PART ONE

UK HOUSE PRICES: A CRITICAL ASSESSMENT

Credit Suisse First Boston
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1. INTRODUCTION: MARKET VOLATILITY

First, the good news. In the very long term, investing in housing – just like investing in equities - is an excellent strategy. But there is bad news. In markets prone to volatile, even bubble-like, behaviour there are some truly terrible, as well as some truly good, times to buy. For consumers who live forever, volatility is a minor inconvenience[2]; for them the rough is – in the limit – evened out by the smooth. For mere mortals, who work, save, and consume over finite lifetimes this is not the case. Market volatility matters.

To illustrate, take equities – usually (and rightly) thought of as having a good long-run return. However, someone paying into a pension scheme over 40 years has an average holding period of at best 20 years. Given that many people deposit most into their pensions later in their working lives and that many don't put in for a full 40 years anyway, the average holding period is a good deal shorter. An average holding period of 15 years finds some people exiting their schemes at different points in time with a great deal less than others. Even though very long-term returns are indeed good, volatility matters for those who will not be around for ever.
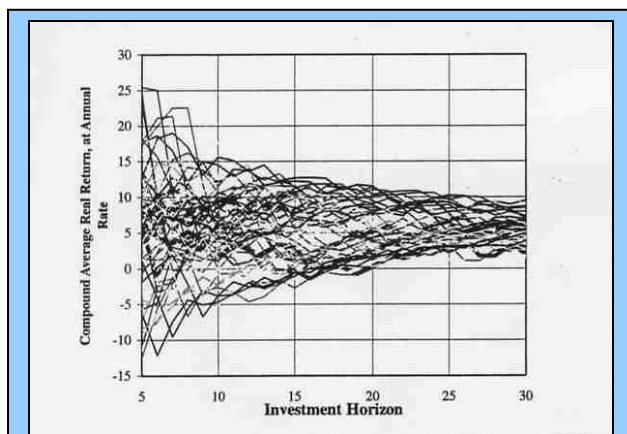

Figure 1: Long run returns to a risky asset – stocks
Andrew Smithers and Stephen Wright, 2000, "Valuing Wall Street, Protecting Wealth in Turbulent Markets", McGraw Hill.

Figure 1 demonstrates the dilemma for mere mortals investing in a supposedly good long-term investment

– stocks[3]. It shows, for each year 1900-1996, the compound average real return made on an investment in stocks in that year (one line for each year of purchase, the first point on each line is the return in the first year, the second point the average of the first two years, etc.). At the ten year horizon the investment could yield anything between -5% and +15% compound average return; for many people it would have been better to have held cash. It takes a full 20 year horizon before they can be certain of a non-zero real return! Those who do best at 20 years meanwhile come out with a nine-fold real increase (11.5% compound average real return)[4]. Many of the above-average years looked, at the time, decidedly unpromising, while many of those years that looked very promising were a disaster. Talk of a typical 'long-run' return is very misleading. If you buy in an overvalued year, you get nowhere near the long-run return in your lifetime!
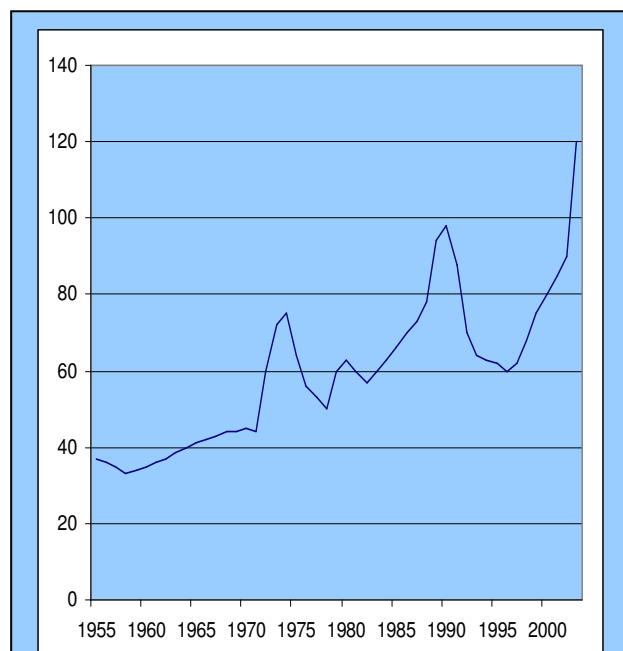
Figure 2: Real UK house prices £1000s, Base=2002

Housing is no different, and probably even harsher[5]. **Figure 2** shows the Nationwide figures for real UK

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[3] Taken from Andrew Smithers and Stephen Wright, 2000, "Valuing Wall Street, Protecting Wealth in Turbulent Markets", McGraw Hill, Chart 11.2, p98, based on S&P composite index.
[4] The diagram is only illustrative since the data sets for each year overlap, so tests for statistical significance are greatly reduced.
[5] This is much harder to demonstrate in a diagram and it would be misleading to try: We do not have 100 years of good quality data – the maximum data series length is about 50 years – thus aggravating the problem of overlapping data sets; many of the interesting years (post-liberalisation) would only give data series of about 10-20 years; if there is a bubble in the recent past few years this seriously biases the analysis – in the direction of indicating good returns; liberalisation has coincided with noticeably more volatile prices, so that the stability of earlier periods biases the overall picture towards one of lower volatility.

house prices. First time buyers sink all at one point in time – largely in the shape of a debt – for an asset of uncertain value, with long-term housing and non-housing consumption possibilities (including future credit constraints based on housing collateral) tied to the ultimate cost of the loan and the relative under- or over-valuation of the asset at this one point in time[6].

Box 1:

"*The biggest housing market correction in the last 30 years saw average nominal house prices fall **just** 12% peak to trough*" (CSFB) But this ignores the fact that real values fell 40%.

Examples:

After paying tax and housing costs every year you have £10,000 left over for living expenses.

Case 1: You own outright a £100,000 house. It is worth ten years' worth of living expenses. Your salary and all prices rise by just under 50% so you can buy exactly the same number of goods and services as before with your spare cash. House prices fall just 12% in nominal terms. But that is 40% in real terms. You are down four years worth of living expenses.

Case 2: You put a £100,000 cash deposit on a £200,000 house. Salaries and prices rise as before, but nominal house prices fall 12%. You are down 8 years of expenses (nearly all your real housing wealth).

Case 3: You put a 25% deposit down on a new £400,000 house. Salaries and prices change as before. This time you have lost all your real wealth, and actually *owe* six years' worth of expenses to someone else. You console yourself that your house only lost 12% in nominal terms.

In a recent study[7] of asset prices and the business cycle the IMF comments that stock, property, and land prices have undergone – since widespread financial deregulation – swings of around typical business cycle frequencies of three to ten years in many industrial countries. The UK is not alone.

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[6] It is often forgotten that the whole point of equity and housing investments is to ultimately consume. A real return of 7% on, say, £1000 would - if you chose not to consume along the way - generate enough purchasing power in about two to three hundred years to purchase just about every marketable thing in the world. The need to consume 'along the way' tempers interpretations of compound interest rates in stockbrokers' small print. A few per cent difference in effective real return – from buying when the market is overvalued – can seriously damage lifetime consumption. Not just first-time-buyers need to take care to avoid buying an overvalued asset; similar reasoning applies to those timing trading-up decisions.

[7] World Economic Outlook, May 2000, "Asset Price and the Business Cycle".

There *are* some terrible years to buy – though thankfully not *that* many. Even when property is mildly 'overpriced', a strategy of investing and taking on debt is not too bad, given the good long-term return from housing and the poor alternative rates. But, those who invested in housing in the UK in 1973 saw a real loss of 40% of their capital over 1973 to 1977 even if they were not leveraged. Someone with a deposit of 20% would have made a real loss of 200% of initial capital. The late 1980s were also terrible years to enter. The losses of the early 1990s only seem large compared to the mid 1970s since low inflation made real losses show up more clearly in the latter period. If projections of 30+% real price falls in the next few years come true then those investing today will get nowhere near the long-term return in this market.

With increased volatility in real estate markets, thinking about this issue has become all the more important for even the most non-professional of investors.

2. MODELS OF HOUSE PRICES

There is no single unified theory of house prices. Theories roughly group into two: i) frameworks using a macroeconomic or financial economics perspective that emphasise housing as investment in an optimising life-cycle model of consumption, with little attention to spatial issues (even when used to analyse regional house prices), and ii) frameworks using an urban economics perspective, placing spatial issues at the centre. We follow the first framework, and find that by following it through to its logical conclusions we still can't explain the pattern of behaviour in the UK.

Box 2:

$$P* = \sum_{t=1}^{\infty} L\left(\frac{1+g}{1+r+\tau}\right)^t \approx \frac{L}{r-g+\tau}$$

(so long as $r - g + \tau > 0$)

Hence $\dfrac{P}{P*} = \left(\dfrac{P}{L}\right)(r - g + \tau)$

Box 2 shows a (simplified) equation for finding optimal housing prices under the first framework, treating housing as any other asset – as something

that ultimately gives utility via consumption, with the added feature (compared to other assets) that housing gives utility while you own it. Such an equation can also be used as one of the bases for tests for bubbles – comparing the change in the actual price of housing with the price 'predicted' on the basis of fundamentals[8]. It is argued in Part Two that this is not that easy to do and there is some sense in looking at the individual factors feeding into house prices and doing some 'qualitative' analysis too.

Everything in the equation is in 'expected' values. Only this year's data is actual; everything else is in the future, and (just as with any other asset) is therefore 'expected'. L is the rent level, g growth rate of rents, r the mortgage interest rate, τ the risk premium. $P*$ is the theoretical 'optimal' price – the sum of the discounted future income that housing will generate. P is the actual price.

If $\dfrac{P}{P*}$ falls, housing prices fall below their optimal

level. Whereas if $\dfrac{P}{P*}$ rises significantly this is described as a 'bubble'. Though two economists can then come to equally reasonable conclusions regarding whether it is significant or not and whether it really is a 'bubble'!

In a sense those who own are renting from themselves – as indeed it is treated in the National Accounts (Blue Book) under imputed rent. Alternatively, since the only other option to owning is renting, the opportunity cost of owning (via payment of interest) is compared to the alternative of renting. So if rent is falling as house prices are rising, then buying housing and renting it to yourself is getting more expensive than letting someone else buy it and rent it to you[9].

One crucially important feature, when looking at explanations given for today's house price levels, is that if consumers are doing as the formula suggests, then only *changes in trends* of fundamental factors will matter for *changes in house price trends*. If underlying factors are trending anyway, this should already be captured in the price trend for house prices. Merely stating that population is still growing

does nothing to explain a step-up in the trend of house price growth. Of course, given the importance of expectations, it all goes wrong if consumers have the 'wrong' expectations and misunderstand the underlying pattern of fundamentals.

We will start with the case of consumers who are not constrained in their access to credit. We will see that the current explanations given by mortgage banks for large house price increases must in the end rely on previous credit constraints that are somehow now unlocked. However, when we put credit constraints back into the analysis, we will find inconsistencies that suggest (even without testing for market efficiency) that the explanation must lie elsewhere. This is taken up in Parts Two and Three, and the analyses of *types of behaviour* that are somehow not fully optimal.

Simplistic explanations of house prices forget that it is the maximisation of *lifetime utility* that should drive analysis - and from this 'correct' house prices follow. Like all assets, housing should be used to *optimally* distribute consumption (including that of housing itself) over lifetime. When critics point out that housing 'is more than just an investment' they forget that the asset-based approach allows for just this.

Critics also often forget that the demand for housing and for *all other* forms of consumer expenditure *should* be set in the *same* theoretical framework. This framework turns out to be a useful pedagogical device; the price and consumption *patterns* generated by changes in each fundamental factor should be consistent with housing's dual role as both consumption and investment, and be consistent with 'patterns' of non-housing consumption and prices generated by the lifetime maximisation of utility. The problem with many of the reasons given for today's high prices is that they generate conflicting patterns of housing and non-housing consumption and prices, because they are not thought through in a unified framework involving *also* non-housing consumption over time.

The framework also guards us against casual explanations that on the outside seem to be based on fundamental reasoning, but are actually based on bubble reasoning: Any analysis that asserts that house-buyers should invest 'because prices have risen' regardless of the fundamentals, is inconsistent with this framework, and is a disguised appeal to a bubble explanation. The framework also guards us

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[8] It has the problem that you need to know a start year when the market was at 'fundamental' values, something avoided by other methods.
[9] Though there are big problems here with the treatment of the tax advantage of housing versus saving, on account of saving being taxed but house price rises not being taxed, and the fact that rent to someone else may be taxed, while rent to yourself is not.

against allowing a bubble later in a series to flatter the average figures[10].

2.1. Some Empirical Results from House Price Models

The life-cycle approach forms the basis of econometric models and tests for housing market efficiency – as outlined in Part Two. For the UK and for all other industrial countries, the most important determinants of long-run national and sub-national house prices have been found to be incomes, real interest rates, housing stock, demographic changes, credit availability, and tax structure.

Meen[11] finds that the price elasticity of UK supply is very small and falling, so that house prices are almost entirely demand determined. The IMF[12] concludes that the UK house supply response has been pretty constant since 1994/5, unlike the last 'bubble' period, when the rates went up. This time the supply response to price rises has been unusually poor. Part Two will explain how this increases the chances of a price bubble.

A survey[13] of many empirical studies suggests the following central estimates of the main long-run national elasticities (there is much more disagreement at the sub-national level):

Real Interest Rates	**-0.02 to -0.04**
Income	**1.7 to 3.0**
Households	**2.0 to 3.0**
Housing Stock	**-2.0 to -3.0**

So, a 1% decrease in real interest rates is typically associated with a 2% to 4% increase in house prices, while a 1% increase in real income is typically associated with a 1.7% to 3% increase in house prices. These are all central estimates and there is some variation; it also depends on the regime of credit constraints at the time. But, at least it pins

things down a bit. We find below that even if we go to the top of some of these ranges, we cannot get enough response to explain current price rises.

2.1.1. Housing Stock

Muellbauer and Murphy[14] find a UK housing stock elasticity of -1.9. That means a 1% increase in housing stock per year puts a downward pressure on the real price of housing of about 1.9% per year. The increase in UK housing stock is currently at its lowest level since the 1950s having recently fallen from about 1% to 0.75% per year. But that is an extra upward pressure on UK house prices of just under 0.5% per year. Hardly dramatic. So un-dramatic in fact as to warrant ignoring it as a contender for an explanation of the recent sudden large rise in house prices.

2.1.2. Demographic Factors

Trends in demographic factors support demand and this helps to explain why housing has a good historical rate of return. However, to support a shifting upwards of that price trend over a few years to a new permanently higher level would require a shifting upwards in the trend of the underlying demographic factors. Whilst the trends keep trending (as is often, if not very illuminatingly, pointed out in mortgage banks' analysis) the position of the trend hasn't recently suddenly shifted. In fact the demographic factors favourable to house prices in the 1980s largely unwound in the early 1990s[15]. As the IMF points out, the households variable works in the long run on prices, and is not a big issue in the short run determination of prices.

CSFB comments: "In addition, government statisticians expect a continued reduction in the average house size – driven by continued proportionate reduction in the number of married couples and cohabiting couples – and this should further support demand." This also is just continuation of a trend rather than a change in a trend, and it ignores the way the same given budget has to be spread over different household types.

2.1.3. The Nominal Interest Rate

Strikingly, given the current emphasis being placed on it by UK mortgage banks, in no econometric

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10 This was apparent in the recent, highly-publicised, Halifax claim of a '300% return' to housing *over* 20 years (more on this in the 'myths' section below), and in the (just out) claims about house buying beating rents in the 'long term'... by... the Halifax again. It is perhaps more readily apparent that if you are told to invest in stocks purely because they have risen 300% over a number of years, when this is not backed up by fundamental factors, that it is not a wise long-term investment; only fundamentals matter in the long term.

11 Meen, G.(1996) "Ten propositions in UK housing macroeconometrics: an overview of the 1980s and 1990s," Urban Studies, 33:425-444.

12 IMF, February 2003, Country Reports No 03/47 United Kingdom: Selected Issues.

13 Meen, 1998, "Modelling Regional House Prices: A Review of the Literature" No.84, Office of the Deputy Prime Minister.

14 Muellbauer, J. and Murphy, A., 1997, "Booms and Busts in the UK Housing Market", The Economic Journal, 107:1701-1727 (data from page 1715).

15 The index numbers used for many international studies ought to, but often do not, weight different demographic groups according to their different space requirements. Often the data just tends to be the number of units regardless of size.

study has the nominal interest rate ever been found to play any role in the *long-run* determination of house prices. At the end of the day, it is the *real* costs of housing that matter.

The recent IMF study of the UK housing market that came up with the figure of greater than 20% (now more like 30%) overvaluation, ran regressions on all variables, including nominal rates, but dropped nominal interest rates when extrapolating the degree of overvaluation. Nominal rates were found to be insignificant. The study concluded: "*Interestingly, while higher real interest rates reduce equilibrium real house prices, nominal interest rates do not appear to have a long-run effect on [UK] real house prices. In the short-run, however, real house prices do respond to changes in nominal interest rate.*" The only way to reconcile the complete non-effect of nominal interest rates on long run UK house prices with a significant rôle on short run prices, is that prices eventually revert to trend.

Muellbauer and Murphy when looking at UK data (1955-1994) also found that including nominal interest rates did nothing to improve the fit.

3. NOMINAL INTEREST RATES

"The key factor behind the doubling in average house prices since 1996 has been the shift to a low interest rate environment... Today, £5,000 of annual mortgage repayments buys £120,000 of mortgage debt, assuming a four percent mortgage rate. This is almost three times higher than the mortgage that could be afforded at 11.5%, the average mortgage rate over the 1980's...It is no surprise therefore that gross mortgage lending is also rising at record levels."
January 2003 Market Comment: Residential Market Forecast 2003, *FPDSavills[16]*

Since the low interest rate environment is given such emphasis by the mortgage industry, we should look in very careful detail at the underlying economic rational for this favoured explanation. What exactly does it mean that house prices *should* double in

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[16] It is standard in such statements to fail to mention that we are in a 'low inflation environment' too these days, and to ignore the need to pay the debt off. And usually the introductory (not the typical, never mind the long-term) interest rate is used; few would suggest that consumers should base the acquisition of a large debt on the basis of a temporarily good mortgage deal.

response to lower interest rates? What exactly is 'affordability'?

When it comes to interest rates, only the nominal level seems to matter to these analysts. It seems "*obvious*" that at an interest rate of 4%, 'affordability' is so much higher than at 11.5%. But, an extreme thought experiment illustrates the futility of this simple reasoning (for the time being we ignore the possibility of credit constraints):

> **Box 3:**
> *Imagine you take on a debt that you can choose to pay off at a nominal interest rate of either 11.5% or 4% per year. You are told that if you choose the first deal, your salary and all prices will grow at 11.5% per year (you pay 0% real interest rate to service the loan – it costs you nothing), but if you choose the second deal you will experience no growth in income or prices whatsoever (you pay 4% of real income every year to service the debt).*
>
> *Which deal would you prefer?*
>
> *Only the **real** rate matters.*

Some simple figures show how damaging this confusion can be. Table 1 shows the relationship between incomes, mortgage rates, mortgage repayments, general price inflation, and wage inflation assuming no credit constraints (for the time being).

Row 1: With a 10% nominal mortgage rate and £30,000 of income, monthly repayments of £918 will get a mortgage of £100,000. The real interest rate is 3% (10% minus 7%) and there is growth in real wages of 2% (9% minus 7%) every year. The burden on income, and hence onto future consumption, falls over time. Lifetime burden of the mortgage is 15% of real income.

Row 2: If the nominal mortgage rate falls to 5%, *and yet price inflation and wage inflation stay the same*, then the *same* proportionate lifetime spend on housing (in this case 15%), supports an approximately 50% higher mortgage. However, this all comes here from a negative real interest rate! There is the same proportionate pattern of payments over time as in Row 1, even though the nominal interest rate has fallen (the pattern is a function of the real interest rate). Even the interest rate story most supportive of rising house prices – a *permanently* lower real interest rate – does not favour consumption of housing *per se over* all other

Table 1. * 'burden' is the percent of monthly or lifetime income used to support the loan							Percent burden* of monthly payments after:				Percent burden* of whole mortgage
	Salary	Mortgage	Mortgage rate	Monthly repayment	Inflation rate	Wage inflation	1 year	5 years	10 years	25 years	(in real terms)
1	30,000	100,000	10%	£918	7%	9%	34%	24%	16%	4%	15%
2	30,000	155,300	5%	£918	7%	9%	34%	24%	16%	4%	15%
3	30,000	155,300	5%	£918	2%	4%	35%	30%	25%	14%	23%
4	30,000	100,000	5%	£591	2%	4%	23%	19%	16%	9%	15%

goods and services, or a higher ratio of lifetime income spent on housing[17].

If this reasoning applied to just one person, they could buy half as much housing again. But, in a supply-constrained world, with many consumers bidding, house prices rise and they simply pay more for each unit of housing services. The higher house price capitalises the lower interest rate and (in the very simple case) consumers consume the same proportions of housing and all other consumption.

Row 3: The nominal mortgage rate falls by 5% to 5% and general price inflation and wage inflation *also fall* by 5% so that all real interest rates and real income levels are the *same*. Were customers to take on higher mortgages and bid up house prices (and debt) to a level that results in the same £918 monthly mortgage payment, they will pay 23% of an unchanged real lifetime income on mortgage costs – the load is much higher in later years, falling much more slowly than in Rows 1 or 2. Standards of consistency require us to explain why agents choose to spend a larger portion of the same real lifetime income on housing and, just as importantly, why they choose to spend a smaller proportion on all other consumption.

Housing and other consumption are (strongly) complementary. We require a huge change in preferences. No intertemporal elasticity of substitution between housing and other consumption would be able to achieve this change in pattern. Furthermore, the price of housing consumption relative to other goods becomes extreme (the marginal utility per pound on housing shrinks while the marginal utility on all other goods/services rises).

If consumers always 'bid' up house prices by taking on debts giving the same initial monthly repayment (as FPDSavills suggest they should), it has a startling logical conclusion: When nominal interest rates hit 1% - *with all real rates remaining the same* - house prices would hit £242,700, and the percentage of lifetime income spent on housing would rise even more dramatically and that spent on all other forms of consumption fall even more dramatically. The puzzle just deepens, with the required change in preferences getting ever more bizarre (we'll see below also that in such a world, just one or two per cent more interest can make a huge difference to total consumption possibilities).

If in the aggregate all consumers capitalise in this way, a consistent story has to explain the pattern of *aggregate* consumption, economic output, business profits (the implications of less demand for 'all other consumption'), etc. over time.

The only explanation is that consumers actually *always wanted* to spend a much higher proportion of their lifetime income on housing and a lower proportion on all other consumption (including education and pensions), but were held back from doing so by credit constraints that are somehow now unlocked by lower nominal rates. The world was hugely suboptimal before. Now it is optimal. *General arguments about the unlocking of credit constraints in ways not specifically related to nominal interest rates are useless in helping us;* the mortgage bank story has to rely on the constraint relaxation somehow being *solely via the fall in the nominal interest rate.*

Row 4: If nothing 'real' has changed, and consumers are *not* somehow credit constrained, they should stick to the same lifetime spend on housing, economise on payments in early years, and pay more in later years and house prices should not rise.

Figure 3 shows how lower inflation, at a constant *real* interest rate, shifts real repayments from earlier periods to later periods of a loan. At 20 years out,

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[17] The exact pattern will depend on the various price and income elasticities, supply response, aggregation issues, time preference, etc.

the real repayments with 2.5% inflation are nearly three times the real repayments at 10% inflation. Consumption 20 years out has to adjust for this.
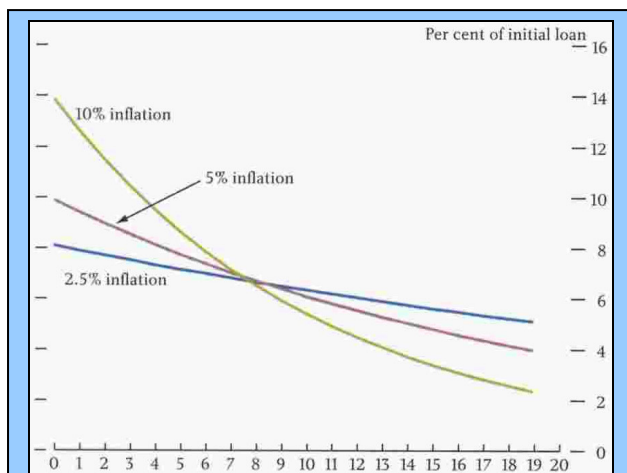

Figure 3: Lower inflation. Lower real repayments now, higher real payments later.
Source: Bank Of England Quarterly Bulletin, Spring 2003, p129.
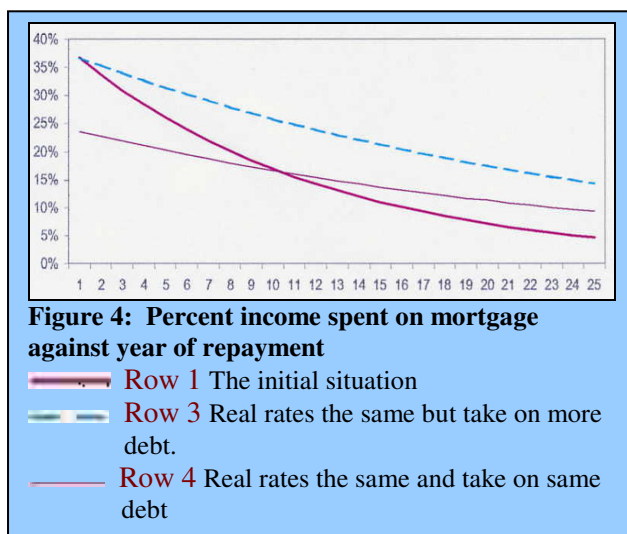
Figure 4 does the calculations for Table 1 above.

Figure 4: Percent income spent on mortgage against year of repayment
Row 1 The initial situation
Row 3 Real rates the same but take on more debt.
Row 4 Real rates the same and take on same debt

For house prices not to go up, however, all consumers must reason this way and must resist outbidding each other (and mortgage banks must resist too, even though they can create a larger quantity of profitable household debt by exploiting the situation, and convincing consumers that it is optimal). This is what economists lovingly call a 'prisoner's dilemma'; we can all refuse to 'cheat' by outbidding each other, which would only land us all on the blue dotted line in Figure 4. Instead, we can 'cooperate' and end up on the thin red line. But then the marginal rewards of those individuals who 'cheat' by deviating from the thin red line is high

(half as much house-space again if no-one else cheats). So we all end up cheating. Even if a only a few wrongly bid the original nominal payments, house prices will rise; even the 'rational' consumers will be forced to spend a higher fraction of lifetime wealth on housing (again, they don't actually get any more housing, but they do get less lifetime consumption and lifetime utility is lower).

The lesson of all this: *If consumers were not credit constrained in the first place, then – at a lower nominal interest rate but at the same real interest rate – house prices should not be bid up by as much as 50% in real terms.*

4. REAL INTEREST RATES

As CSFB[18] put it, a low interest rate "incentivises customers to borrow."[19] This has a *real* and a *nominal* interpretation.
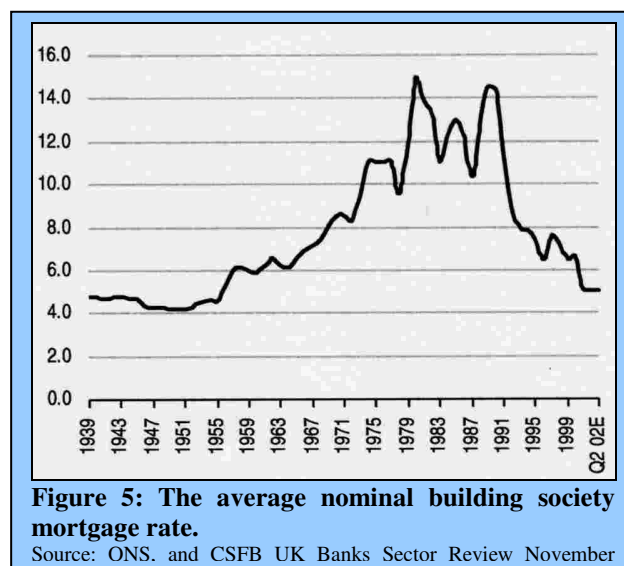
Figure 5: The average nominal building society mortgage rate.
Source: ONS. and CSFB UK Banks Sector Review November

Given that debt is a long-term contract in an uncertain world borne by risk-averse consumers, a borrower (for the moment treated as credit unconstrained) should base his/her calculation of how much debt to take out, on the basis of the i) real ii) after tax iii) expected, iv) risk-adjusted rate of interest. The current nominal rate (**Figure 5**) is a pretty poor proxy for this. Though analysts would never dream of discounting a firm's future debt repayments and expected profit streams with the current spot rate, it doesn't seem to matter if consumers do.

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[18] CSFB UK Banks Sector Review November 2002.
[19] The presumption is that it is the interest rate and not the price rise that has dragged customers in.

Even looking at the nominal data, it is sobering to see that practically all house price spurts in the past took place at high nominal interest rates (you'd think from some commentaries today that you need low nominal rates to get rapid rises).

Has the appropriate measure of real interest rate fallen enough to justify the recent doubling of house prices?

4.1. Comments on the Real Interest Rate Series

A particularly striking feature about the house price debate, is the way the 'bullish' camp practically never include a table of real interest rates in their publications, while the 'bearish' camp always do.
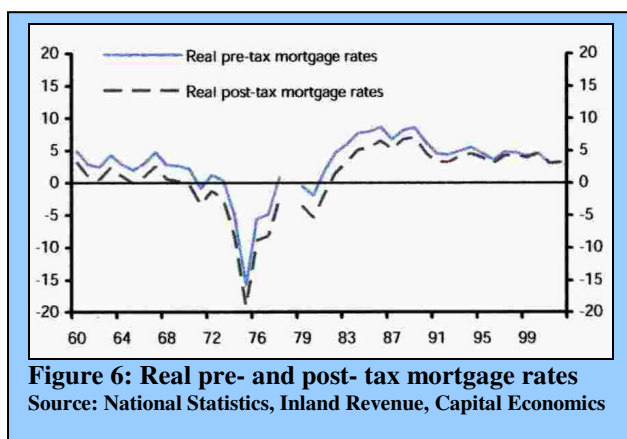

Figure 6: Real pre- and post- tax mortgage rates
Source: National Statistics, Inland Revenue, Capital Economics

Figure 6 shows *real* UK interest rates for the past 40 years. It's startlingly different from Figure 5. Concentrating on 'real pre-tax interest rates' we see that current real mortgage rates are not that different from the average of the 1980s and much higher than the 1970s. And the late 1980s, when real interest rates rose greatly, is a period of dramatic house price rises. The 'big' recent falls in real mortgage interest rates took place in the early 1990s (coming down from about 6%-7% in 1991 to about 4% in 1995); falls in nominal interest rates since 1996 (the PFDSavills benchmark in the quote above) have largely matched falls in inflation to leave real rates pretty much the same (in fact they rose to about 5% in 1999-2000 before falling back). So *real* notions of 'affordability' – if measured *only* by the spot real post-tax interest rate – are the same as in 1996.

Many studies have the actual and the fundamental UK house prices equalling in about 1994 (IMF, Capital Economics, and Groupe Caisse Des Dépôts

studies come to similar conclusions, with the actual price then staying below 'fundamentals' in all three studies until moving above fundamentals somewhere in about 2001/2002). It may be that a great deal of the initial fall in real interest rates, coming as it does *before* 1994, helped to prevent an even greater crash, and if 1994 is the correct year from which to measure fundamentals, then lower real interest rates do not obviously explain the doubling (trebling by the summer of 2004) in the recent few years.

In theory, lower real interest rates generate higher house prices, but the dynamics of this are very unclear from the data. If there has been no surprise disturbance in the real interest rate, real house prices should not have gone up as dramatically on this account alone. We need to look elsewhere.

4.2. Comments on Real Post-Tax Interest Rate Series

Offsetting the benefits of lower real rates, interest payments are now much less favourably treated in the tax system. The effects of this can be seen in **Figure 6**. The case for real interest as the heart of recent house price surges is even harder to sustain. The UK and Denmark stand out as countries where the removal of mortgage interest tax relief has done most to raise the cost of new mortgages (in the UK mortgage interest tax relief finally phased out in 2000). Also, given that many industrial countries have higher marginal tax rates than the UK and yet still have partial deductibility of interest payments on mortgages, this, comparatively speaking, is a much more depressive influence on UK house prices. Given the downward pressure that the removal of the relief should have exerted, something else must have been acting more than disproportionately to make up for it in recent years.

In addition major changes have taken place in the social security system since 1995 removing benefits to those with mortgages, so that unemployment bites much more quickly on the inability to repay than during the early 1990s. The Council for Mortgage Lenders quotes that one in five customers falsely believe that they can rely on state assistance to pay their mortgages[20].

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[20] FSA, "Financial Risk Outlook" 2003.

4.3. Comments on Expectations of Interest Rates

In deriving how much debt to rationally take on consumers should be interested in the possible course of future real interest payments – not just current nominal payments and current spot real interest rates. It is easy to forget that when the impetus of the latest house price spurt was at its highest, financial markets[21] were pricing in a one per cent rise in short-run interest rates (see **Figure 7**). It is an interesting reflection on house-buyer behaviour at the moment that after the last ¼ point rate cut, which sent immediate short run interest rate expectations much lower (expectations two or three years forward went down by ¾%), the housing market has ground to a halt in parts of the South East.
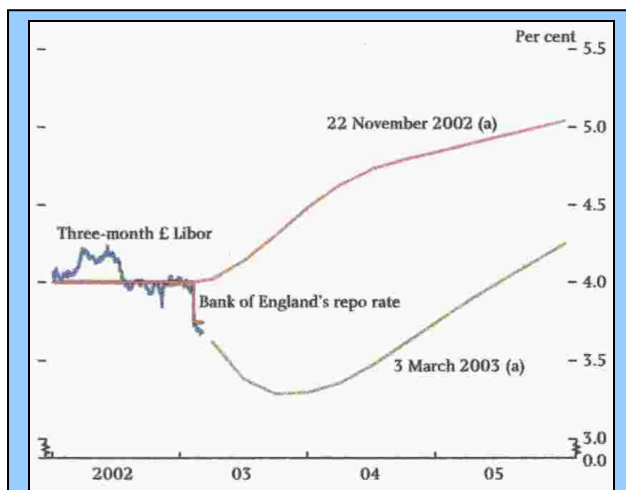

Figure 7: Interest rate expectations
(a) Three-month interest rates implied by short sterling futures contracts at the dates specified. March 2003 onwards, the x-axis relates to contract expiry date
Bank of England Quarterly Bulletin, Spring 2003

4.4. Inflation Expectations and Real Interest Rates

It is still not clear to what extent current post-tax *real* interest rates are permanently lower. One argument is that the independence of the Bank of England has reduced inflationary expectations, and this has led to a permanently lower and more stable nominal interest rate – and hence similarly for the real interest rate – and that this has fed into higher house prices. However, it is hard to account for how much of this decreased inflationary expectations is

the result of central bank independence or the result of the general world economic situation – and falling inflation itself. **Figure 8** shows that inflation expectations in the UK fell more in the early 1990s – before central bank independence – than the late 90s, though this could also reflect moves in the earlier period towards a more transparent, Bank of England based system.

Figure 8: Inflation expectations
Breakeven inflation five-year forwards five years ahead derived on Bank of England's variable roughness penalty spine-based technique.
Consensus Forecasts of five year RPI inflation five years ahead Bank of England Quarterly Bulletin, Spring 2002.

The non-survey method (dark green line) yields a greater reduction than the survey method (red dots), but it has been more variable. Comparing the expectations to the actual inflation turn-out, there tended to be under-prediction before 1991, and over-prediction after 1991. Since 1997 there have been equal periods of under- and over-prediction. So the exact changes, and the causality of changes, in inflation expectations are still debateable. The fall in inflation and inflation expectations has also taken place across a wide swathe of countries without any changes in institutions[22].

Furthermore, the Bank of England's commitment is to low and stable inflation, not *per se* to a low real interest rate – though a stable real rate would be the by-product of a more stable environment. With an upper inflation limit of 3.5%, inflationary pressures (maybe related to a falling pound, which might itself

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[21] While some financial markets can be inefficient, some are likely to be less so than others, and better arbitrage makes it more likely that interest rate expectations are being derived efficiently.

[22] As Obstfeld and Rogoff point out: "Because institutions are endogenous in the long run, the critics who view inflation and central bank independence as jointly determined have a point. The evidence linking central bank independence to low inflation may be regarded as highly suggestive but not decisive", in "Foundations of International Macroeconomics", 1998, MIT, p 647 (in an interesting section reviewing several papers on central bank independence and inflation).

be related to a deteriorating housing market[23]) would be kept under control by higher nominal (and hence real) interest rates – or at least by interest rates that could not go as low as the housing market might need to protect it[24]. There is nothing inconsistent in having a period of high real interest rates and low inflation – when the former serves to bring about the latter.

And in this new policy environment, asset price instability (probably more so debt-backed house price instability than equity market instability) itself introduces uncertainty into the path of inflation/ deflation and interest rates. The jury must still be out on the level and degree of real interest rate stability.

4.5. Conclusions on the Real Interest Rate Story

There is not enough in the real interest rate story to explain the more than doubling[25] (trebling by mid 2004) in real house prices since 1996, and the even more dramatic 25%-30% real increase in one year.

It may not be terribly scientific, but the most *generous* piece of empirical evidence above suggests that a permanent reduction in (post-tax) real interest rate of 12.5% could generate a 50% real house price rise. We get nowhere near this (it would be impossibly negative anyway), and we certainly can't absolutely guarantee its permanence.

This is why the mortgage banks have increasingly turned to an argument based on nominal interest rates. And since we found (in Row 3 of Table 1 above) that the nominal rate story does not work unless agents *choose* to spend a higher proportion of lifetime consumption on housing, the argument centres on a story about the relaxation of credit constraints *caused* by the fall in nominal rates. We now turn to this, probably the most important section of this paper.

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[23] There is no time to discuss the pros and cons of this, but there are arguments on both sides.
[24] See Andrew Farlow, *The Bank is losing a house price game*, Financial Times, 28 November 2002, on this very point.
[25] By the time this was being updated in January 2004, national house prices has risen enough to regard prices as having gone up 2.5 times since 1996, and, if predictions of the mortgage banks prove correct, this translates to a trebling by summer 2004.

5. NOMINAL INTEREST RATES AND CREDIT CONSTRAINTS

"...with low interest rates re-distributing the debt-service burden from the earlier to the later years...given that borrowers are much more likely to be stretched at the start of the house-buying process, low interest rates do make housing more *affordable for all*. Indeed, in our view, low interest rates support an upward and sustainable adjustment of the house price earnings ratio, such as that seen recently." CSFB p11. [26] (emphasis added...not just "*affordabl*" but "*affordable for all*", an important distinction).

We saw (in Figures 3 and 4 above) the way in which lower inflation serves to redistribute the burden of debt to later in a consumer's lifetime. It is on the basis of this at the individual's level and the aggregation of this effect across the population, that it is argued that real prices have doubled in a few years.

Figure 9: UK Loan to Income multiple
Source: CSFB
━━━ First Time Buyers
▬▬▬ Previous owners
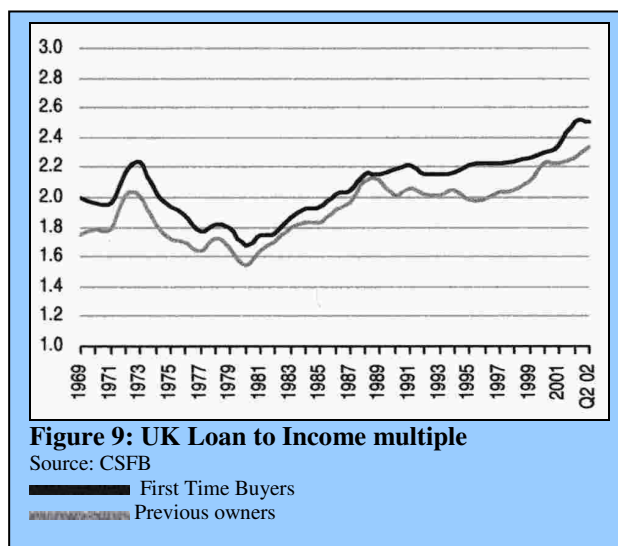
Figure 9 shows that as nominal interest rates have fallen, loan-to-income ratios have risen greatly. First-time buyers borrow 2.5 times income compared to 2 times over the last 30 years. In London it is 2.75 compared to 2.2, and the average house price is over 5 times average potential first-time buyer income, and up to nine times income for certain key workers[27]. All these sorts of figures are, in a sense, biased by the exclusion of those unable to enter the market (who will be on lower incomes than those who enter the figures). However, even this overall picture hides important details.

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[26] CSFB (ibid) Implicit within this is that measures of mortgage payments to current income are biased downwards.
[27] Multiply figures by about 1.15 to get early 2004 figures.

As the FSA points out, the proportion taking out especially high income multiples (>3x for singles and >2.5x for joint incomes) have risen nearly three-fold since 1994 (see **Figure 10**).

Figure 10: The increase in the proportion of those on high income multiples
Source: Financial Risk Outlook 2003, FSA
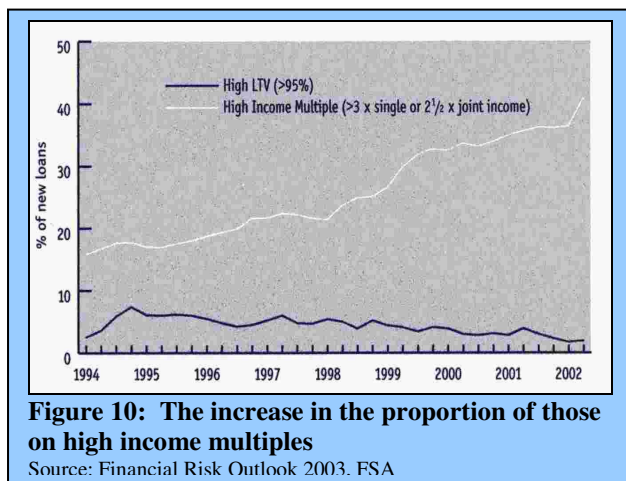
Regarding Loan to Value, LTV (see **Figure 11**), the majority of new LTVs are in the 75%-90% range, and 4%-7% of new mortgages have an LTV over 100%[28]. However, as the FSA point out[29], though the average LTV fell slightly in 2002, "It is however worth noting that the security margin even on a recent loan made at a 'safe' 75% LTV would be effectively eliminated if house prices should fall to their level of one year ago." The number of first time buyers without a deposit is much lower than it was in the late 1980s when it rose from about 12% to 33%. However, for much of the 1990s it was running at three or so per cent, and has shot up to about 12% in the last couple of years even as real house price inflation reached 25%-30%. The FSA comments that there are still cases of 95% and 100% LTV and these to first time buyers, though lenders seem to have limited propensity to lend where there is both high LTV and a high income multiple at the same time.

Figure 11 should be looked at alongside Figure 12 several pages below. Figure 12 reveals that the percent of all loans being given for house purchase to first-time buyers is at record lows. The collapse of the first time buyers' proportion puts an upper limit on the LTV anyway (since those who would take it over the limit don't enter the data – they can't enter the market at current prices) further biasing the LTV towards painting a picture of a market that is safer than it actually is.

Since a bubble has potential to flatter the apparent health of the system, one should visualise how much these LTV figures are themselves flattered by the 25%-30% year on year house price rises.

Figure 11: Loan to value
First time buyers
Previous owner occupiers
Source: Financial Stability Outlook 2003, FSA
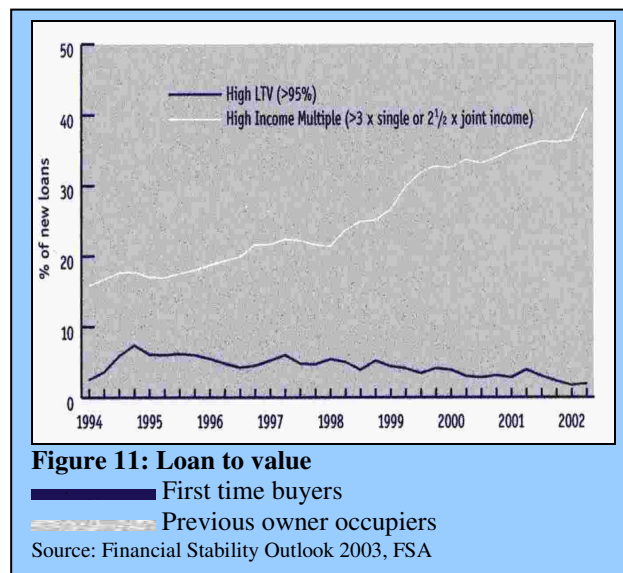
5.1 Credit Constraints Overview

Now we turn to the specifics of the credit constraint story.

We are told that high nominal interest rates had previously constrained borrowers from their optimal level of debt, and that today's low nominal rates (for the same real interest rate and the same real lifetime income as before) enable them to get closer (if not actually to achieve) their optimal debt level. Furthermore, it is argued, though forward looking income expectations are important, many households feel constrained by current income. With lower nominal rates, more first-time buyers can come into the market who would otherwise have kept out, all first time buyers can hold larger debts, and home-owners can also take on bigger debts, trade-up, and consume more housing earlier in life. The effect is supposed to be so strong that – even at the same real interest rate – consumers can sustainably take on three times the original level of *real* debt. And, of course, consumers always optimally adjust debt levels – they and banks never 'overdo' it.

One crucial prediction is that consumers devote a higher proportion of lifetime income to housing consumption than they did in the past. This drives house prices higher given the tight supply.

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[28] Bank of England Financial Stability Report December 2002.
[29] FSA, Financial Risk Outlook 2003.

Empirical evidence finds that mortgage rationing in the past had large effects on house prices[1]. In the 1960s and 1970s constraints did not have much logic on the basis of the default risks of lenders. In the 1970s negative real interest rates made some forms of rationing necessary. In the 1980s, financial liberalisation led to shifts in house price behaviour – in particular shifts in wealth effects and the consumption function[2]. Muellbauer and Murphy report that the 'spendability' of illiquid assets changed dramatically; at the peak of financial repression such assets had a weight (compared to liquid assets) of 0.12, while at the peak of financial liberality it was 0.4.

But the new story is very specific: Nominal interest rates – regardless of what is going on in the realm of real variables – drive credit constraints. If so, the consequences must be consistent with what we know about credit constraints

In the simple life-cycle model above (see **Box 2**) an unconstrained, maximising, consumer makes his housing investment decision on the basis of *current* and *expected* future values of all variables. Only *unanticipated* changes in *real* interest rates, *real* income, or some supply side factor would cause changes in house prices (and this would depend on how permanent this was perceived to be).

In a world where all consumers are credit constrained, however, current consumption (both housing and non-housing) is a function of current income and the level of constrained borrowing, with *no* role for real interest rates or expected future income[3]. However, as the distribution of consumers becomes, in the aggregate, less credit constrained, aggregate consumption should become increasingly sensitive *to expectations of income and real interest rates.*

5.2. The Level of Credit Constraints

There is a twist to this story, however. The *distribution* (both individually and in the aggregate) over 'housing' and 'non-housing' consumption is a function of the *level* of credit-constraints (both individually and in the aggregate). When credit

constraints are high, since housing is used as collateral for loans (the more collateral you have, the cheaper the loan will be) consumers – since they expect good returns on housing – will economise in earlier periods on non-housing consumption and increase the proportion they spend on housing consumption (compared to the unconstrained optimal) so that they can consume more non-housing consumption in later periods (using housing as collateral) than their constraints would have otherwise allowed[4]. As credit constraints relax, this 'over-consumption' of housing early on in life declines in favour of non-housing consumption.

Furthermore, at a given high level of aggregate credit constraint, an increase in expected future income (since consumers know that it will relax future credit constraints) will *reduce* housing demand (i.e. consumers know they are less in need of future collateral) and increase current 'non-housing' consumption at the expense of housing consumption. As the aggregate level of credit constraint falls, therefore, this affect reverses, and is *added to* by the fact that more and more consumers obey the unconstrained asset pricing formula; aggregate housing demand becomes *increasingly* positively related to expectations of future income growth. To repeat: *As credit constraints fall, housing demand becomes (from two different directions) more and more positively related to expected future income (as well as expectations of future real interest rates).*

There is a further twist. The 'price' of a constraint – the marginal penalty it imposes in terms of the lost optimal choice – is higher in a more constrained world. So, the removal of the constraint has a bigger impact on choices in an already heavily constrained world than in a world that was much less constrained to start with. Therefore, the removal of credit constraints in the already less constrained late 1990s might be expected to have generated a much less dramatic change in patterns of consumption and house prices compared to, for example, the 1970s or 1980s[5].

5.3. The Pattern of Credit Constraints

The *form* of the relaxation of constraints matters too. In the late 1990s, has this been capable of generating

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[1] Muellbauer and Murphy 1997, Meen 90, 93, and 96 (though the Meen studies do not use 'frenzy' variables).
[2] In M&M different assets have different 'spendability' weights that shift with liberalisation
[3] In economic parlance they find themselves at a 'corner solution'. Flemming, J.S.. 1973, "The consumption function when capital markets are imperfect." Oxford Economic Papers, Vol. 25, pp.160-172.

[4] The trade off is a function of i) elasticity of intertemporal substitution, ii) sensitivity of external finance premium to net worth.

the *pattern* of behaviour required by the mortgage bank argument?

One claim is that increasing bank price competition has driven down bank margins and the general price of *all* forms of credit, and hence driven house prices up. But this is an argument about real price variables (and this is well covered in **Figure 6** already) and not one about the 'redistribution of debt-service' for a given real interest rate.

To the extent they are positively related to lower real credit costs (wherever this may come from, including from bank competition), house prices rise. However, the life-cycle framework shows that a *level* fall in the price of credit would increase the lifetime consumption of both housing *and* all other goods, and would not show up as disproportionately increasing housing consumption compared to non-housing consumption, as the above nominal story claims. The price competition story puts the emphasis back onto the real after-tax interest rate and real income growth, and we have found that falls in real after-tax interest rates have not been dramatic enough over the 1990s. There was also no new *surge* of financial deregulation in the late 1990s, as would be needed to explain a *surge* in prices, but rather a continued trend following major one-off changes in the 1980s[6], a trend the effect of which should already have been reflected in the trend price of housing.

Recent *structural* changes in UK retail financial markets have *opposing effects* on consumption, housing investment and house prices. On the one hand, the ease with which consumers can extract housing equity to finance consumption (mortgage equity withdrawal, MEW) means that for any given house price increase (which reduces the external finance premium), more additional borrowing is devoted to consumption relative to housing investment (so, there should be a natural sort of 'release valve' on house price pressure – unless there is a bubble aspect to this). Consequently, the response of 'all other' consumption to unanticipated changes in real interest rates is higher and the response of housing investment is lower. At the same time an increase in credit unrelated to housing (so that consumers don't have to reduce consumption so much in the face of temporary income falls) has the opposing effect, increasing the demand for housing and hence house price pressure.

Of course, the exact housing demand response depends on consumer preferences, which it is why it is so hard to pin down exactly the expected response. However, as the Bank of England notes: "*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.*"[7]

This analysis leads to several uncomfortable problems in the logic of the mortgage banks' favoured nominal interest rate story[8]. The next points follow the logic to its end, often generating conflicting and inconsistent results:

1) The reduced credit constraint element of the story (which we *always* have to take care to separate from the real interest rate story), combined with the nature of recent changes in finance (especially MEW), would dictate that the proportionate lifetime spend on housing should *fall,* whereas the sums (Row 3 in Table 1) have it rising and 'all other' lifetime consumption falling.

2) If this analysis is correct, recent real interest rate falls should translate into more (not less) non-housing consumption relative to housing consumption. Debt-supported consumption has risen, yet house consumption and prices have risen much greater in proportion.

3) Given the generally lower level of constraints today than in the past, the credit-relaxed response (of both housing and non-housing) to a given nominal interest rate fall has to be even greater compared to, say, the 1980s, to get a similar price impact. There is no evidence for this sort of degree of pent up demand in the late 1980s/early 1990s in the UK – neither in terms of sufficient numbers of consumers nor in terms of a sufficient reaction of those consumers.
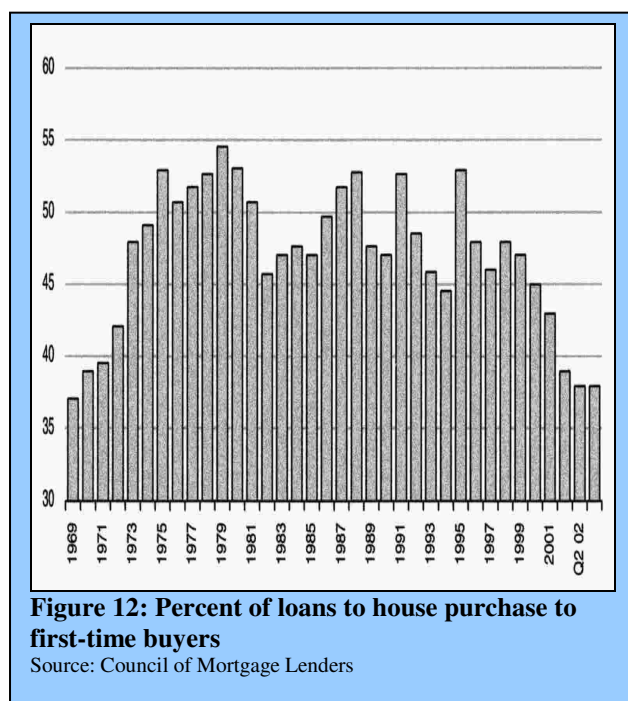
4) The overall impact of constraints on housing and non-housing consumption depends on the *distribution* of constraints and the *number* of consumers involved *for each constraint*[9]. Those who were not constrained before should not respond at all (for example those who are late in their working life

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[6] The current trend is for the reverse, as financial institutions have been looking to merge or absorb smaller competitors.

[7] Aoki, K., J. Proudman, and G. Vlieghe, 2001, "Why House Prices Matter", BOE Quarterly Bulletin Winter 460-468. http://www.bankofengland.co.uk/qb/qb010406.pdf

[8] It may be that the author has missed something obvious. However, even if the following are not precisely right, it's felt that they would have to be out by quite a mark to get the size of recent price rises.

[9] This section ignores speculative behaviour.

and have relatively little future earned income ahead of them, or those who have good housing collateral already). Those who were credit constrained before are on a spectrum. At one end are those who were relatively unconstrained before who will – so the story goes – become 'less credit constrained' though more constrained as house prices rise. At the other end are those who were totally unable to get loans before based on their lifetime real income who are now able to get loans, but who also face a rising constraint as house prices rise (we have already seen the way these people have dropped out of the system). We need those gathered at the heavily constrained part of the spectrum to react disproportionately strongly on house prices than those at the less constrained end of the spectrum, and everyone together to have a reaction strong enough to impact real house prices by 100% to 200% over just a few years.

Figure 12: Percent of loans to house purchase to first-time buyers
Source: Council of Mortgage Lenders

But we also have the problem that the numbers getting locked out of the market have risen dramatically (see **Figure 12**). The average age of first-time buyer rose to 34 in 2001 compared to 29 in 1974, and the proportion of first-time buyers under 25 fell from 30% in 1990 to 11% in 2001 (CSFB Figures). So, the story relies on greater numbers of, once heavily constrained, buyers, and yet large numbers of important categories are present in ever decreasing numbers. The argument is having to rely on a stronger and stronger effect of a smaller and smaller group of consumers who start off less and less constrained anyway. It is a little ironic that an

argument about relaxing credit constraints is cutting out from the housing market large numbers of the people whose credit constraints it is supposed to be relaxing. It is also illogical.

5) It confuses the ability to get more debt with the notion that this is the result of the relaxation of 'inefficient' credit rationing constraints. Both scenarios generate the same outward appearance. Yet, credit constraints are a response to an asymmetric information problem composed of: i) adverse selection (the lender can't fully separate out the riskiness of the different applicants, and so some form of rationing mechanism is used at a fixed credit price, rather than just a variable credit price), and; ii) moral hazard (that borrowers' behaviour is changed – once they get credit – in ways potentially detrimental to the lender). Shifting payments further into the uncertain future doesn't help either of these.

For the lender who previously assumed that the credit risk of mortgages fell over time, it now rises (a risk that might be masked by an asset bubble). There are two sides to the market visualised in **Figures 3** and **4** above (that show the shift of burden); that of the lender as well as that of the consumer. And as the nominal rate falls (for a given real rate) the prevalence of mechanisms to exclude the more risky should be rising. It also requires that in the late 1980s/early 1990s highly competitive banks were doing such a bad job (as measured by the subsequent big house price rises) of allocating credit (in spite of having a myriad of improvements in information, screening, and other ways to separate customers) that they needed the blunt instrument of an across-the-board nominal interest rate fall, allowing consumers to defer real payment as far as possible into the future, before they were prepared to give them efficient amounts of credit.

6) To be consistent, *the story should work the other way too*. Higher nominal rates should have increased credit constraints in the past – and even more strongly in previously more constrained eras. However, figures produced by CSFB (reproduced in **Figure 13**) show that in the early 1970s, late 1970s and late 1980s nominal rates were all higher at the house price peak than three years prior to the peak, +1, +1, +3 (the difference between the last two rows of **Figure 13**), with this particularly so in the late 1980s. Only today are nominal mortgage rates lower than three years before the peak, -1. There are no records of mortgage banks arguing in these earlier periods that customers were becoming more credit

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constrained on account of increased *nominal* interest rates!

7) Lingering on this Figure for a moment, the difference in the typical nominal mortgage interest rate (from a sample of Building Societies) at the current house price peak compared to three years prior to peak is -1%. This is an awfully small amount to hang 50% of real price growth upon via a credit constraint story.

housing consumption than in the past, we should be expecting to see rents rising (at least eventually). Either rents, like earnings, have to adjust upwards in the long-run or prices have to adjust downwards.

10) *If* nominal interest rate falls do reduce constraints, then expectations of future income levels would be becoming more (*not less*) important! So a given expected income (along the lines of what would happen if house prices themselves started to

	Early 1970s	Late 1970s	Late 1980s	Present
Peak house price inflation (nominal)	45	29	34	31
Peak house price inflation (real)	36	15	28	29
House price growth 3 year prior to peak (nominal)	92	60	74	50
House price growth 3 year prior to peak (real)	64	18	60	44
Mortgage rates at house price peak	10	12	15	5
Mortgage rates 3 year prior to peak (average)	9	11	12	6

Figure 13: Percent House price inflation and percent nominal interest rates.
Source: Office for National Statistics, Halifax, 5% survey of Building Societies, CSFB (UK Banks Sector Review 19 November 2002, Figure 2)

8) Lingering further. While the table lists nominal and real house price inflation, as usual there are no real interest rates (interestingly, there is no table with large negative real house price inflation figures for the bust periods either, for which only nominal house price inflation, it appears, matters). But the real interest rates can be readily read from the table by taking the difference of the first two lines and subtracting from the fifth. They are: Early 1970s, +1%; Late 1970s, -2%; Late 1980s, +9%; Present +3%. This again confirms the unusual nature of the late 1980s boom – suggesting again that it is not a good reference point – whilst also suggesting that real cost of mortgage debt are higher today than in many previous house price booms.

9) Thinking of housing as any other asset yielding 'rental' income, if prices are rising then owners must be making some sort of projection about rising rental income, just as in equity markets rising valuations imply expectations of rising earnings growth. However, Campbell and Shiller[10] show that the earnings growth rates implied by extreme equity market valuations have never materialised in U.S. history, and it is stock markets that adjust down rather than earnings that adjust up. Rather than rising, rents are falling. If consumers do value housing consumption such that they really wish to spend a great deal more of their lifetime income on
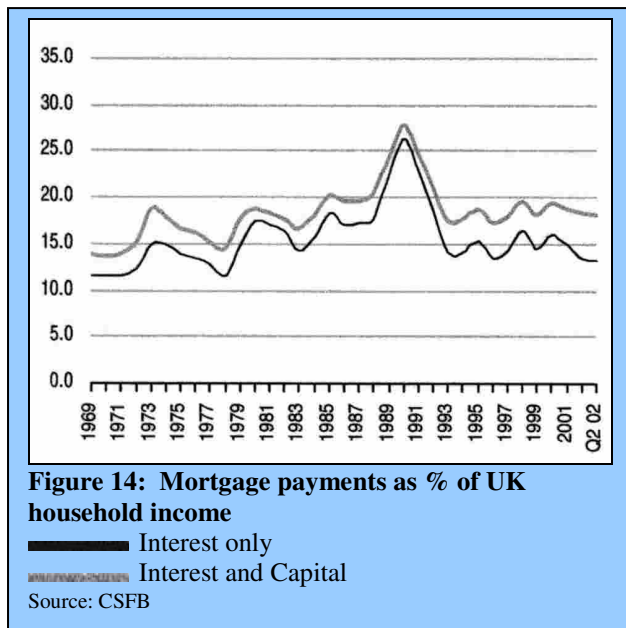
fall, impacting the economy) would have *an even bigger negative impact on housing demand than in the more constrained world of higher nominal rates*[11].

11) It ignores the possibility of bubble-type behaviour.

5.4. The 'Affordability' Evidence

Even in this higher debt environment, mortgage repayments are described as 'very affordable' – currently 18% of UK household income and 20% in London, compared to 27% and 32% in the late 1980s (**Figures 14 and 15**). The reader might be forgiven for placing his or her thumb over the 1988 to 1992 part of the data and concluding that there is nothing all that remarkable about today (except that London is well up on the typical level prior to the peak in the late 1980s, if one includes repayment as well as interest). Though much emphasis is placed on the figures for interest-only mortgage payments as a proportion of income (these are the ones that hit the headlines because they are bound to be small in a low nominal interest rate period), the figure shows that for the past few years, repayments – *including capital repayments* as well as interest (which is the correct way to think about these things) have been consistently above the trend pre-late 1980s. The

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[10] Campbell, J., and J. Shiller, 1998, "Valuation Ratios and the Long-Run Stock Market Outlook", Journal of Portfolio Management, 24:11-26.
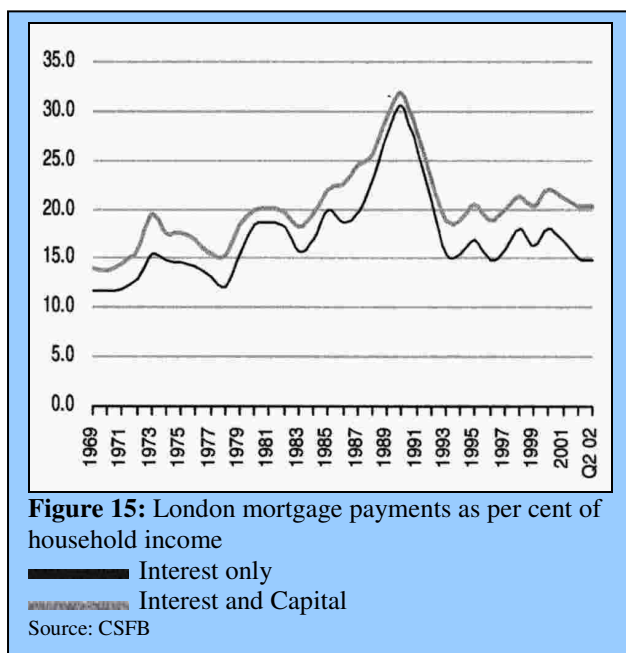
[11] And this ignores the risk imposed on the system if lower nominal rates have been capitalised into larger debts.

figures show the unusually prominent spike in 1989, suggesting that it is extremely dubious to use 1989 constantly as a point of comparison.

Figure 14: Mortgage payments as % of UK household income
▬▬▬ Interest only
▬▬▬ Interest and Capital
Source: CSFB

Such tables – *average aggregate* payments as a percentage of *today's income* – also have their limitations as indicators of "burden":

1) Because it is extremely dependent on the continuation of an unusually – maybe only temporarily – low nominal interest rate which biases current payments down;

Figure 15: London mortgage payments as per cent of household income
▬▬▬ Interest only
▬▬▬ Interest and Capital
Source: CSFB

2) By the number of consumers on the 'special deal' phases of loans (flows of whom vary – rising as

nominal rates fall, falling off as rates stabilise, dropping off if the market retrenches and banks reduce such deals or even try to increase their margins);

3) By the fact that those currently paying low amounts will, over time, be replaced by consumers in similar phases of their loans but at higher payments. Imagine moving away from a population consisting mostly of consumers distributed at all points of the distribution in Row 1 of Table 1, towards a population consisting of consumers at all points of the distribution in Row 4. In an early phase of this process the figures look much better than in a later phase.

4) Because it ignores capital repayments, which are getting more – not less – difficult to cover. Because house prices are higher and debts to pay for them are higher, including capital repayments in the figure only serves to remind the viewer that higher loans require more capital repayments.

5) Because – as with many of the figures – it is biased by those it doesn't cover, those whom we saw from Figure 12 are increasingly being cut out from the market;

6) Because the figure is highly dependent on a (currently) good income stream.

5.5. Sensitivity to Interest Rate Rises

CSFB suggest that households are being rational in taking on more debt because servicing it is more affordable, and that interest rates would need to rise to 9% before affordability is as overstretched as the late 1980s (it's that comparison year again). Given the low inflation environment of today, this translates into a massive increase in real interest rates, four times the real interest rate revealed in Figure 13 above, a quite remarkable occurrence were it to happen, and utterly unlikely.

But how would even a few per cent increase look for a customer who takes the above advice of PDFSavills and capitalises £5,000 mortgage payments at 4% (which sounds like an introductory rate), into £120,000 of interest-only debt, compared to a customer who capitalises at 11.5% into £41,740 of debt? **Figure 16** shows the consequences.

Capitalising at low nominal rates leads to monthly payments a great deal more sensitive to small

changes in nominal interest rates. In the PDFSavills example, a 2% interest rate rise would increase monthly payments by 50%. Consumers either have to be very sure that nominal rates will continue the same, or have to have a very high degree of risk tolerance. And this is only in the first year. The stream of all future payments would be higher too.
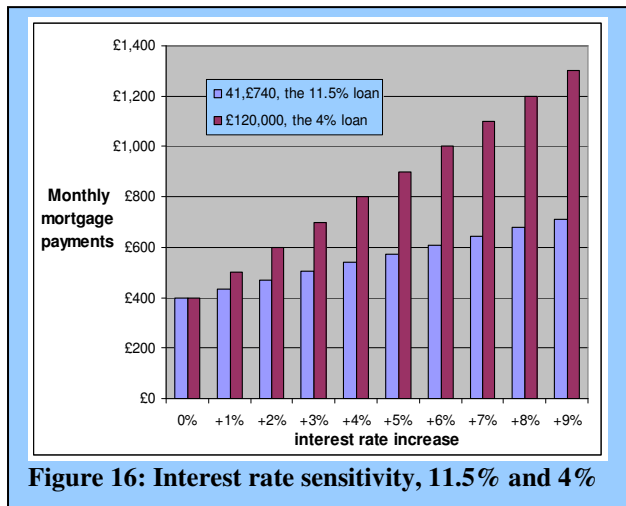

Figure 16: Interest rate sensitivity, 11.5% and 4%

Averages mask important details. Those at the upper end of the house ownership lifecycle are less likely to be indebted, or credit constrained. To the extent that small changes in interest rates don't cause large changes in their interest costs their presence serves to keep the average down, even as those at the bottom of the cycle are struggling.

Since it is used as a story to justify higher house prices and the notion that buying is better than renting 'when rates are so cheap', we should – to be true to the logic – look at what happens as the nominal rates rise. The capitalisation into higher house prices has to swing into reverse. A 2% rise decreases the capitalised value of the mortgages of new 4% entrants by 1/3, depressing prices of the housing asset of the current mortgage holders. So, current mortgage holders get squeezed to pay more for an asset that dramatically declines in value (part of the cost of 'getting it wrong' is not just the extra interest costs but the loss of future housing wealth and access to cheaper credit via collateral value).

The expenditure weighted ODPM house price measure reveals that it is the less expensive houses that have experienced the higher rates of house price inflation recently. Just as it is those at the bottom of the house-buying cycle whose suffering in extra interest payments might be masked by the averaging process over those higher up in the house-buying cycle, so average price falls might mask the fact that

prices are falling most at the cheaper end of the spectrum – where the most fragile debt is (this doesn't mean that the first house prices to fall will not be those at the upper end).

And this story gets increasingly dramatic as capitalisation takes place at rates increasingly lower than 4%. **Figure 17** shows what happens at 1% nominal rates. Capitalising at 1% and then finding that the rate turns out just 2% higher would be a disaster.

We don't need to go anywhere near to a 9% interest rate hike to generate damaging scenarios for highly indebted borrowers who capitalised too much debt at low nominal interest rates. And this analysis ignored the impact on the economy – on jobs, income, profits, confidence, etc. – and so further rounds of effects on house prices.

Given recent falls in rental yields this makes something of a mockery of the notion that paying off a debt on an asset of uncertain value is always better than renting[12]; the debt holder has to contend with the riskiness of payments as well as the riskiness of the price of the asset and hence of his/her lifetime consumption possibilities. To make things worse, most of those rent comparisons are done on the basis of a bubble at the end of the data series which greatly increases the apparent 'long-term' benefit to buying over renting.
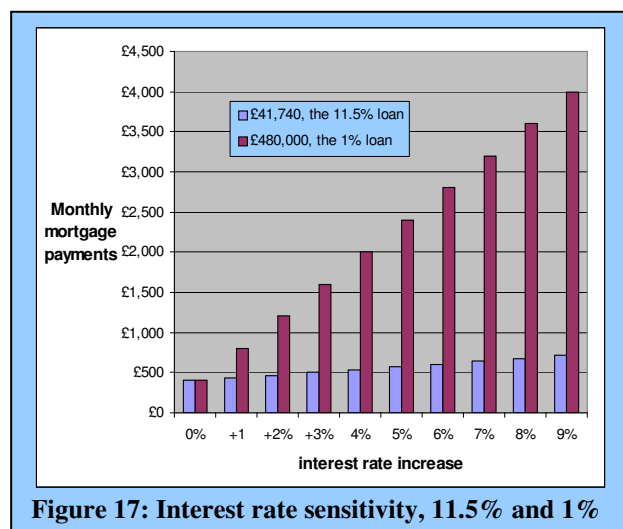

Figure 17: Interest rate sensitivity, 11.5% and 1%

Short-term interest rates are a more significant factor in the UK (compared to, say, the US) than long-term interest rates, since most UK mortgages are variable.

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[12] "I am just wasting so much money on rent. I'm forking out a huge proportion of my salary for someone else's mortgage." CSFB quote, p 18, of the renter who sees the light!

Only about 35% are fixed (IMF average of 1996-2002[13]) and usually for no more than 5 years. Mortgage payments and house prices are therefore much more sensitive to short-term changes in interest rates than many other countries.

5.6 Buy-To-Let

"...such is human nature[14] that it is likely investors will continue to enter the market until house prices start to fall – it is unlikely that significant buy-to-let selling will itself precipitate a material fall in house prices." CSFB

Buy-to-let represents only about 3.1% of housing stock and 6% of gross lending, though in London buy-to-let represented one in ten transactions in 2001, compared to 1 in 20 for the whole UK. 75% of all buy-to-let are in the South (CSFB and CML).

Since the vast majority of housing stock does not change hands in any given year (and there is evidence that in a downturn the proportion falls as many homeowners hold back from the market rather than trim their prices), so the much more liquid buy-to-let sector is potentially capable of making up a disproportionately large proportion of the active market.

The attractiveness of the buy-to-let yield relative to the interest rate is very sensitive to economic conditions, especially expected asset price gain/loss. High leverage translates even slight price falls into large negative yields. And unless fresh buy-to-let buyers engage in curiously irrational behaviour (buying even as capital losses are taking place and the risk of future capital loss is rising) one would expect downwards selling pressure to materialise way before negative yields materialise. Banks too will react in ways putting downwards pressure on the market; to the buy-to-let owner compared to the owner-occupier, the threat of repossession is less of a threat to maintain payments in times of difficulty, and the incentive not to sell or force a sell in a collapsing bubble is lower.

If housing prices fall, the promotional buy-to-let deals will decline. The FSA concludes that while residential loans to the sector are low (less than 2%) it accounts for 10% of commercial loans[15]. Current

yields are now so low that many owners are almost entirely relying on capital gains to make positive returns. About 2/3 of buy-to-let mortgages are interest-only, making them specially vulnerable to a downturn and fire-sales.

5.7. Conclusions on the Nominal Interest Rate Story

In sum – and especially in light of the econometric evidence that nominal interest rates play no significant role in the determination of long-run house prices – we can conclude that the nominal interest rate/credit constraint story is an argument peculiar to the mortgage banks themselves and those analysts who pick up on it.

It is probably the case that the nominal 'interest rate explanation' is an ad-hoc, ex-post, rationalisation after the dramatic recent price rises. Halifax (amongst many other mortgage banks) forecast a 5% house price rise for 2002, well short of the actual 30% that took place (and they were well out again on their 2003 prediction). One would have thought that most of the knowledge of the lower interest rate environment, and the degree of credit constraint waiting to be unlocked, would have been factored in at the time of the original forecast. Just as the bubble folk are wrong to immediately read into rapidly rising house prices that this must obviously be a bubble, the mortgage economists are engaging in similar after-the-event reasoning regarding interest rates.

6. INCOME

6.1 House Price to Earnings

Figure 18 shows the ratio of house price to income since 1970.

Crudely taking the average of 20-30 years worth of data is not a very good way to find the 'optimal' ratio; a bubble towards the end of the series would pull the average up, just as a collapse would pull it down. Capital Economics finds 3.6 based on data back to 1970, while CSFB finds 4.2, based on data since 1983 only – a figure more affected by the surges of 2000-2003 and of the late 1980s (and also affected by depressed incomes in the early 1980s).

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[13] IMF Country Reports No 03/47 United kingdom: Selected Issues, IMF February 2003.

[14] Part Two will look at the psychology of investing in housing.

[15] FSA, Financial Risk Outlook 2003.

Nevertheless, several studies suggest that the actual price series equalled the fundamentals series in about 1993/4, at which time the average house price to income ratio was 3.5/3.6. If forced to pick a ratio, this is the more sensible. Given that *recent* changes in nominal interest rates are argued to have made the traditional ratio no longer valid, it probably is wiser to use 3.5-3.6 as a baseline against which to assess these claims. To use 4.2 is to suggest we look for explanations as to why prices have been pulled above a long term average that has itself been influenced upwards by those very same factors – thus biasing down the required degree of explanation.
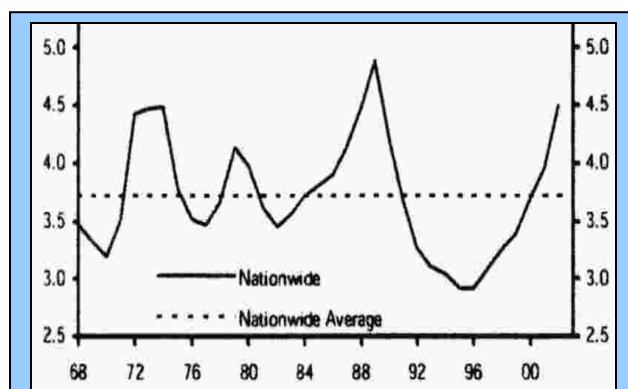
Figure 18: House price to income ratio 1968 – May 2002
Source: Capital Economics

6.2. Income Elasticities and GDP Movement

UK house prices move strongly with GDP, with a slight time lag (**Figure 19**).

The 1980's boom is clearly seen to follow a move from strongly negative to strongly positive deviation from trend. But much of that positive deviation was built on what turned out to be unsustainable foundations. Depressed expectations of income growth played a major role in the collapse of the early 1990s – something often forgotten in all the talk of interest rates.

A comparison of a large number of international studies of house prices by Meen (1996) finds that the income elasticity of demand is 1.7-3.0. For the UK housing market, using data from 1955 to 1994, Muellbauer and Murphy find a long-run income elasticity of demand for housing of 1.32 and the elasticity of real house prices to real income to be

2.5[16] given the housing stock – a figure towards the upper end of the international range. They also find that income growth expectations and wealth effects are significant and more so in the 1980s with financial deregulation. We saw earlier that in a highly credit constrained world where consumers 'overuse' housing early on in life (in order to use its collateral value later on in life to increase consumption beyond what it would otherwise have been) as the constraints come of, more and more consumers face the unconstrained optimisation conditions and income expectations become more and more important.

The IMF[17] finds, in cross-county analysis, that prices are driven greatly by current and lagged income growth and real interest rates, and not as heavily driven by expectations as the asset theories would argue is optimal.
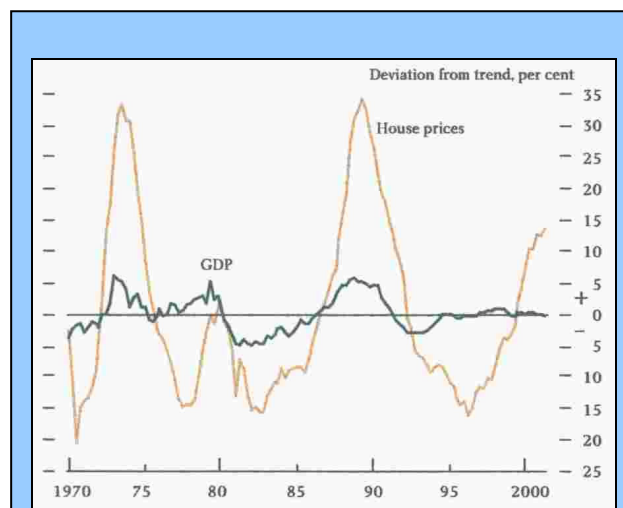
Figure 19: House prices and GDP deviation from trend
Source: Bank of England Quarterly Bulletin Winter 2001

Together this gives anecdotal evidence that the UK housing market is relatively much more credit *unconstrained* than many others, and became a great deal more *unconstrained* in the 1980s. This does not auger well for stories relying on unusually high UK credit constraints in the late 1980s and early 1990s suddenly released by nominal rates in the late 1990s. We also found above, rather paradoxically, that if the mortgage banks are right and somehow low nominal interest rates do reduce constraints, then income expectations will be becoming more, not less, important.

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[16] Muellbauer and Murphy (ibid.)

[17] IMF World Economic Outlook May 2000, Asset Price and the Business Cycle

6.3. Recent GDP Growth and Expectations

Recent GDP growth has been good but not that spectacular compared with earlier periods.

The recent "ten years of sustained strong growth, low levels of unemployment and higher earnings" (CSFB p7) would raise house prices but not the average house price to earnings ratio.

It could be that consumers have very high expectations of future real income growth, much higher than in the past so that the high future payments are not so high after all. But rates of future GDP growth have recently been heavily revised downwards. To generate the current price-income ratio via income alone we need that the future looks better than average and the present lower than average – not the other way around!
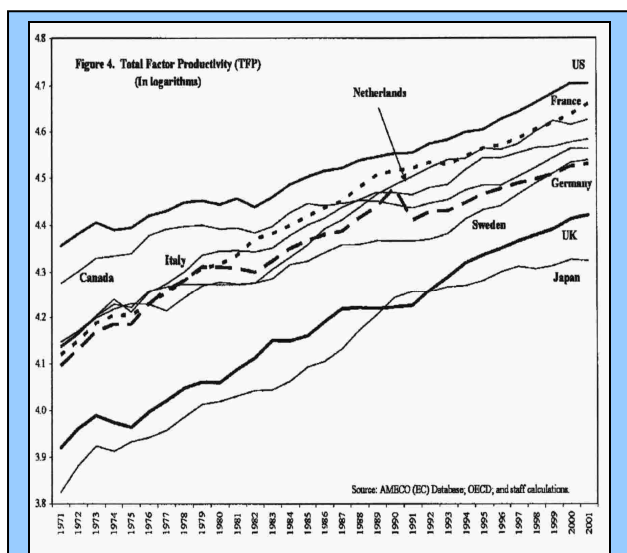

Figure 20: UK Total Factor Productivity
(UK is the thick black line in the lower half of the diagram)
Source: IMF, United Kingdom, Selected Issues, February 2003

Since housing is complementary with other goods, if consumers become more optimistic about their economic prospects, this will not just show up in house prices, since they will also want to increase consumption of other goods. It could be that both house prices and the growth of debt-driven consumption are a result of unrealistic extrapolations of recent unemployment and income patterns. This is very reminiscent of equity market bubbles[18].

The sources of growth matter. To the extent that recent UK economic performance is based on consumption that is itself based on high house prices, there is a risk of justifying house price levels on the basis of a tautology (they're high because they're high). The last time the housing market collapsed, unemployment rose to 9%.

A closer look at the macro-data reveals that a great deal of the recent dip in unemployment is from expansions in government employment (a not-to-be extrapolated one-off mobilisation) and from the housing market itself.

Ultimately long-run consumption possibilities of both housing and non-housing are driven by productivity growth. And the record on this for the UK is not good. **Figure 20** shows that UK total factor productivity continues to lag many other industrial countries. As the IMF also observe[19], since much of the recent increase in employment is in the government sector, this is not as likely to enhance measures of productivity. And, just as long-term increases in productivity feed into house prices, so too productivity can be harmed by swings in the housing market (reducing output, credit conditions, non-housing investment, etc.). A populace less obsessed with property and more interested in other forms of wealth creation might not be a bad thing.

If income is alone to drive a 50% real increase in house prices, future expected rates of growth must be a great deal higher than the recent average. Again, we are forced back to a nominal rate story as our main hope of explaining recent price rises. But we already found that to be too weak.

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[18] Stock markets also tend to overreact to recent streams of good earnings growth – as if expecting them to increase. Robert Shiller (Irrational Exuberance, Princeton University Press, 2000, Chapter 10)

points out that all of the price to earnings peaks in the US stock market followed peaks in earnings. In 1901 the S&P Composite index p/e ratio hit 25.2 after a doubling of earnings over five years after emerging from 1900s recession. By 1902 the market had lost 67%. In September 1929 the p/e reached 32.6; by June 1932 the index had lost 80.6% of its real value, and took till December 1958 (29 years) to return to its September 1929 real value. In January 1966 the p/e hit 24.1 after five year surge in earnings of 53%. By Dec 1974 real stock prices were down by 56%, and took till May 1992 to get back to their January 1966 level (26 years). The jury is still out on the 1999/2000 episode. People might have *thought* that there really was news that was going to change the long-run trajectory of dividends and maybe *thought* that there were also good reasons also for the price to drop, but in fact there was no change to justify either. Similarly, real estate prices may be driven by *thoughts* even if the underlying variables have not changed at all.

[19] IMF, World Economic Outlook May 2000, Asset Price and the Business Cycle

6.4. Consistency with the Stock Market

Unfortunately, many of the factors used to explain housing prices are the same as those used to explain equity prices. We now realise that many of the supposed productivity gains in the late 1990s were not sustainable and were a product of the stock market bubble itself.[20] But these productivity gains would also have underlay projections of earned income growth (on the assumption that the shares of income to labour and capital were as before) on which house prices are supposed to be based.

In addition, now that the stock market is down, compared to 2000, theoretically this should have depressed (actual and expected) stock-market related payoffs and hence depressed consumption of housing services via non-earned income. Since consumers desire housing and non-housing consumption over their lifetimes, the equity market rises of the late 90s (to the extent they were perceived as 'real' and not a bubble) should have fed into house prices, and the dramatic recent falls in equity wealth (to the extent they are perceived as 'real') should have fed into price falls.

In a large study of countries, the IMF[21] finds that stock and real estate markets have been much more strongly connected in the past. The real puzzle today is why many of the factors that dictate a lower equity market do not seem to be doing the same to the housing market, and it raises the troubling issue of timing – why the equity market rose earlier than the housing market, and, after falling strongly, why the housing market continued to rise strongly. Arguing on the relative price performance of the two markets (that customers pile out of one and into the other because of the poor price performance of the former and the better price performance of the latter) is pure bubble thinking (the price is high because people demand the asset because the price is high)[22].

7. CONCLUSION

Thinking of housing as an asset, consumers should only hold it at a high price if they think that when they sell it in the future someone else will be prepared to hold it at a high price, and that person will only be prepared to hold it if they believe that someone yet further in the future will be prepared to hold it at a high price...and so on. That is why the price of housing should reflect the future. So when nominal interest rates fall and consumers capitalise those rates in to large debts and high house prices, they better be sure that the next person in the chain can do so too[23].

We explored the variables that feed into the pricing of housing. We briefly considered supply-side factors and some demand-side factors relating to household formation and population size[24] and concluded that, typically, the trends (especially the tight supply conditions) favoured good long-run returns, but that the trends had not changed enough to explain the huge change in the trend of real house prices just recently.

With respect to interest rates, we found that real interest rates had fallen, especially in the early 1990s, imparting price pressure to housing, but by nowhere near enough to explain the recent real house price rises. We found that much of the argument these days centred on the notion that nominal interest rate falls had unlocked credit constraints in an unusually powerful way, and that house prices had risen dramatically as a rational response. But we found little support for this, especially when the *nature* of credit constraints is taken seriously. To the extent that a credit constraints explanation worked, it reflected attention back on to real income expectations. In turn these income expectations turn out to be far too weak to explain all the recent real growth in UK house prices, and indicate more the risk of future house price falls. If an explanation is to be found for recent dramatic house price rises, it is not to be found in the usual demand or supply fundamentals, but rather in the behaviour of consumers and banks, an issue we turn to in Part Two.

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[20]Nicholas Crafts, 2000, "Globalization and Growth in the Twentieth Century," IMF Paper 00/44, Washington IMF, finds, anyway that historically the impact of past technological revolutions on productivity were quite small, and often wildly overestimated by the financial markets at the time.

[21] IMF World Economic Outlook May 2000, "Asset Price and the Business Cycle".

[22] This arises commonly in the context of discussions of pensions – that asset holders have moved from holding equity to holding real estate, regardless of underlying fundamentals, to fill the pensions 'blackhole'. Only a 'permanent' confidence bubble component in the market might do this, but it would be fragile and a very inefficient way to solve the problem.

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[23] There are winners even in this. Those who owned housing equity outright at the time the prices rose dramatically and who spent the wealth created before anyone cottoned on.

[24] Not covered extensively here, since Roger Bootle was already speaking on these at the conference where this was being presented.