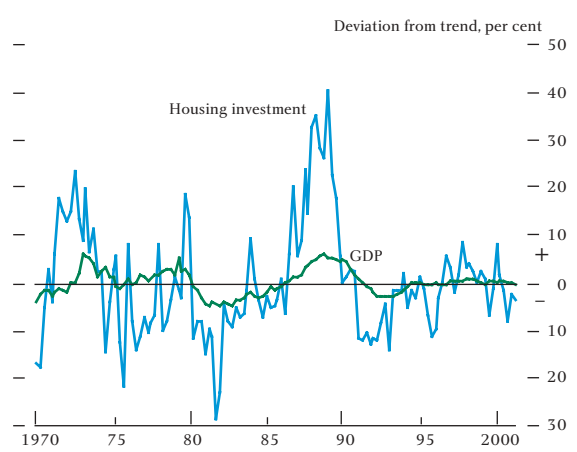
Chart 1.3
House prices and housing investment

Deviation from trend, per cent
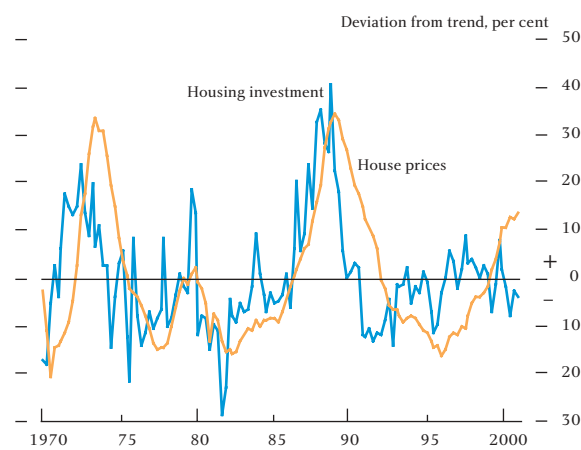
Chart 1.4
House prices and consumption

Deviation from trend, per cent
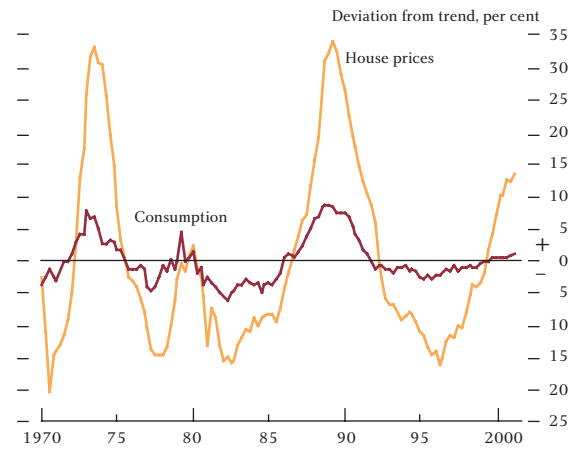
Chart 1.5
House prices and consumption of non-durable goods

Deviation from trend, per cent
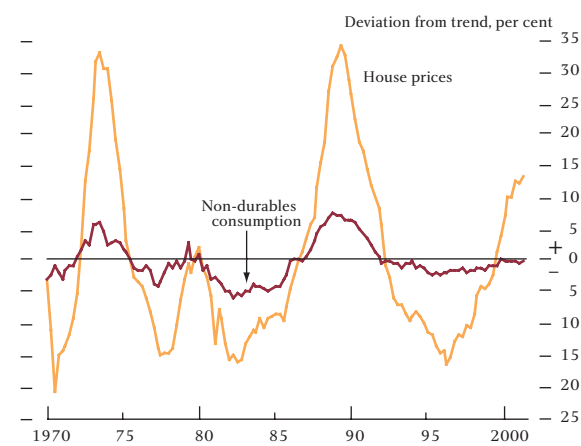
Chart 1.6
House prices and consumption of durable goods

Deviation from trend, per cent
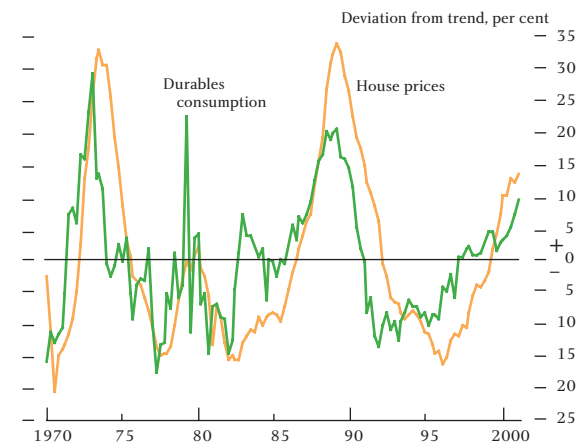
Chart 1.7
House prices and inflation

Deviation from trend, per cent   Per cent

Inflation
(right-hand scale)

House prices
(left-hand scale)
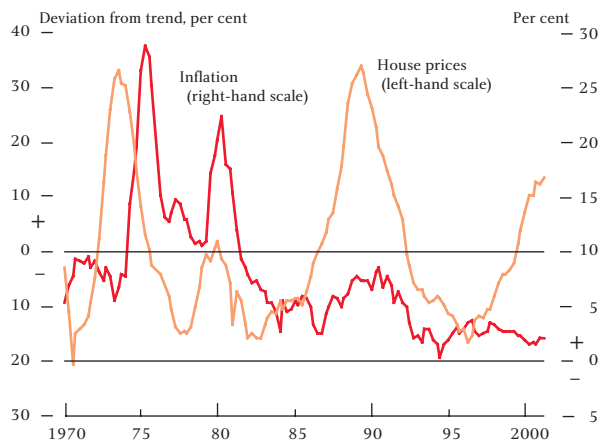
Chart 1.8
Net housing equity and MEW (as a share of disposable income)

Per cent of disposable income   Per cent of gross housing wealth

Housing equity
(right-hand scale)

Equity withdrawal
(left-hand scale)
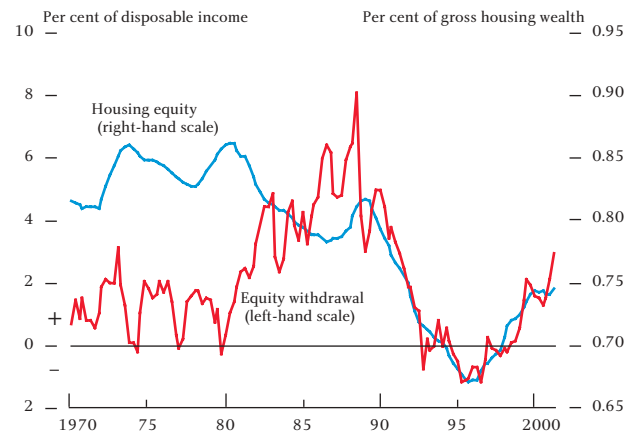
Modelling the household credit channel

This section outlines the model we use to explore the implications for monetary policy of the recent structural changes in UK financial markets.[1]

Our analysis is based on the financial accelerator model of Bernanke, Gertler and Gilchrist (1999) (BGG).[2] The BGG model focuses on the macroeconomic effects of imperfections in credit markets. These imperfections generate premia on the cost of raising funds, which in turn affect borrowing decisions. The BGG framework links the cost of firms' external finance to the quality of their balance sheet and net worth. Our model applies the BGG framework to the household sector.

Credit frictions

In practice, fluctuations in the external finance premium can be thought of as follows. When house prices fall, households that are moving home have a smaller deposit available than they otherwise would for the purchase of their next home, and so they obtain less favourable interest rates when renegotiating their mortgage. A fall in house prices also offers less scope for extracting additional equity to finance consumption. Since house prices determine the collateral value of houses, fluctuations in house prices significantly affect the borrowing conditions that households face.

Modelling 'households'

We think of each household as a composite of two behavioural types: homeowners and consumers. This strategy allows us to consider separately the costly process of borrowing to finance a home from the lifetime consumption decision.[3] Modelling households in this way captures the ideas that some elements of the household sector save while others borrow, and that this process is intermediated through financial markets with credit frictions. Diagram A, which illustrates the flows of funds within our model, emphasises the idea that consumers and homeowners form part of the same composite household.

Diagram A

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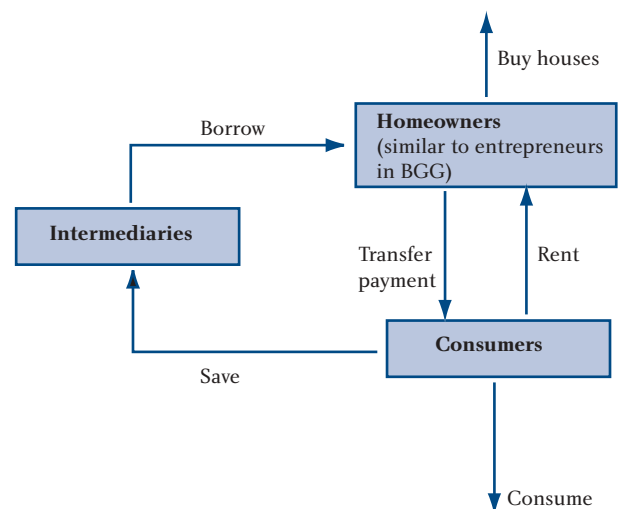
(1) See Aoki, Proudman and Vlieghe (2001) for a full description of the theoretical model.
(2) This model is explained in more detail in Hall, 'Credit channel effects in the monetary transmission mechanism', on pages 442–48.
(3) The solution of household optimisation problems under liquidity constraints and uncertainty is complex, which makes the construction of a tractable general equilibrium model very difficult. Our approach captures many of the implications of this literature for the transmission mechanism of monetary policy in a relatively simple way.

Structural change in the retail credit markets and its effect on the pattern of household debt

There has been a series of major institutional and legislative changes in the UK retail financial markets since 1979. First were the removal of exchange controls in 1979 and the direct control of bank lending ('the Corset') in 1980. And a number of measures (such as the Building Societies Act (1986)) have lifted the restrictions on how building societies operate to give them the same status as banks. Other non-bank entrants—particularly department stores, retailers and insurance companies—have also increasingly been able to offer selected retail financial services, such as credit cards, unsecured loans and mortgage products. For mortgages in particular, the restrictions in place in the 1970s and early 1980s had the effect of making withdrawal of equity difficult, if not impossible: homeowners generally needed to move house to increase the value of their loan, and even then binding loan-to-value restrictions may have limited the extent of the increase (see Wilcox (1985)).[1]

In the mortgage market, the range and flexibility of products have increased. Lock-in clauses in mortgage contracts have become increasingly rare. More firms now offer variable-repayment mortgages, the facility for lump-sum withdrawals against net housing equity, and flexible mortgage products, which allow the borrower to change the loan principal at low or zero transactions cost. A recent survey by MORI for the Council of Mortgage Lenders showed that 16% of respondents now have mortgages with at least some degree of flexibility, defined as those mortgages offering over and under-payments, daily or monthly interest calculation, and the option of payment holidays. In recent months, several major lenders have introduced such flexibility into all of their new and outstanding mortgage loans. And some lenders have introduced 'current account mortgages', where a range of savings and borrowings can be 'pooled' at a single rate, offering even greater flexibility.

Despite this increased competition, the standard variable mortgage spread has not shown a steady decline over long periods. But temporary discounts, usually offered to new customers for the first year or two of the mortgage, have risen, and reached their highest recorded level during 2000. Discounted mortgages have risen markedly as a share of total new mortgage lending, to more than half, which has reduced the average mortgage interest rate that customers pay. Remortgaging, ie obtaining a new mortgage to refinance an existing mortgage, has also increased as a share of total mortgage lending, perhaps reflecting the reduction in lock-in clauses.

The balance sheet of UK households has altered substantially as a result of these changes. The stock of debt as a fraction of annual household income increased from 30% in the late 1970s to more than 100% in 2000. The composition of debt also changed, with the share of unsecured debt increasing from 11% to 19%. So, in aggregate, UK households appear to have become less credit-constrained; more credit is available and more households that previously did not qualify for credit have been able to borrow.

Transaction costs associated with retail financial products have been falling since at least the early 1990s. In the mortgage market households have been able to extract equity more easily when house prices rise. Chart 1.8 shows the relationship between aggregate net housing equity and secured borrowing for consumption, or mortgage equity withdrawal (MEW). Prior to the mid-1980s, there was little relationship between housing equity and mortgage equity withdrawal. When the market was dominated by building societies and subject to rationing, withdrawing additional equity generally required homeowners to move house, which carried high transaction costs. MEW has become more closely linked to movements in net housing equity as new mortgage products allowing refinancing or additional borrowing at ever-lower transaction costs have become available. The increased use of flexible mortgages suggests that this trend is likely to continue. Such products drive the transaction cost of withdrawing additional equity to zero.

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(1) There is another financial innovation, which we do not consider in this paper, that is likely to have had an effect on the behaviour of house prices. In the 1970s and early 1980s building societies collectively agreed the mortgage and deposit rates they offered, and were reluctant to change rates frequently. When market interest rates were rising, building societies would end up with interest rates below market rates. This reduced the supply of deposits, which was their main source of funding (see Pratt (1980) and Wilcox (1985) for an exposition of these mechanisms). Because building societies were also the main provider of mortgages, interest rate rises had a direct effect on the supply of mortgage loans, which is likely to have amplified any effect of interest rates on house prices.

'Homeowners' borrow funds to buy houses (from housing producers) and rent them to consumers.[1] Homeowners finance house purchases partly with their net worth ('internal' finance) and partly by borrowing from financial intermediaries ('external' finance). External finance is more costly than internal finance as lenders cannot perfectly observe or control the risks of lending. This asymmetry of information gives rise to an external finance premium.

'Consumers' consume goods and rent houses from the homeowners. Consumers and home owners are further linked by a 'transfer payment' from homeowners to consumers. This captures the fact that households use their housing equity to finance consumption as well as housing investment. When house prices increase—and so housing equity rises—the household faces a decision problem. It can increase the transfer payment and hence consumption today, which would increase current household utility. But if the household keeps the transfer payment constant, net worth would increase, reducing the external finance premium in the future. In other words the household faces a choice between current consumption and a cheaper future external finance premium. The optimal allocation—and hence optimal transfer payment—would depend on factors such as the elasticity of intertemporal substitution, the sensitivity of the external finance premium to household net worth, and uncertainty about future income. In general, there is a target level of net worth relative to debt (ie leverage), and transfer payments will depend on how far away the household is from its target leverage; payments are assumed to be increasing in the net worth of the households relative to their debt.

Fluctuations in transfers can be thought of as borrowing against housing equity to finance consumption (MEW).[2] Then the sensitivity of transfers with respect to housing equity will also depend on the transaction costs involved in MEW. Other things equal, if it is less costly to withdraw mortgage equity, MEW will be more sensitive to households' financial positions and hence to house prices. This sensitivity is captured in the model by an elasticity parameter on transfers with respect to housing equity. Lower transaction costs associated with

MEW increase the elasticity, because for a given increase in house prices, mortgage equity becomes cheaper to withdraw.

Consumption behaviour

We also assume two types of consumer. Some consumers have accumulated enough wealth so that their consumption decisions are well approximated by the permanent income hypothesis (PIH).[3] Other consumers are assumed to be impatient or subject to borrowing constraints; their behaviour will be similar to rule-of-thumb (ROT) consumers, who spend their current income in each period. So their consumption in each period is equal to their labour income and transfers. The reason for this additional assumption is that PIH consumers can, by definition, borrow without frictions against their lifetime income. They are therefore not constrained by the amount of housing collateral in their consumption decisions.

The rest of our model is standard. We introduce nominal price stickiness in the consumption goods sector so that monetary policy has real effects. House prices are determined by a q-theory of investment.[4] And monetary policy is assumed to follow a feedback rule: the monetary authorities increase interest rates when inflation is above target, and decrease interest rates when inflation is below target.

Model simulations

How does the financial accelerator framework apply in our model? A positive shock to economic activity causes a rise in housing demand, which leads to a rise in house prices and so an increase in homeowners' net worth. This decreases the external finance premium, which leads to a further rise in housing demand and a rise in the transfer paid to consumers. This rise in the transfer payment captures increased borrowing by constrained (ie ROT) consumers, and increases consumption. As in BGG, credit market frictions amplify and propagate shocks to the economy.

We now consider the effects of an unanticipated interest rate reduction within our model, and show how these

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(1) This flow of rental payments within households is captured in the UK National Accounts as imputed rents.
(2) See Davey (2001) for an explanation of the mechanisms by which consumers extract mortgage equity.
(3) The permanent income hypothesis states that consumption decisions are based on expected total lifetime income rather than period-by-period changes in income. Consumers are forward-looking and will vary consumption today when there are unexpected changes in future income.
(4) The q-theory of investment states that investment will rise if the marginal value of an additional unit of capital exceeds its replacement cost. In practice, measures of q are often constructed as the ratio of the market value (as measured by share prices) of capital relative to its replacement cost. The market value of capital will reflect future expected profitability. In housing terms, this means that if the expected future return to housing increases, the market value of the housing stock, and therefore housing investment, will rise.

effects are altered by the financial innovations considered in this paper.[1] The steady-state annual external finance premium is assumed to be 200 basis points and the target ratio of net worth to debt is 0.7, the average historical leverage ratio of UK households.[2] The elasticity of the transfer payment with respect to housing equity is set at 3. This is the estimated average elasticity of mortgage equity withdrawal with respect to the net worth ratio; we experiment with changes in this parameter below. And the share of rule-of-thumb consumers is set at 0.5. The literature suggests a range of between 0 and 0.6; we experiment with changes in this parameter also.

Better access to housing equity

The transaction costs of extracting equity from housing have fallen in recent years, and new product development is likely to reduce costs further in the coming years: MEW and net housing equity have become more closely linked (see Chart 1.8). We examine the implications for monetary policy of this structural change.

In our model, households can either withdraw additional equity for consumption or they can use their stronger balance sheet to lower the rate at which they can finance housing investment. This trade-off is captured by the elasticity parameter on the transfer rule between the house-owning and the consuming elements of the household. Better access to housing equity is simulated as an increase in the elasticity parameter, so that for a given increase in house prices, consumers will borrow more to finance consumption.

Chart 2 shows the effects of an unexpected interest rate cut when the elasticity of transfer payments with respect to housing equity is set to 3 (Case A) and then when it is increased to 10 (Case B). The net effect on housing investment of reducing transaction costs is to dampen the response to the interest rate cut. Its effect on consumption is to heighten the response. This is because, when transaction costs are lower, households consume more of the increased housing equity. The balance sheet improvement is therefore smaller and shorter-lasting than it would otherwise have been, and this dampens the response of housing investment and house prices.

Chart 2
Better access to housing equity
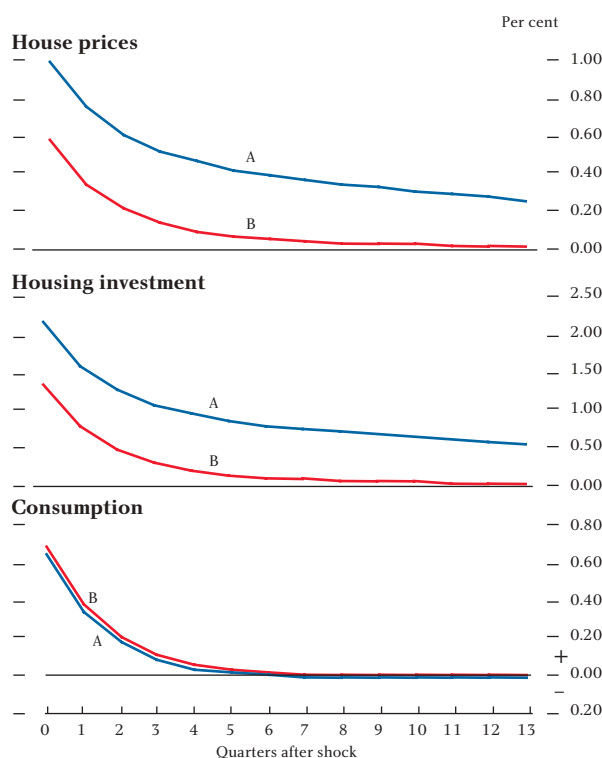
Note: Response of model economy to an unanticipated cut in interest rates of 0.5 percentage points.

Other sources of lower liquidity constraints

We also examine the increased availability of unsecured consumer credit, which may have lowered liquidity constraints independently of changes in house prices. It is likely that households now have better access to credit regardless of the general level of economic activity. We proxy these developments by varying the share of ROT consumers.

Chart 3 analyses the effects of a reduction in interest rates when the share of ROT consumers is lowered from 0.5 (Case A) to 0.2 (Case B). When there are fewer ROT consumers, the responses of investment and house price are larger, while the consumption response is dampened. This is because ROT consumers react strongly to changes in current income, so with fewer ROT consumers, a given unanticipated interest rate change will have a smaller effect on consumption demand, and therefore a smaller effect on inflation. Since the increase in consumption is smaller following the unanticipated interest rate reduction, housing investment is crowded out by less. So housing

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(1) The parameter values chosen for the model underlying the simulations are discussed in Aoki, Proudman and Vlieghe, *op cit*.
(2) Financial innovation may have lowered the target net worth ratio, for example if banks are better able to monitor the riskiness of their loans. We assume here that the target has remained constant.

Chart 3
Lower liquidity constraints
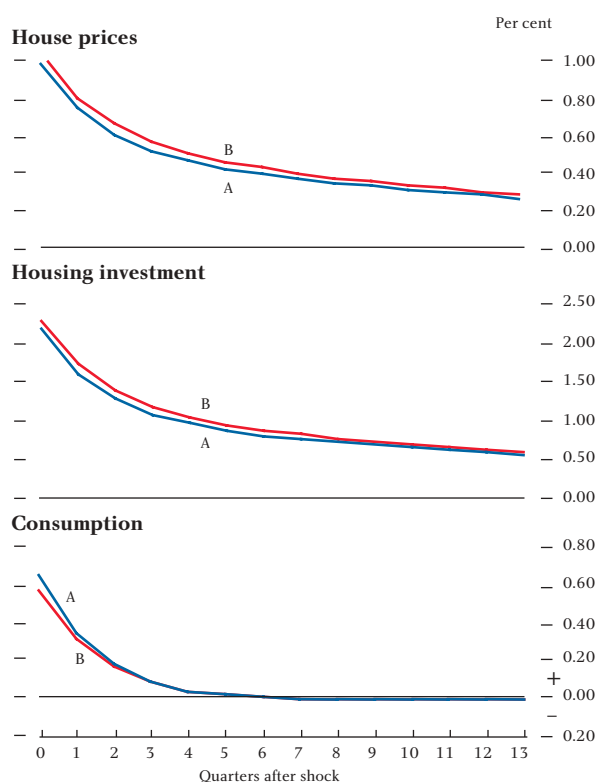
House prices

Per cent

Note: Response of model economy to an unanticipated cut in interest rates of
       0.5 percentage points.

investment and house prices increase by more than in the baseline scenario.

Increased access to both housing equity and lower liquidity constraints

In order to find out which of the two offsetting effects is likely to dominate, we consider the two structural changes simultaneously. We compare the consumption, house price and housing investment responses after both changes have taken place. Because there is considerable uncertainty about how much we need to vary the parameters to reflect the changes that we believe have taken place, we examine a range of parameters that we regard as plausible.[1] The result that house prices and housing investment will move by less when credit constraints are relaxed holds across a wide range of parameter combinations. The result for consumption is more sensitive to the particular parameter choice: consumption can become more sensitive or less sensitive to changes in interest rates, depending on how we calibrate the structural changes.

But the effect of the structural changes on consumption responses is generally small. On the other hand, the reduction in the housing investment and house price responses as a result of the structural changes is substantial. So it appears to hold more generally in this model that changes in consumption will be associated with smaller changes in house prices and housing investment.

Conclusion

This article has examined a credit effect of house prices in the monetary transmission mechanism. We have constructed a model in which house prices affect consumption directly by changing the interest rate at which households can borrow. When house prices rise in response to, for instance, an unanticipated interest rate reduction, this increases the value of collateral available to borrowers, which reduces the external finance premium. With a lower external finance premium, households increase housing investment and borrow to finance additional consumption. We further show that the link between house prices and consumption may have changed as a result of recent structural changes in the UK financial markets. Developments in the mortgage market have increased the response of consumption to an unanticipated interest rate change, but have reduced the response of housing investment and prices. We also simulate the effect on consumption of a general loosening of credit constraints unrelated to housing, proxied by a reduction in the number of rule-of-thumb consumers in the economy. In this case, the effects are reversed: the response of housing investment and house prices is larger, but the effect on consumption is dampened. For a range of parameters, the aggregate effect of the financial innovations combined is that the magnitude of house price responses to unanticipated interest rate changes has fallen relative to consumption responses.

This has important implications for the information content of house prices and the stability of estimated econometric models that do not take these changes into account. Even if the economic shocks facing the economy had remained the same, the relationship between house prices and consumption would have changed over time.

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(1) The elasticity of MEW with respect to housing equity over the whole sample period is approximately 3, which we use in
     our baseline model. Over a more recent period, ie 1986–99, elasticity is much higher at 20. We therefore define the
     plausible range as 0 to 1 for the share of ROT consumers, and 1 to 20 for the transfer adjustment elasticity. Full
     details are given in Aoki, Proudman and Vlieghe, *op cit.*

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