

# The Housing Market and the New Macroeconomic Framework

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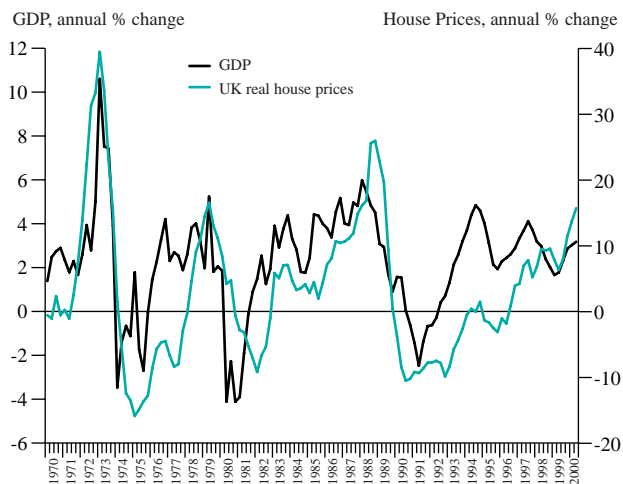
- *The new macroeconomic framework aims to deliver clear objectives for macroeconomic policy with well understood rules and credible institutions. The aim of the framework is to deliver lower inflation, a more stable economy and reduced uncertainty.*
- *The new framework has an important role to play in reducing house price volatility by reducing the amplitude of the economic cycle, but the nature of housing demand and supply in the housing market encourages such house price volatility and, over the long-term, house prices to grow slightly ahead of incomes.*
- *Under the new framework initial mortgage payments will be a comparatively lower proportion of incomes than in the past but debt servicing costs will not erode as quickly. Furthermore lower house price inflation may impede moves up the property ladder.*
- *The framework is likely to subdue activity levels with real house prices growing less quickly over the long-run than they have in the past.*

## Introduction

During 1999 house price growth strengthened, rekindling fears that the housing market would repeat the boom-bust of the late 1980s/early 1990s. This strength was mirrored by a rebound in economic growth with the economy expanding by up to 1% per quarter in each of the last three quarters of 1999. Between 1986 to 1988 the economy grew by 1.25% each quarter and real house prices (after stripping-out the effects of inflation) rose at annual rate of over 25%. Chart 1 shows how housing market cycles mirror economic cycles, although the magnitude of the former are much greater.

A more stable housing market would appear to go hand-in-hand with a more stable economy. A central plank of the Government's macroeconomic policy is to reduce economic fluctuations in the belief that this will help to raise the economy's sustainable or non-inflationary rate of growth. To achieve this it has introduced a framework for policy-making which enables policy decisions to be made for the long-term rather than serving short-term political needs. This

CHART 1: UK REAL HOUSE PRICE INFLATION AND ECONOMIC GROWTH, 1970-2000



Source: DETR and ONS

Note: The DETR house price index was deflated by the consumer expenditure deflator (1995=100)

framework is referred to as the *new macroeconomic framework*.

This article takes a closer look at the new macroeconomic framework and considers its implications for the housing market.

## What is the new macroeconomic framework?

The UK is often singled out as having performed poorly in the second half of the last century, especially when compared with other Western Industrialised nations. The Government elected in 1997 attributed this poor macroeconomic performance to past policy errors. It felt that all too often policy had been conducted with an eye on political concerns and, thus, was short-termist rather than in the long-term interests of the economy. It is argued that these errors could have been avoided if macroeconomic policy had had clear objectives, well understood rules and credible institutions. These ingredients were taken as the cornerstone of the new framework which the Government wanted to be transparent, forward-looking and underpinned by legislation.

The new macroeconomic framework comprises three individual frameworks:

- monetary framework
- fiscal framework
- public spending framework.

### The monetary framework

On 6 May 1997, the Chancellor of the Exchequer announced that the Government was giving the Bank operational responsibility to set interest rates. The Bank of England Act 1998, which enshrined this in law, came into force on 1 June 1998.

The Government sets the inflation target which is reaffirmed in each Budget. The current target is a 2.5% annual increase in the Retail Prices Index excluding mortgage interest payments (RPIX). The inflation target is symmetrical with deviations below target treated equally seriously to those above. The task of the Monetary Policy Committee (MPC) is to set interest rates to meet the target. If inflation is more than one percentage point below or above the target, the Governor of the Bank of England is required to write to the Chancellor explaining why this divergence occurred and how it is being dealt with.

The MPC meets monthly to determine interest rates and announces its decision immediately. To make the process transparent minutes of the MPC meetings are published within two weeks of its decisions. In addition, the Bank publish a quarterly Inflation Report which reviews monetary policy decisions and assesses economic developments. Members of the MPC are subject to scrutiny by Parliament through

the Treasury Committee and a House of Lords Committee.

The MPC currently comprises the Governor (Eddie George), the Deputy Governors (Mervyn King and David Clementi), two Bank Executive Directors appointed by the Governor (Ian Plenderleith and Charles Bean) and four experts appointed by the Chancellor (Christopher Allsopp, Dr. DeAnne Julius, Professor Steve Nickell and Dr. Sushil Wadhvani). The Governor and Deputy Governors are appointed on five-year terms, while the remainder of the committee are appointed on three-year terms.

### The fiscal framework

The Government has a short-term and a medium-term objective for fiscal policy. The short-term objective is to support monetary policy where possible, while the medium-term objective is to ensure the public finances are sound and that the generations benefiting from public spending meet the costs of this spending. These objectives have resulted in two fiscal rules: the golden rule and the sustainable investment rule.

The golden rule requires that over the economic cycle the Government will borrow only to invest and not to fund current expenditures. This rule is met if on average across the cycle, the current budget is in balance or surplus. The sustainable investment rule requires that public sector net debt as a proportion of GDP will be held at a stable and prudent level over the economic cycle. The Government has said a reduction in net public sector debt to below 40% of GDP over the economic cycle is desirable. These rules form part of the Code for Fiscal Stability approved by the House of Commons in December 1998.

### The public spending framework

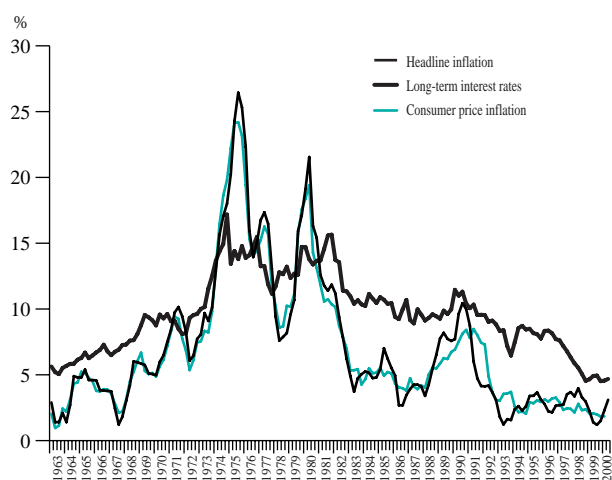
While the fiscal framework provides the guidelines for what governments should spend and borrow, the third framework is concerned with the mechanics for planning and controlling public spending. Three-year spending limits known as Departmental Expenditure Limits (DEL) are set for all the main government departments. Annual scrutiny is applied to those expenditures thought difficult to subject to multi-year limits. This part of government expenditure is referred to as Annually Managed Expenditure (AME). The sum of DEL and AME is Total Managed Expenditure (TME). Within TME a distinction is made between current and capital spending, consistent with the distinction in the fiscal rules.

## Economic gains claimed for the new macroeconomic framework

### Lower inflation

Economists believe the main economic benefit of the new macroeconomic framework is a permanent reduction in inflation. The framework should increase the public's confidence that economic policy will be geared to the long-term and so allow the public to scale down its inflationary expectations. Without this confidence economic policy is argued to lack credibility and inflation is higher than it would otherwise be.

CHART 2: INFLATION AND LONG-TERM INTEREST RATES



Source: ONS

- Notes:
1. Headline inflation is the RPI measure which includes mortgage interest payments
  2. Consumer price inflation is derived from the price index used to deflate household consumption expenditures (the consumer expenditure deflator)
  3. Long-term interest rate is rate on 20-year British Government securities at end of each quarter

Chart 2 shows that the UK's inflation record since around 1993 has been fairly impressive. Headline inflation, RPI, which includes mortgage costs, has consistently been below 5%. Consumer price inflation, which is not distorted by mortgage payments and covers all consumer expenditures, shows an even more impressive performance.

### Economy less volatile

The political system, as well as inducing higher than necessary inflation, can induce greater variability in the economy's output. Rogoff (1985) feared that an independent central bank whose sole concern is inflation would ignore the implications for the volatility of the economy. However, the overwhelming evidence from countries with independent central banks is that volatility has been reduced alongside lower inflation. Alesina and Gatti (1995) show how depoliticising policy-making can

reduce both inflation and output volatility. Economic policy becomes more appropriate to the current and future economic environment. The Government has attempted to address the concerns over the impact of deflationary shocks on economic growth, by making the inflation target symmetrical so that too little inflation is also bad. Chart 1 shows that the profile of recent economic growth is smoother than in the past.

### Reduced uncertainty

The Government argues that an impediment to long-term investment is an uncertain macroeconomic environment. Sustainable economic growth allows individuals and business to plan for the long-term. It allows for steady on-going investment rather than erratic investment patterns. By reducing uncertainty, households and firms alike can make investment decisions more geared to the long-term.

Some commentators argue that increased certainty in the macroeconomic environment allows individuals to reduce their level of saving. They believe that saving rose sharply in the early 1990s as fears grew of a deep and protracted recession and this led the saving ratio (the amount of saving by the household sector relative to its income) to rise to unusually high levels. Since the establishment of the new macroeconomic environment, the saving ratio has fallen and is now below its long-run average.

### Lower long-term interest rates

A by-product of the expectation of lower inflation and a more stable economy is that long-term interest rates can be lower than would otherwise be the case. Long-term interest rates began falling in the early 1980s as economic policy became more geared to the combat of inflation. However, a significant fall in long-term interest rates followed the decision to grant the Bank of England operational independence to set interest rates (see Chart 2). Long-term rates are now at historic lows which may reflect a confidence that the inflation target can be met consistently as well as fostering the belief that the removal of politics from economic policy-making prevents governments engineering the economy for electoral purposes.

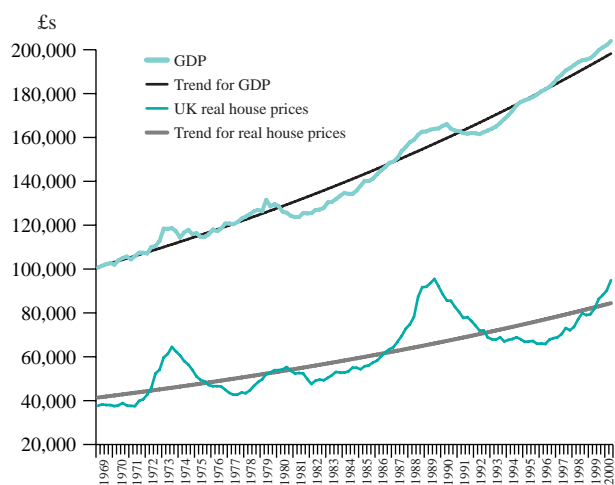
### Economic and house price cycles

One of the benefits attributed to the new framework is a more stable economy. The Government believes this will help to encourage sustainable home-ownership which it defines in terms of financial security of home owners. In the recent Housing Green Paper, the Government stresses that it is 'determined to avoid a return to the boom and bust of

the past, which eroded the security many expected from their homes and created an uncertain climate for one of the most important financial commitments which most people make' (p. 30, DETR, 2000).

Chart 3 shows that the trend in the real average house price and the real value of the economy's output are both upward and that in periods when the economy's output has been above trend so have real house prices. Unsustainable economic growth is associated with sizeable swings in economic growth and in house prices which can hurt householders and lenders alike as demonstrated in the early 1990s.

CHART 3: REAL GDP AND REAL HOUSE PRICES, 1969-2000



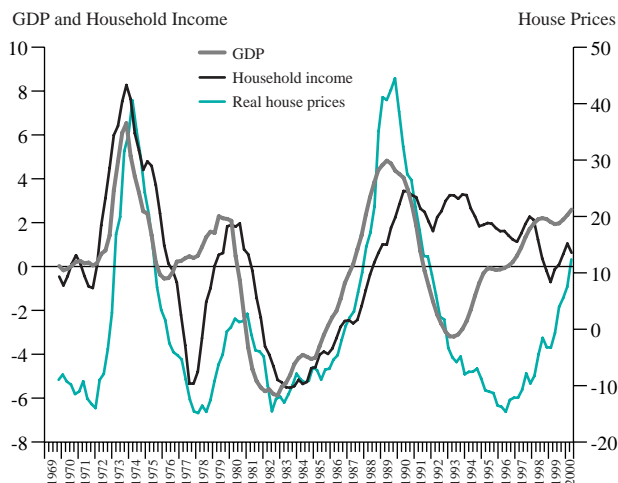
Source: DETR and ONS  
Note: Trends are exponential trends

Looking at the link between sustainable economic growth and sustainable house price growth as shown in Chart 4, it appears that when average house prices diverge from their long-run trend they do so by a significantly greater amount than GDP or household income.

The link between the economic and house prices cycles is strongest during upturns but the adjustment following house price overshoots is much longer and in the early 1990s house prices actually fell in nominal terms during the adjustment. From the peak of the house price boom in 1989 to 1993 house prices fell by 11%, highlighting the clear benefits to households and lenders from avoiding large overshoots in the first place.

During the periods of unsustainable economic growth in the early 1970s and late 1980s, when the output gap or divergence of economic output from trend was between 5% and 6%, real house prices were above their long-run trend by over 35%. Table 1 summarises the extent of over and undershooting of real house prices in the UK since 1969. While there are

CHART 4: DIVERGENCE OF ECONOMY AND HOUSE PRICES FROM TREND, %, 1969 TO 2000



Source: CML calculations  
Notes: 1. Divergences from trend are averages over latest 4 quarters  
2. Correlation coefficient between GDP and house prices is 0.63 and between household income and house prices is 0.56

relatively fewer quarters when real house prices have been above trend, the average overshoot of house prices has been twice the average under-shoot.

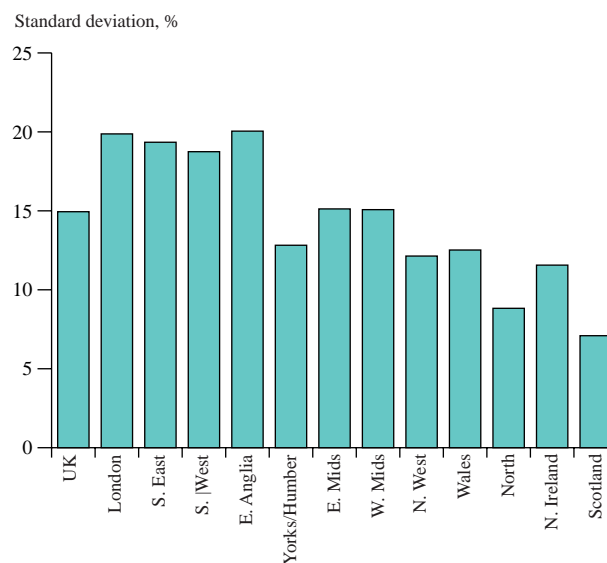
TABLE 1: REAL HOUSE PRICE UNDER/OVERSHOOTING LONG-RUN TREND, 1969-2000

No. of quarters above long-run average	Maximum overshoot %	Average overshoot %	No. of quarters below long-run average	Maximum undershoot %	Average undershoot %
48	44.5	16.9	78	-14.9	-8.4

Source: CML calculations

Chart 5 shows the volatility of real house prices around their trend for the UK regions and countries as measured by the standard deviation. The volatility

CHART 5: VOLATILITY IN DEVIATION OF REAL HOUSE PRICES FROM TREND, %, 1969-2000



Source: CML calculations

in the divergence of real house prices from trend in the UK is not uniform. The greatest levels of volatility are found in London and adjoining regions, although the volatility found in other parts of the UK is still high. In terms of a European comparison, the level of volatility in UK house prices is extremely high, although not unique (see Garratt, 2000a). Holland and Finland, for instance, also have extremely volatile house prices. What does set the UK apart, however, is the combination of a high level of volatility and a high average increase in real house prices.

## The importance of housing demand and supply

In addition to their volatility, house prices have risen both in nominal and real terms over the past thirty years. Both facets of house prices can be related to the underlying characteristics of housing demand and supply. The effect of the new macroeconomic framework on house prices will depend on these characteristics, a point that is all too easily overlooked. Some understanding of these is required to fully appreciate the likely effect of the new macroeconomic framework on house prices.

The influence of the economy on house prices is typically modelled through the effect of household income on housing demand and the degree to which housing supply then reacts to re-establish equilibrium in the market. Over the period from 1969 to 2000, the average annual growth rate of real household income has been 2.7%, while that for real house prices has been 3.2%. To help explain this it can be shown that the increase in house prices resulting from an increase in incomes is greater when

- (i) housing demand is *responsive* to changing incomes
- (ii) housing supply is *unresponsive* to changing house prices
- (iii) housing demand is *unresponsive* to changing house prices.

Empirical evidence finds in the UK the long-term effect of house price changes on housing demand and supply to be weak, while housing demand is fairly responsive to changes in income (see Appendix 1). These findings are consistent with UK house prices growing slightly ahead of household incomes over the long-term. In the short-term the adjustment in housing supply is likely to be more sluggish so that the responsiveness of supply to price is even lower. Such inelastic housing supply magnifies short-term changes in housing demand. Therefore, the short-run effect of volatile incomes is acutely volatile house

prices. The volatility exhibited by incomes is consistent with the volatility of UK house prices. Large swings in economic growth are absorbed by the housing market through house prices. In short, the patterns shown by UK house prices are no fluke, but reflect the underlying characteristics of housing demand and supply.

By curtailing large cyclical swings in the economy the exaggerated movements seen in house prices in the past can be avoided, although volatility is unlikely to be totally eliminated. If the prevailing characteristics of housing demand and supply persist this points to a continuation of rising real house prices over the long-term.

Over the past thirty years average annual house prices have grown by inflation *plus* 3%. But while the new macroeconomic framework could deliver a more stable profile for house price inflation, it would be one where house prices would continue to grow more quickly than general inflation. For it to prevent this it would need to affect the underlying characteristics of housing demand and supply.

## The inflation hedge

The high income elasticity of housing demand in the UK is often attributed to the purchase of a home being a good hedge against inflation (Cutler, 1995). Therefore, as households' incomes rise they demand a greater number of units of housing. This explanation emphasises the investment characteristics of housing. Under a low inflation environment, it is argued, there is less need for this hedge, thereby reducing the income elasticity of housing demand. The new macroeconomic framework reinforces this by making low inflation credible and thus consistently achievable. The consequence is that as incomes rise households invest less in housing than if inflation was higher.

Inflation attacks households' wealth so there is reason enough to consider both how total investment and the share going to housing will be affected by low inflation. A fundamental limitation of the inflation hedge argument is that housing is only one investment opportunity open to investors. Investors use various investment instruments to shelter from inflation. What matters to investors is the real return available on a series of investments, and the associated level of risk on each. The question that needs to be addressed is whether the new macroeconomic framework makes investment in housing less attractive relative to other investment opportunities, thereby causing investors to adjust their investment portfolio.

There is, however, a problem of circularity. If households perceive property to offer the same real return as before then they will continue to invest in additional units of housing as their prosperity increases. In turn, this causes real house prices to rise over the long-term as real incomes increase. If households believe that the framework can reduce the volatility of house prices without impacting on the average annual increase in real house prices, then housing becomes relatively more attractive, not less attractive. In effect, the return is no smaller, and may actually increase, while the associated level of risk is less. This means that households are prepared to invest more as their incomes increase than would otherwise be the case. With housing more attractive compared to other investment opportunities the effective number of substitute goods is rendered smaller and housing demand also becomes less sensitive to price.

Although it is tempting to conclude that housing demand becomes more responsive to income because there is less risk involved, there are other factors muddying the waters. Firstly, the level of total investment might decrease as the demand for inflation hedges fall. Therefore, low inflation and economic stability, which accompany the new macroeconomic framework, have potentially different impacts on housing demand, the outcome of which are not entirely clear. Secondly, the effect of low inflation and the new macroeconomic environment on the demand for housing also depends on any impact they have on mortgage debt. Mortgage debt, for the overwhelming majority, is acquired jointly with housing.

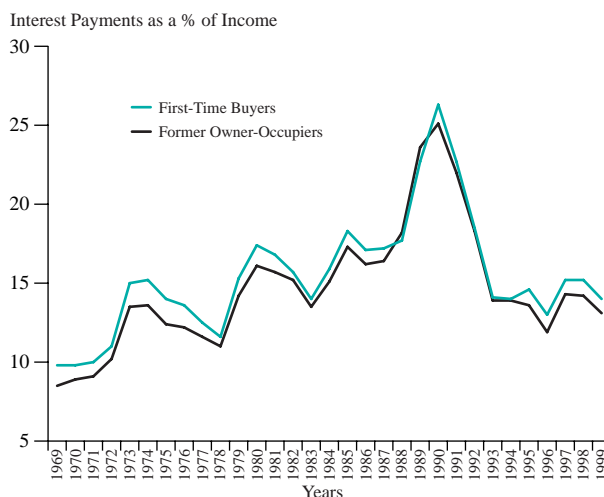
### Debt servicing costs

The return on housing and, hence its attractiveness, is dependent not only on potential capital gains, but also on the debt servicing costs. Low inflation and low interest rates transform the debt-servicing aspect of house purchase affordability and the new macroeconomic framework offers the possibility of lower nominal interest rates on a permanent basis. Chart 6 shows the proportion of income supporting mortgage applications used to meet initial mortgage repayments (interest only). It indicates that the value of mortgage interest payments to income is roughly half the level of the late 1980s.

While interest rates will remain lower under the new macroeconomic framework, so too will nominal income growth. So mortgage payments as a proportion of income also declines more slowly.

To illustrate how low inflation affects the profile of debt servicing costs through the life of a mortgage a

CHART 6: INITIAL MORTGAGE INTEREST PAYMENTS AS A PERCENTAGE OF INCOME FOR FIRST-TIME BUYERS AND FORMER OWNER-OCCUPIERS IN THE UK, 1969-1999



Source: SML  
Note: Based on an interest-only mortgage

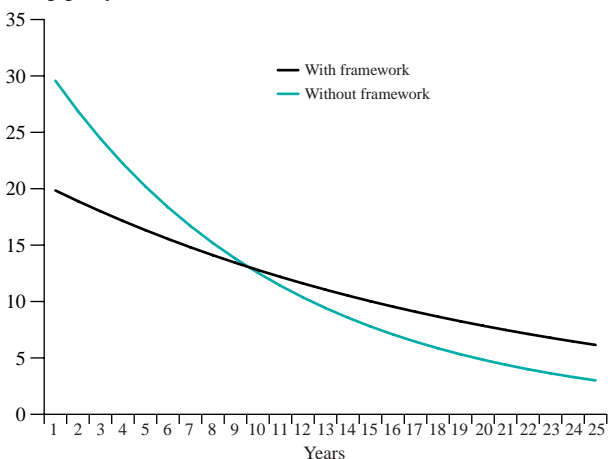
simple model based on a series of assumptions can be used. First, assume a nominal mortgage rate of 7% to represent the low inflation or new macroeconomic framework scenario (this is approximately the building society average mortgage rate since 1997). With an inflation rate target of 2.5% this translates into a real return of 4.5%. Second, assume annual nominal income growth is taken to be 5% each year under the framework so that real household income growth is 2.5%, its long-run average. Under the alternative scenario of higher inflation and no framework, the nominal rate of interest is 12%. This is based on the average rate of inflation between 1960 and 1997 of 7.5% and a real return of 4.5% under both scenarios. The rate of nominal income growth used is 10% which is the average over this period and consistent with real income growth of 2.5%. These assumptions are summarised in Table 2.

TABLE 2: MODELLING ASSUMPTIONS

	Alternative Scenarios	
	Lower Inflation/New Macroeconomic Framework	Higher Inflation/No Framework
Nominal interest rate	7	12
Inflation rate	2.5	7.5
Real interest rate	4.5	4.5
Nominal income growth	5	10

Finally, we take the average advance and income figures for first-time buyers in 2000 Q2, of £62,000 and £26,500 respectively, to generate our mortgage payment to income schedules. These are consistent with an advance to income ratio of 2.34. Chart 7 shows the total value of repayments (interest and capital) as a percentage of income.

CHART 7: ALTERNATIVE SCHEDULES FOR INITIAL MORTGAGE PAYMENTS AS A PERCENTAGE OF INCOME  
Mortgage Payments in Income, %



Source: CML calculations

Under this set of assumptions, the two mortgage payments to income schedules cross at the start of year 10. They suggest that with the current average advance, low inflation results in mortgage payments taking a smaller proportion of income for around nine years. However, for the remaining 16 years total mortgage payments take a larger share of income. While these results are naturally sensitive to the underlying assumptions, the analysis, nonetheless, gives an indication of the impact of low inflation on the burden of debt servicing costs over time.

By reducing the front-end costs and so the initial proportion of income taken by mortgage payments, the new macroeconomic framework makes it easier for potential first-time buyers to enter the market than in the past. However, once on the property ladder mortgage costs maintain their share of income for longer than would otherwise be the case. In addition to the persistence of debt, low inflation impedes homeowners' ability to trade-up and thus move along the property ladder. This too will affect the property decisions of first-time buyers, as well as the level of activity by existing owner-occupiers, which is also likely to be lower.

## Trading-up

To analyse the reduced ability of homeowners to trade-up the paper adapts the work of Pannell (1994) who demonstrates the importance of inflation on a household's level of housing equity. Table 3 shows how inflation helps homeowners to trade-up. Nominal house price and income growth are both assumed to be 10% (each year) and are thus consistent with the high inflation/non framework scenario. Take the example of purchasers of a £75,000 property with income of £26,500, a deposit

of £22,000 and, hence, an advance to income ratio of 2. After a year, the value of their property has increased to £82,500 and the equity in the property has increased by 34% to £29,500 (for simplicity it is assumed that the mortgage is interest-only so that no principal repayments are made until the final redemption date).

TABLE 3: BUILD-UP OF HOUSING EQUITY UNDER A HIGH INFLATION SCENARIO

Year	Annual Income of Purchaser £	Value of Original Property £	Equity in Original Property		Value of Trade-up Property £	Loan Required for Trade-up Property	
			£	£ Relative to Income		£	£ Relative to income
0	26,500	75,000	22,000	0.83	100,000	78,000	2.9
1	29,150	82,500	29,500	1.01	110,000	80,500	2.8
2	32,065	90,750	37,750	1.18	121,000	83,250	2.6
3	35,272	99,825	46,825	1.33	133,100	86,275	2.4
4	38,799	109,808	56,808	1.46	146,410	89,603	2.3
5	42,679	120,788	67,788	1.59	161,051	93,263	2.2
6	46,946	132,867	79,867	1.70	177,156	97,289	2.1
7	51,641	146,154	93,154	1.80	194,872	101,718	2.0

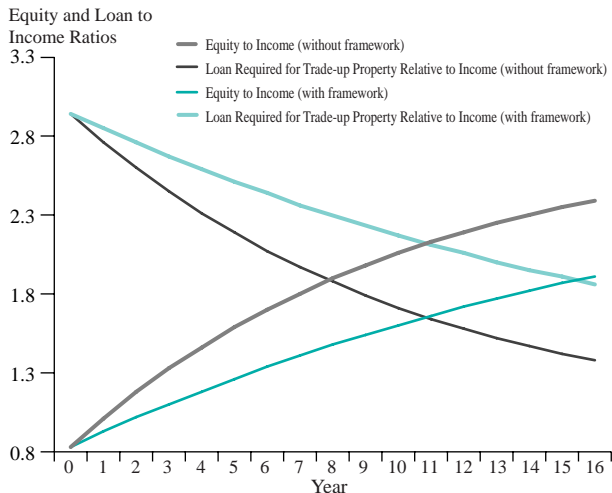
Source: CML

The Table also shows the value over time of an alternative more expensive property, the value of which similarly increases by 10% per annum (each year). The value of the loan needed to trade-up to the more expensive property is simply the value of the more expensive house less the equity in housing.

As a result of house price and earnings inflation of 10%, our household can trade-up to the alternative more expensive property seven years after purchasing the 'cheaper' property. At this moment if the household borrows the additional sums necessary to trade-up they will once again have an advance to income ratio of 2. If, however, under the new macroeconomic framework earnings and house price inflation were both 5%, then after reworking the calculations in Table 3, you find that it is 13 years before the household can trade-up. Under low inflation, therefore, trading-up is made more difficult and less attractive. This is illustrated in Chart 8 which, based on our example, shows the paths of equity in the original property and the loan required to trade-up, both relative to the level of income. With 10% house price and earnings inflation the value of housing equity is equivalent to the loan required to trade-up by year 8, but with 5% house price and earnings inflation, is not equivalent until year 15.

Higher nominal house price growth allows households to trade-up more quickly. Inflation, acts as an escalator "which carries you upward through the housing market, making more and more expensive properties financially accessible. The more rapid the pace of house price inflation, other things equal, the more rapidly the escalator takes you

CHART 8: EQUITY AND LOAN TO TRADE-UP RELATIVE TO INCOME



Source: CML calculations

upwards and the greater the number of property transactions made possible”, Pannell (1994).

## Future prospects for the housing market

The impact of low inflation and the new macroeconomic framework on the characteristics of housing demand is important because it influences the volatility and long-term trend in house prices. There appears to be a body of evidence that housing may be less attractive an investment despite greater stability. Lower housing and earnings inflation results in debt costs persisting and trading-up is also made less attractive by lower inflation because larger cash deposit or mortgage advance to income ratios are required. If these costs are significant then the average increase in real house prices over the long-term will be reduced. Housing demand would be less income elastic but more price elastic.

The new macroeconomic framework hopes to provide more stable conditions which help to promote confidence amongst the household sector. The largest impact of confidence is expected to be in reinforcing the smoothness of activity levels. There is some tentative evidence that large changes in confidence levels, as witnessed in the past, affect the willingness of households to consume mortgage debt (see Garratt, 2000b). A more stable confidence profile will further help to stabilise activity levels.

However, while the new macroeconomic framework may reduce house price volatility, the inelasticity of supply will remain and the more unresponsive the total stock of housing supply is to price, the more changes in housing demand impact upon house prices.

The inelasticity of supply is attributed, in part, to the pool of suitable housing, the planning system and the shortage of land for new housing. In theory, the planning process is designed to enable local authorities to allocate sufficient land to match expected household growth. However, the UK has a very low level of new build per capita by international standards (see Barlow 2000) and the current system may not be allowing sufficient supply in areas of high demand.

## The Euro

The impact on the analysis outlined so far of the UK opting to join the European single currency will depend less on the currency itself than the institutional frameworks for monetary and fiscal policy. The European Central Bank is an independent institution as is the Bank of England, although it is argued to be less transparent. For those in the single currency there are rules governing fiscal policy as in the UK. The Growth and Stability Pact allows for penalties to be applied to nations whose fiscal policy is deemed to be overly-lax. While in the past it was thought that the UK needed the economic discipline of Europe, either by shadowing exchange rates or joining a single currency, the UK’s inflation record and the new macroeconomic framework demonstrate how far the credibility of UK economic policy has improved. The bottom line is that if the UK was to join the single currency, the UK and European economies will have had to converge anyway.

## Conclusions

The new macroeconomic framework takes the UK housing market into uncharted waters. The intention of the framework, which is in fact three frameworks in one, is to provide the conditions for continuous sustainable economic growth. It remains to be seen if in the longer-term economic stability guarantees housing market stability. However, a quick trek through recent UK economic history shows a high degree of correspondence between unsustainable economic growth and an unsustainable housing market. Characteristics underpinning housing demand and supply have meant the instability shown by the economy has been magnified in the housing market. Therefore, while economic stability offers the potential for a more stable housing market, it does not guarantee perfect stability. In particular, the inelasticity of housing supply will magnify the effect of any changes in housing demand.

While not overlooking the significance of the inelasticity of housing supply, this analysis suggests



that the housing market is embarking on a period of greater stability. Activity levels, while being more stable over time, are likely to be subdued by low inflation, with lower inflation extending the time borrowers require to gain the housing equity to trade-up. Low inflation preserves the value of debt too, so that while initial mortgage costs take a smaller proportion of incomes, this proportion declines more slowly thereafter. Similarly, we expect to see a more stable profile for house price inflation than has been the case in the past. If the factors affecting activity levels prove substantive then the average increase in real house prices will be lower than in the past.

## Appendix 1: Impact of household incomes on house prices

The impact of a change in household incomes on house prices is known as the income elasticity of house prices,  $E_{HP}$ . This depends on the ratio of the responsiveness of housing demand to a change in household income (income elasticity of demand,  $E_Y$ ) to the sum of the responsiveness of housing demand and housing supply to price (price elasticities,  $E_D$  and  $E_S$ ). This can be represented by the following, where all values are absolutes.

$$E_{HP} = \frac{E_Y}{E_D + E_S}$$

The effect on house prices of the numerator, the income elasticity of housing demand, is more pronounced the larger is the impact of household income on the level of housing demand. Andrew and Meen (1998) conclude that an increase in household income of 1% is likely to increase the demand for housing in the UK by 1%. An income elasticity of demand of +1 means that changes in income feed roughly one-for-one into changes in housing demand.

The less responsive housing demand is to price, the lower is the price elasticity of demand and the more house prices need to change to offset the impact of a change in incomes on housing demand. Studies find that a 1% increase in house prices reduces housing demand by ½%, implying in *absolute* terms a price elasticity of demand of ½.

The less responsive supply is to price, the more prices need to move to induce the change in supply necessary to meet the change in housing demand. If housing supply was perfectly responsive to price then whatever the effect of income changes on housing demand, supply would always adjust to the point

where prices would be unchanged. Although a more limited amount of work has been done on the effect of prices on housing supply, Meen (1996) finds that for England a 1% increase in house prices increases housing supply by ½%.

Taken together, the three individual responsiveness measures suggest that over the long-term house prices will grow at least as quickly as household income. As we have seen this is not too far off what has actually happened over the past 30 years.

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