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Mortgage product innovation in advanced economies:

More choice, more riskⁱ

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Abstract:

In many developed countries house prices have been rising rapidly, mortgage debt has been increasing and affordability has worsened. It is in this context that the standard annuity mortgage is increasingly being supplanted by mortgages with nonstandard features, such as longer terms or interest-only payments. Many of these new features aim to reduce the borrower's monthly debt service in the initial period of the loan. While these new mortgage types help households to enter owner-occupation and to vary their expenditure patterns, the long-term cost to the borrower cannot normally be less than for a standard product. Moreover, such mortgages can also be more risky: the interest-only borrower does not accumulate equity as an annuity borrower does, and loans with longer terms expose the borrower to greater risk of interest-rate or other economic shocks. As a result both borrowers pay more and the housing finance system may be more fragile.

This paper brings together evidence from thirteen developed countries about house prices, debt and affordability, and particularly the availability and market share of mortgages with these new features. It analyses trends over the last ten years and discusses the risks of these mortgages compared to standard annuity products.

1. Introduction

Anecdotal and statistical evidence indicates that both housing and mortgage markets in developed countries are evolving in similar ways. According to the International Monetary Fund, 'house prices are highly synchronized across industrial countries. Specifically, a large share (about 40 percent on average) of house price movements is due to global factors, which reflect global co-movements in interest rates, economic activity, and other macroeconomic variables...' (IMF 2004a, p.71)

The trends affecting mortgage markets have also been similar across countries. Mortgage markets have been liberalised in many western European countries over the last 20 years as part of the more general globalisation of finance markets: restrictions on the use and terms of loans have been lessened, and a wider range of financial institutions is now permitted to offer mortgages. An important goal of deregulation was to improve the efficiency of the system by opening up the market to new providers and increasing competition amongst lenders, thereby lowering costs to consumers. This aim has largely been met—fees to borrowers have fallen and an increasing number of lenders have introduced wide ranges of new mortgage products (Mercer Oliver Wyman, 2003). While western economies were deregulating and expanding their mortgage systems, those central and eastern European countries that did not previously have risk-based mortgage systems were in the process of creating them (Hegedüs and Struyk, 2005). Across Europe, then, mortgage debt has increased significantly over the last 20 years. This expansion of mortgage availability in response to strong demand has contributed to higher house prices in many countries.

Given the extent of change it is hardly surprising that international economic and financial organisations have closely monitored developments in European markets. In 2005 the European Central Bank noted the rapid rise in mortgage debt in most EU countries, saying that ‘in line with its growing size, mortgage debt has taken up a prominent place in economic analysis and macroeconomic policy-making.’ (Wolswijk, 2005, page 5)

In 2006 the Bank for International Settlements (BIS) published a report noting the general rise in household indebtedness, attributing it in part to financial liberalisation and deregulation, which have allowed ‘increased loan-to-value ratios, a reduction of credit restrictions (and) a wider array of loan contracts offered to borrowers... Together, these developments have made borrowing cheaper and more readily available, which has allowed new categories of households to enter the housing market.’ (Committee on Global Financial Markets, 2006, p.1) They were concerned, however, that ‘Households may not completely understand their mortgage contracts or how their payments could change in response to interest rate shocks or other developments. In particular, the introduction of negative amortisation loansⁱⁱ and a number of other new loan contracts has led households to assume more, and increasingly complex, risk. This is part of a broad global trend in financial markets to shift risk towards households.’ (CGFM, 2006, p. 2) Even so, the BIS said most borrowers were not overstretched and could absorb both declines in house prices and higher interest rates. However they also noted that new forms of mortgage contract had allowed some households to take on financial commitments that would be unaffordable if there were a sufficient economic shock.

The Organisation for Economic Co-operation and Development (OECD) has also recently examined the impact of growing levels of household debt in its member countries, of which mortgages (at around 70%) are the most important component. They noted that ‘There have been...a number of supply-side innovations in credit markets that have eased the access to credit for lower-income borrowers and reduced financial constraints for first-time homebuyers’ (Girouard, *et al.*, 2007, p. 5). The authors concluded that recent developments have heightened sensitivity to economic shocks, saying ‘whether the situation remains benign or not depends on what happens to interest rates, asset values (particularly house prices) and incomes. In the event of adverse developments in these variables consumption and the wider economy would be affected’ (Girouard *et al.*, 2007, p.6).

It was in this context that the Housing Finance working group of the European Network of Housing Research coordinated by Bengt Turner and Christine Whitehead decided to

undertake a comparative project to examine the extent to which behaviour in individual markets was consistent with this picture and particularly how mortgage markets are developing in response to the changing economic, and regulatory financial environment.

One of the important aspects of market development has been the introduction of new mortgage products. Consumers clearly enjoy much greater choice than they had in the days when, in the UK for instance, a mortgage meant a straight annuity loan with a 25-year term and a significant minimum down-payment. Conversely, this expanded range of choice makes much greater demands on consumers' financial acumen, and has generally increased market and credit risk (for the individual borrowers, lenders and society as a whole) (Leece, 2004; Miles 2004).

Of particular interest in the context of rising prices and increasing affordability problems are a group of products that reduce monthly payments and therefore make it easier for households to enter owner-occupation or to move up market. Products with these attributes include, in particular, interest-only mortgagesⁱⁱⁱ without a funded repayment vehicle and increased mortgage terms (of up to 50 years or even longer in some cases).

Product development aimed at reducing early payments has been seen before, particularly in the 1970s and 1980s in the US and the UK, as well as in some developing countries. Then the major problem was that very rapid inflation meant that mortgages with nominal interest rates had 'front-loaded' payments: the higher inflation was, the more borrowers paid early in the mortgage and the less they paid later (as their incomes rose in money and--in growing economies--real terms). Inflation-adjusted, deferred-interest and longer-term mortgages allowed the real costs of the mortgage to be matched more closely with nominal income growth (Miles, 1994, chapter 8; Leece, 2004).

The current situation is quite different. Inflation has been controlled over the last decades and inflationary expectations remain low. This has led to a widespread fall in nominal interest rates. Incomes are generally rising relatively slowly in both nominal and particularly real terms. Principal has therefore become a larger part of repayments even in the earlier years. Spreading repayments over a longer period reduces initial costs and enables additional households to enter owner-occupation, but puts these households at greater risks for longer periods. Interest-only mortgages in particular raise the issue of how the capital is to be repaid at the end of the mortgage term, or whether the mortgagor will simply have to re-mortgage, extending the period that the household is at risk.

In this paper we call mainly on evidence about recent mortgage-market developments in thirteen developed countries^{iv}. Statistical data and other material were provided by housing finance experts in each country. The questionnaire asked for a range of information on markets and product innovation. In particular it focused on quantifying the market shares of some of the new product features and assessing the importance of these developments to consumers, lenders and the stability of the marketplace.

The target group of countries for the study was those with a high ratio of mortgage debt to GDP, or where that ratio had grown rapidly over the past ten years. A questionnaire, covering developments in each country's mortgage market in the last decade, was sent to members of the ENHR Housing Finance group (or, in a few cases, other housing finance experts) in the target countries. Responses were received from some thirteen such experts. Information from the questionnaire was supplemented by published data from other sources, including Eurostat and the European Mortgage Federation. Throughout the paper the tables reflect 2005 data,

which was the most recent available for all countries. In the text, however, we cite more recent figures where available.

In this paper we first clarify the economic environment in which mortgage product innovation is occurring. We then examine the potential for and limitations on reducing repayments. We then turn to empirical evidence on how mortgage markets are developing and the use of specific repayment reducing products. Finally we assess the impact of these products on the risks facing both individuals and the housing finance market.

2. The economic environment

Over the decade from 1995 - 2005, inflation and interest rates fell in almost all advanced economies. This has supported more investment in housing, which has been associated with rapid house-price rises in markets across Europe and the USA, generating problems of affordability. Since 1990, the price of an average house has gone up much faster than incomes in Spain, the Netherlands, Ireland and the UK for example (Table 1). In this situation borrowers' loan-to-income ratios rise and some borrowers cannot afford to pay standard annuity payments on the resultant mortgages, creating a demand for mortgage products with low initial payments.

Table 1: House-price affordability since 1990

| <i>Country</i> | <i>1970</i> | <i>1980</i> | <i>1990</i> | <i>2003</i> |
|----------------|-------------|-------------|-------------|-------------|
| Germany | 129 | 114 | 95 | 80 |
| Spain | 147 | 127 | 199 | 289 |
| Netherlands | 137 | 151 | 111 | 243 |
| Ireland | - | 136 | 110 | 201 |
| UK | 97 | 109 | 137 | 156 |

Change in ratio of house prices to disposable income per worker. 1985 = 100. Source: IMF (2004b), cited in Stephens (2006)

At the same time, deregulation and globalisation have enabled innovation in financial instruments, including mortgages. This development has been broadly recognised. “The changes that have transformed housing finance have been global in scale and are the result of global forces. These include: new technology, a societal-wide move from government regulation to a greater market orientation, and a world-wide decline in interest rates.” (Green & Wachter 2007, p.6).

Since the same economic forces are at work across countries, we therefore expect to find some consistency in market responses – in this case, in the range of products offered by mortgage providers (though frameworks vary hugely by country). House price rises have generated affordability concerns across Europe, and lenders have responded by developing products that permit lower monthly payments (at least initially) for a given level of borrowing. Such products allow borrowers to attain a level of mortgage—and standard of housing—that would not otherwise be possible. On the other hand, this increased availability of funds is being capitalised into house prices, and (as we have already noted) the new product types are often inherently more risky.

Although economic forces may be pushing mortgage providers in the same general direction, the specific character of new mortgage products is conditioned by each country's regulatory and legal framework; by whether or not it is in the Euro; and by its own particular ‘mortgage

culture' (see e.g. Kleinman et al, 1998). So while the direction of movement may be the same across countries, path dependency means that product offers do not necessarily converge^v.

3. Mortgage innovation to reduce repayments

The size of payments in the first year of a mortgage is a major determinant of how much a buyer can afford to borrow, and therefore the price of the house purchased and the capital gain expected over time. So cheap initial payment mortgages would seem to be a good thing—buyers can borrow more, lenders can expand their portfolios, and governments can meet their goal of expanding owner-occupation. However, in the long run 'cheap mortgages' do not exist, because in an efficient market the net present value of the payment on a loan is always equal to the initial mortgage; the lender will demand and receive the market rate of return. The payment profile of a nonstandard mortgage may be different from that of an annuity mortgage, but it is not in the long run a better deal.

Interest-only and longer-term mortgages are being provided across Europe in both prime and subprime markets. In Europe and the UK in particular, a distinction is drawn between borrowers with good credit history and those with some degree of credit impairment (the 'subprime' market)^{vi} (Whitehead & Gaus, 2007; Pannell, 2006). In the USA, in contrast, there are specific subprime mortgage products. These fall into the category of 'non-conforming' mortgage lending—that is, loans that do not fulfil the criteria used by Fannie Mae and/or Freddie Mac with regard to loan amounts and household income (Green and Wachter, 2007). For single-family homes these were a maximum loan of \$417,000, a debt service-to-income (DTI) ratio below 55%, and a loan-to-value (LTV) below 85%. Among these products are interest-only mortgages (with adjustable or fixed rates), option-adjustable-rate-mortgages (option-ARMs),^{vii} and negative amortisation mortgages (Kiff and Mills, 2007). These mortgages tend to have a heightened risk profile compared to standard mortgages and are therefore *more* expensive initially—very different from the products that this paper is concerned with which involve lowering the initial payments.

The impact of reducing payments

Interest-only mortgages offer clear short-term benefits to many types of consumer (Whitehead & Gaus, 2007). Most important of these is the lower monthly payment required compared to annuity/amortization mortgages which enable potential owner-occupiers to overcome cash flow constraints. They can allow more flexible repayment patterns for those borrowers who have irregular incomes. More sophisticated investors may feel they could achieve a better return on their money by investing it themselves than by making payments on a traditional mortgage (Tatch, 2006). Interest-only mortgages allow elderly households, whose incomes fall after retirement, to maintain consumption with a consistent level of debt as compared to the more expensive strategy of paying instalments and raising new debt over the years. Owner-occupiers more generally can use interest-only mortgages to consume part of their housing equity without having to move.

On the other hand, interest-only loans give rise to several concerns. The first is whether and to what extent borrowers fully understand the implications of taking out such a mortgage, and whether they have a clear understanding of how they will repay the capital sum. In this context, because interest-only mortgages are a relatively recent development, studies have yet to be conducted on the behaviour of a cohort of interest-only borrowers over the full life of their loans and, in particular, to study whether, how and when principal repayments were made.

The second cause for concern is that interest-only borrowers are more vulnerable to interest-rate or house-price shocks than borrowers with other mortgage types. Interest-only borrowers with variable-rate mortgages are particularly vulnerable to interest-rate shocks because any change in rates will affect the whole of their mortgage payment. With a traditional annuity mortgage, over time a diminishing percentage of the monthly payment goes towards interest, and thus the potential effect of interest-rate shocks diminishes over the life of the loan. And because interest-only borrowers may not build up equity in the course of the mortgage, they can be tipped into negative equity by house-price falls more easily than holders of traditional mortgages—again, even after many years. Finally, mortgagors using this type of mortgage do not build up a cushion that could help in the case of individual risks such as unemployment, illness or relationship breakdown.

The example of bond-financed mortgages demonstrates why risk increases with duration. A change in the interest rate for bonds sold means that the market value of the bonds (and therefore for the mortgage debt financed by the bonds) will change in the opposite direction. A fall in the bonds' market interest rate increases the market value of the loan they finance, and represents a capital loss for the borrower. On the other hand, an increase in the market interest rate results in a capital gain for the borrower with a fixed interest rate. To give an example, for the common 30-year fixed-rate mortgage loan in Denmark, a decrease of 1% in the market interest rate leads to an increase in the value of the debt of approximately 10%.

Interest-only mortgages are often used in association with other mortgage product attributes, notably remortgaging (Whitehead & Gaus, 2007). Remortgaging of itself should be neutral with respect to the interest rate except where larger sums are borrowed, but the capacity to mix and match different product attributes carries with it both increased complexity and, potentially, increased risk.

A further important issue is that while mortgage innovations allow buyers to pay less in the early years they can also be expected to increase demand for owner-occupied housing offsetting the benefits of lower repayments as the size of mortgage required increases. In the absence of a strong supply response, at least part of the higher demand will be capitalised as higher house prices. In the short-run adjustment period this capitalising effect can be rather strong – as seen in Denmark after the introduction of interest-only mortgages (Bentzen and Lunde, 2006) – although the long-run price effect should be lower. To the extent that this house price effect occurs the benefits of rescheduling are reduced and risks are increased.

The limits to slower debt repayment

Over the years, many different loan types have been employed to reduce borrowers' payments. Three main methods have been used to reduce repayments in the short term. The first is the use of variable interest rates. These are attractive when the yield curve is sharply increasing (that is, when there are strong expectations of increasing interest rates in the long term, so long-term fixed interest rates are higher than short-term rates). The second is to require the borrower to pay only the interest on the loan, but not make any contributions to repaying the principal until the end of the loan's term: interest-only mortgages. The third is to lengthen the term of the mortgage and so reduce the size of the regular payment.

How could the lowest possible debt service be achieved? In principle, it is possible to design a mortgage where the borrower makes *no* monthly repayments at all, and the interest is added to the principal. The full amount is repaid at the end of the loan's term. Such mortgages do exist, but are only available to owner-occupiers with very high equity in relation to loan

size—when offered to elderly asset-rich borrowers they are known as reverse or lifetime mortgages.

Such a mortgage is the equivalent of the simplest financial claim of all, the zero-coupon bond (loan). This consists of a disbursement to the borrower, I_0 , at time 0, and the borrower's repayment at time n of amount I_n . Through the n years no payments of principal or interest are made by the borrower. However, the lender must receive a return (the interest rate for the mortgage, i_n), so the unpaid interest is added to the mortgage debt. The interest rate i_n represents the internal rate of return as well as the zero-coupon interest rate.

$$I_n = I_0 \cdot (1 + i_n)^n$$

We can employ this limiting case to illustrate the financial risk to the lender as well as to the borrower of reducing mortgage payments in some of the different possible ways.

The nominal interest rate is made up of the real interest rate plus a component to compensate for expected inflation in the relevant period (the Fisher effect). Therefore the interest rate i_n will be higher than expected inflation. In addition, i_n will increase as the loan's term lengthens because of risk: the longer the period of the loan, the more uncertain forward interest rates are. So while longer loan terms decrease payments because the amount of principal in each payment is lower, this comes at the cost of higher interest rates.

The lender's return from this zero-coupon loan is the mortgage interest rate, i_n , made up of the real interest rate plus an inflation component. The borrower's rate of return from investment in property consists of a) the value of using the property during the period, which equals the rent obtainable from letting the property out, plus b) the expected price increase (capital gain) from the property. As long as the real interest rate is higher than the real capital gain, which it must be in the longer term, the interest rate on the debt will be higher than the average property-price appreciation, a borrower with a zero-coupon mortgage and a high initial LTV will experience negative equity after a few years, as the market value of the debt will have increased more than the value of the house. The borrower is technically insolvent and the lender has no security that can cover the debt in case of real insolvency. Because of this, most borrowers are forced to pay some debt service through the loan term to avoid negative equity.

This analysis demonstrates that preservation of the security underlying the mortgage (which is an advantage for both borrower and lender) requires debt-service payments that are higher than the real interest rate. This additional payment can be a) the inflation component in the nominal interest rate, which serves as payment for inflation's erosion of the real value of the debt, and/or b) instalments (principal payments) in ordinary annuity loans. Thus debt service can be reduced by the lengthening of loan terms, use of interest-only mortgages and other modifications of standard mortgage features, but payments will always be higher than the real interest rate.

Finally there is a natural limit to the length of mortgage terms, as the structure of annuity mortgages means that the marginal benefit (in terms of reduced payments) of an additional year declines as the term lengthens. As terms lengthen, the proportion of principal in each payment falls; at the limit (an infinite term), the annuity payment is equal to the interest payment and the two approaches of interest only and extending the term are identical. In both cases the mortgagor must find another means of repaying principal.

4. Empirical evidence: owner-occupation and mortgage lending

Owner-occupation rates in the thirteen countries studied range from a low of 37% in Switzerland (an outlier) to a high of 82% in Spain (Table 2). The percentage of owner-occupiers with mortgages varies more widely, from about 25% in Spain to 85% in the Netherlands. There is no obvious correlation between owner-occupation rates and mortgage penetration rates--some countries with high homeownership rates have low mortgage penetration rates (Greece, Portugal, Spain), while others have a high score on both measures (Ireland, the UK). In general the northern European and Anglo-Saxon countries have a higher mortgage penetration rate than southern European ones. This is consistent with findings that the correlation factor between national owner-occupation rates and GDP is close to zero (Miles 1994 p. 97). In some countries with high owner-occupation but low mortgage debt, there may be a tradition of households financing house purchase via funds from the extended family (Greece, Spain); in many eastern and central European countries high owner-occupation rates with low debt are the result of mass sale or restitution of state-owned dwellings to private owners after the fall of communism (Hungary).

An earlier study indicated that owner-occupation rates were relatively stable in Europe during the 1990s and the first years of this century (Scanlon and Whitehead, 2004), while the US owner-occupation rate rose from 64.7% in 1995 to 68.8% in 2006, supported in part by the expansion of the subprime market. (Kiff and Mills, 2007)

Table 2: Owner-occupation rate and % of owner-occupiers with mortgage (highest-lowest last column)

| | Owner-occupation rate (latest available) | % of owner-occupiers with a mortgage |
|-------------|--|--------------------------------------|
| Netherlands | 56 | 85 |
| Denmark | 53* | 80 |
| Ireland | 76 | 62 |
| Germany | 44 | (2003) 60 |
| UK | 70 | 58 |
| Australia | 70 | 50 |
| Finland | 64 | (2004) 44 |
| France | 57 | 35 |
| Greece | 74 | (est) 33 |
| Portugal | 76 | (2001) 32 |
| Spain | 82 | (est) 25 |
| Switzerland | 37 | Not known |
| Korea | 63 | Not known |

Source: country experts; VROM + own calculations

*not counting dwellings not in use

The growth in the ratio of mortgage debt to GDP is an important risk indicator (Girouard et al 2007). Across the countries studied, the ratio of residential mortgage debt to GDP has grown over the last ten years (Table 3). (Data from some countries on residential mortgage lending includes loans to both owner-occupiers and landlords, and it can be difficult to determine the relative importance of the two categories of borrower.) The rate of growth has been highest in those countries that are starting from a low base (Greece, Ireland, Spain). The exception is France, where the ratio remains low by European standards.

In the US, not covered by the survey, the ratio has also been increasing rapidly; from 1997 to 2005 nominal mortgage debt outstanding rose 250% while nominal GDP rose 50%. In addition, the number of households with a mortgage had increased by 20% over the period, while the number of households increased by just 9% (Green & Wachter, 2007, p. 35).

Table 3. Ratio of residential mortgage debt to GDP (highest-lowest 2nd column)

| | Ratio of mortgage debt to GDP | | % change 1995-2005 |
|-------------|-------------------------------|-------------|--------------------|
| | 1995 | 2005 | |
| Netherlands | (1996) 43.9 | 97.1 | *121 |
| Denmark | 62.9 | 94.0 | 49 |
| Switzerland | 65.7 | 88.9 | 35 |
| UK | 53.3 | 80.0 | 50 |
| Ireland | 23.5 | 61.7 | 163 |
| Portugal | (1999) 37.4 | 53.9 | **44 |
| Germany | 44.0 | 51.7 | 18 |
| Spain | 16.6 | 52.6 | 217 |
| Finland | 30.2 | 42.5 | 41 |
| Korea | (1997) 12.0 | (2006) 35.7 | ***197 |
| France | 19.8 | 29.4 | 49 |
| Greece | 4.0 | 25.1 | 528 |

Source: EMF 2005, 2006; Kyung-Hwan Kim

* Netherlands % change applies to period 1996-2005

**Portugal % change applies to period 1999-2005

***Korea % changes applies to period 1997-2006

Countries where residential mortgage debt is tax-favoured have higher debt levels than those where it is not. In the Netherlands, Denmark and Switzerland, the countries with the highest ratio of residential mortgage debt to GDP in Table 3, the interest element of mortgage payments is fully deductible from owner-occupiers' income for tax purposes. The same applies to the US. In Germany, where mortgage interest is not tax-deductible for owner-occupiers, the ratio is much lower at 52%. At the far end of the scale, Greece, which 'on balance imposes a tax levy on mortgage-financed housing', has a ratio of 25.1% (Wolswijk, 2005).

Fiscal arrangements are not all-important, however. In recent decades several countries have carried out tax reforms which removed or reduced the deductibility of interest expenditures from taxable income (e.g. in the UK between 1991 and 2000; Denmark in 1987, 1994 and 1999; Germany in 1987; France in 1997). Nevertheless, residential mortgage debt has continued to increase in those countries, as Table 3 shows.

Table 4 sets out the amount of new mortgage and remortgage lending in the countries studied. Gross mortgage lending has increased least in the Netherlands, and most strongly in Ireland (and Greece—though 1995 figures are not available, Greek mortgage lending more than doubled in the period 2003-2005 alone).

Table 4: New (gross) residential mortgage lending, millions of Euros (alphabetical)

| | 1995 | 2005 | % change |
|---------|--------|---------|----------|
| Denmark | 15,353 | 86,213 | 462 |
| Finland | 4,778 | 28,806 | 503 |
| France | 32,440 | 134,500 | 315 |
| Germany | n/a | 103,100 | |

| | | | |
|-------------|---------------|---------|------|
| Greece | n/a | 13,609 | |
| Ireland | 2,284 | 21,536 | 843 |
| Netherlands | (1996) 37,610 | 114,134 | *203 |
| Portugal | n/a | 17,578 | |
| Spain | 15,476 | 139,319 | 800 |
| UK | 67,802 | 421,231 | 521 |

Source: EMF 2005, 2006

*Netherlands % change refers to 1996-2005

Table 5 shows that interest rates fell sharply in all countries from 1996 to 2005, when interest rates reached the lowest level seen in recent years. Since then interest rates—particularly short-term—have increased, and rates for countries that joined the Euro have converged (though not completely). In most countries 10-year interest rates now are about half the level they were in 1996, though in Greece the reduction was much greater.

Table 5: Interest rates, %, 1996* and 2005 annual averages; June 2007 monthly (alphabetical)

| | Short-term (3 month interbank rates) | | | Long-term (10-year government bond) | | | Typical mortgage rate on new loans*** | |
|-------------|--------------------------------------|------|----------|-------------------------------------|------|----------|---------------------------------------|------|
| | 1996 | 2005 | 2007m6** | 1996 | 2005 | 2007m6** | 1996 | 2005 |
| Denmark | 3.98 | 2.22 | 4.37 | 7.19 | 3.4 | 4.64 | 7.9 | 4.4 |
| Finland | 6.28 | 2.19 | 4.15 | 7.08 | 3.35 | 4.62 | 5.5 | 3.0 |
| France | 16.35 | 2.19 | 4.15 | 6.31 | 3.41 | 4.62 | 7.4 | 3.5 |
| Germany | 3.27 | 2.19 | 4.15 | 6.22 | 3.35 | 4.56 | 7.1 | 4.2 |
| Greece | 6.58 | 2.19 | 4.15 | 14.62 | 3.58 | 4.80 | 5.6 | 4.0 |
| Ireland | 5.75 | 2.19 | 4.15 | 7.29 | 3.33 | 4.61 | 7.1 | 3.7 |
| Netherlands | 2.99 | 2.19 | 4.15 | 6.15 | 3.37 | 4.61 | 6.0 | 4.1 |
| Portugal | 9.79 | 2.19 | 4.15 | 8.56 | 3.44 | 4.74 | 11.5 | 4.2 |
| Spain | 7.52 | 2.19 | 4.15 | 11.27 | 3.39 | 4.62 | 6.2 | 3.2 |
| Switzerland | 1.9 | 0.76 | 3.19 | 4.37 | 1.93 | 2.70 | 4.8 | 3.1 |
| UK | 6.11 | 4.76 | 5.88 | 7.94 | 4.46 | 5.49 | 6.8 | 5.2 |

Source: Eurostat; EMF 2005, 2006; Swiss National Bank, UK Council of Mortgage Lenders Table ML5

*1996 figures were used rather than 1995 because data on mortgage interest rates were better for 1996

** at June

***Denmark: Fixed rates based on 30-year callable bonds

Finland: Variable rate and initial fixed rate up to 1 year

France: Fixed rate, contracted loans (*prêts conventionnés*)--maturity 12-15 years

Germany: mortgage loans with an initial fixed-rate period of 5-10 years.

Greece: Reviewable rate after a fixed term of 1 year

Ireland: Reviewable rate (including fixed rates fixed up to one year)

Portugal: Variable rate and initial fixed up to 1 year

Spain: Effective average interest rate not including costs during first period of loan. Interest rate usually floats every 6-12 months.

UK: Weighted average of building society rates on all mortgage loans

It is difficult directly to compare mortgage interest rates internationally, because mortgage types vary so much from country to country. In Finland, for example, over 90% of mortgage loans were at variable rates, while in France about 75% of new loans were at rates fixed to maturity. Moreover, even within individual countries the composition of the pool of

outstanding mortgages, in terms of interest-rate type and other loan characteristics, can change greatly over the years. Nevertheless, it is clear that mortgage rates fell in all countries studied in the decade to 2005, and that in that year rates across countries on the most common types of mortgage in 2005 were within a relatively narrow range (3% - 5.2%).

5. Empirical evidence: recent mortgage product innovations

Just as with interest rates, the range of products offered is also becoming more similar across countries. This does not, however, mean that product ranges are becoming narrower; on the contrary, in most countries the number of product choices has increased greatly. Mortgage product innovation has flourished in Europe over the last decade, helped by a general relaxation of regulation and the push towards EU mortgage-market integration. As Mark Stephens and others have pointed out, it would not be correct to say that the various markets have been evolving in a parallel fashion, because they came from different starting points—some countries traditionally had long-term fixed rates, others mostly variable rates; legal and cultural norms differ, etc. (Stephens, 2003; Kleinman et al, 1998) Indeed, it can be said that in all countries the trend is towards a wider variety of mortgage types in terms of repayment model, interest-rate structure and term—towards ‘product completeness’—although there is huge variation in the range of products offered. (Mercer Oliver Wyman, 2003)

In response to affordability problems, mortgage providers have aimed to design new products with lower monthly payments. Two main methods seem to have been used: changing the repayment structure, particularly by using interest-only mortgages; and lengthening mortgage terms. The remainder of this paper discusses developments in these two types of mortgage innovation.

Interest-only mortgages

Interest-only loans, sometimes known as ‘bullet loans’^{viii}, are mortgages where the purchaser pays the interest on the loan every month, but makes no contribution to repaying the capital sum borrowed. At the end of the loan’s term, then, the borrower is obliged to repay the entire principal^{ix}. The repayments on interest-only mortgages are significantly lower than those on a traditional annuity/amortisation loan, where part of each monthly payment goes to repaying the principal. The UK Council of Mortgage Lenders, for instance, notes, ‘At a time of intense affordability pressures, one possible reason for taking out an interest-only loan without a formal repayment vehicle could be to reduce the burden of monthly mortgage payments. A homebuyer taking out an average size loan of £120,449 in Q3 2006, at a typical interest rate of 5.01% over 25 years, would face a monthly capital and interest payment of £713. But on an interest-only basis with no repayment vehicle, the total payments would be £515’ (Tatch, 2006, page 5).

The same issues are relevant in many other countries. For instance Table 6, from a Danish newspaper, shows figures for payments on interest-only and instalment mortgages, with and without the effect of tax relief on interest payments. The interest rates and payments are based on bond prices as of 22 October 2007. As Miles (2004) makes clear, many borrowers base their mortgage choice mostly—or only—on the level of payments, and have a rather limited knowledge of other characteristics of the mortgage and will therefore be likely to choose lower repayments at the expense of higher risk.

Table 6: Standard and interest-only 30-year mortgages. Market interest rate and monthly payments in DKK on loan of DKK 1 million (DKK 10 = €1.34)

| | Market interest rate (rate of return) | | Monthly payments in DKK | |
|---|--|-----------|-------------------------|-----------|
| | Before tax | After tax | Before tax | After tax |
| Standard mortgages with payment of capital | | | | |
| Annual interest adjustment | 5.3 % | 3.6 % | 5,690 | 4,280 |
| Fixed interest rate (5% coupon) | 6.2 % | 4.2 % | 6,150 | 4,540 |
| Interest only mortgages | | | | |
| Annual interest adjustment | 5.3 % | 3.5 % | 4,250 | 2,840 |
| Fixed interest rate (5% coupon) | 6.2 % | 4.2 % | 4,930 | 3,290 |

Source: *Berlingske Tidende* 28 October 2007, based on bond prices 22 October 2007 and calculated by mortgage bank BRF.

One reason why interest-only mortgages have become more popular over the last few years is that the formula for determining annuity payments means that repayment of principal accounts for a higher percentage of the monthly payment when interest rates are low. The difference between the two types of mortgage is therefore also greatest when interest rates are low, and narrows as interest rates increase.

Interest-only loans are entirely new in some countries: they were introduced in Denmark in 2003. In others, notably the UK, Germany and the Netherlands, interest-only mortgages have long been offered in conjunction with separate repayment vehicles (Table 7). Such mortgages are popularly known as ‘endowment mortgages’ in the UK. Purchasers thus make a monthly interest payment to the lender, as well as a separate payment into a savings plan (often stock-market based). This rather complicated system grew up as a result of the tax-favoured treatment given to some of these investment plans and the tax relief on mortgage interest that was available until 2000. In addition, during a period of strong stock-market growth there was the possibility that when the investment plan matured there would be a surplus left over after repayment of the capital sum borrowed. Conversely, however, there was also the possibility that the investments would not perform well enough to pay off the sum borrowed at the end of the mortgage term, and endowment mortgages fell dramatically from favour when stock market performance declined. Even so, the existence of some defined fund clearly reduced risk as compared to the current form of ‘pure’ interest-only mortgage, where there is no associated investment vehicle.

Table 7: Availability of interest-only mortgages

O = unavailable X = available

| | <i>Interest-only mortgages available</i> | |
|-------------|--|-------------|
| | <i>1995</i> | <i>2005</i> |
| Australia | O | X |
| Denmark | O | X |
| Finland | O | X* |
| France | X | X |
| Germany | X | X |
| Greece | O | X* |
| Ireland | X | X |
| Korea | O | X |
| Netherlands | X | X |
| Portugal | O | X |
| Spain | ? | X |

| | | |
|-------------|---|---|
| Switzerland | X | X |
| UK | X | X |

*with associated repayment vehicle

Source: expert responses

The precise meaning of interest-only differs from place to place. In the Netherlands, the term ‘interest-only mortgages’ refers to perpetual loans (with no fixed term) on which only interest is paid; there are separate categories for life-insurance and investment mortgages (Rouwental 2007b; VROM 2006). On the other hand, some countries limit the interest-only period, to ensure that buyers are forced to begin to repay the capital sum at some point. In Denmark, for example, the interest-only period was formally limited to ten years, although provided the price of the house had not fallen, buyers expected to be able to remortgage at that point and take out another interest-only loan.^x Availability also depends on the nature of default legislation in each country. For example in Germany, the lender can immediately cancel the loan if the borrower goes into negative equity, even if the borrower’s payments are up-to-date, although the facility is little used in practice. There is clearly a higher risk of negative equity with interest-only mortgages, since the borrower does not contribute with instalments to build up equity.

In many countries it is difficult to find data on the share of interest-only loans, but in most countries for which data were available, interest-only loans make up an increasing share of the mortgage market (Table 8).

In the Netherlands pure interest-only loans (those without an associated repayment vehicle) have tripled their market share since 1995; their popularity is usually attributed to the tax system (discussed below). In the UK the proportion of pure interest-only loans has doubled from 10% to 20% since 1995, despite the abolition of mortgage interest tax relief in 2000. In Denmark interest-only products were first allowed in 2003, and by the end of 2005 they accounted for 25.6% of all the outstanding mortgage debt and for 31.5% of owner-occupiers’ mortgage debt. This exceptionally quick growth has continued, and in September 2007, four years after their introduction, interest-only mortgages represented 43% of owner-occupiers’ outstanding mortgages. (Danmarks Nationalbank, MFI financial statistics). In Ireland, the percentage of new loans that were interest-only fell from 7.3% in 1995 to 2.1% in 2001, then rose quickly to 12.6% in 2006 (Department of the Environment, Heritage and Local Government 2008).

In Spain, interest-only mortgages have been available since April 2006, although only a few banks offer them: BBVA bank, for example, offers a mortgage that is interest-only for the first three years. Although there are no data available about the market penetration of such mortgages, experts believe it is still low but rising. Interest only mortgages have also been popular outside Europe and the USA; in South Korea such mortgages did not exist in 1995, but by 2005 they made up 48% of outstanding loans (Kookmin Bank 2005). These are mainly 3- to 5-year bullet interest-only loans rather than for the full mortgage term (Chiquier 2006).

Table 8: Mortgage repayment models: new residential loans

| | <i>% new loans that were interest-only</i> | |
|-----------|--|--|
| | <i>1995</i> | <i>2005</i> |
| Australia | 0 | 30 (all residential) 15 (owner-occupiers) |
| Denmark | 0 | 31.5 |
| Finland | 0 | 3 |

| | | |
|---------------------------------|-----|--------------------------|
| Ireland | 7.3 | 8.4 (12.6% in 2006) |
| Netherlands | 69 | 87.6 (2006) |
| (of which no repayment vehicle) | 14 | 44.3 |
| Spain | 0 | 0 (available since 2006) |
| UK | 62 | 24 |
| (of which no repayment vehicle) | 10 | 20 |

*Netherlands: only borrowers with a single mortgage loan

Source: Reserve Bank of Australia (2006); Council of Mortgage Lenders Table ML6; Department of the Environment, Heritage and Local Government (2008); van Dijkhuizen (2005); VROM (2006); country experts

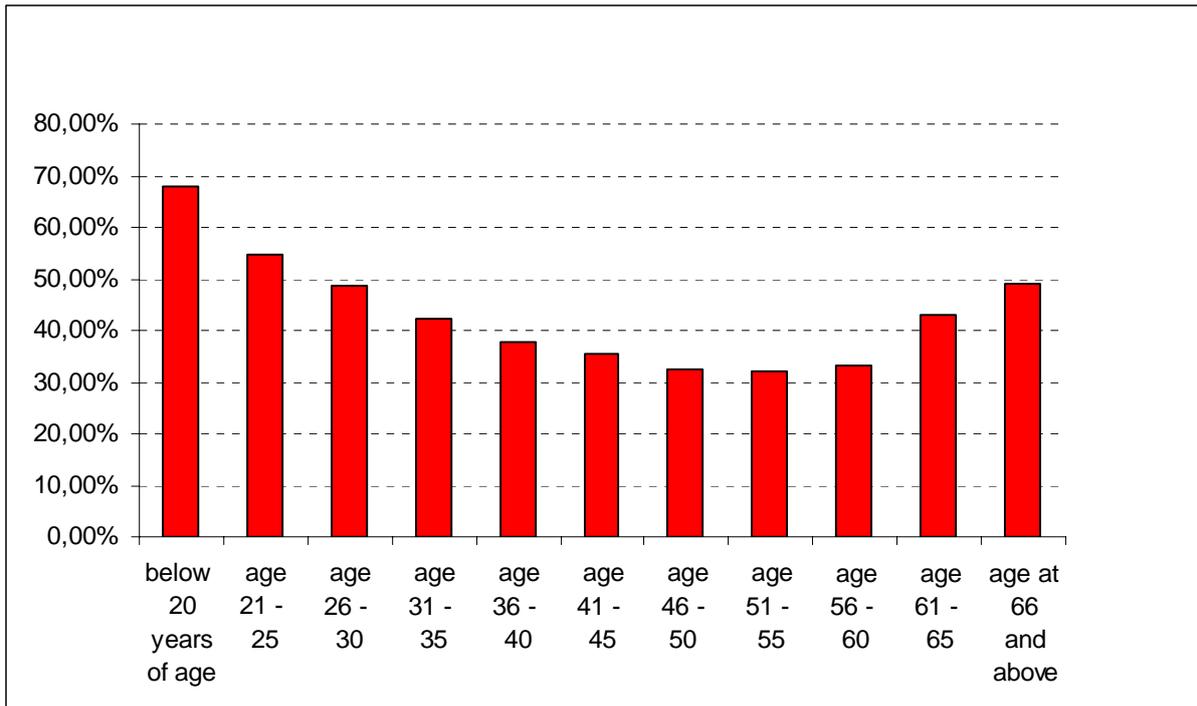
Interest-only loans are particularly attractive in countries where owner-occupiers can deduct interest payments from income for tax purposes, as in the Netherlands. Jan Rouwendal points out that taking tax deductibility into account, the payments on an interest-only mortgage could be lower than rent for an equivalent house. Pure interest-only mortgages accounted for 3.4% of Dutch mortgages in 1993, according to the Dutch Housing Needs Survey; by 2006 the figure had risen to 44%. Such mortgages are particularly popular among the elderly (about 60% of elderly borrowers in the Netherlands had interest-only mortgages in 2002), because they allow owner-occupiers to consume part of their housing equity without moving (Rouwendal, 2007a)

Interest-only loans are also popular with investors in residential rental properties because they improve the cash-flow difference between the income from rent and the debt service. In addition, interest payments are deductible from taxable income for landlords (even if not for owner-occupiers) in many countries. In Australia, about 60% of new investor housing loans in 2005 were interest-only (Reserve Bank of Australia 2006)

Age distribution of interest-only borrowers: Denmark

Among the arguments for the introduction of interest-only mortgages for owner-occupiers in Denmark in 2003 was that young families might need to stop making payments on the principal for a period, for example after the birth of children. This possibility might allow people to keep their house after a divorce or to finance further education; older people could remain in their homes even though their incomes had fallen after retirement. This reasoning is borne out by data on the age distribution of interest-only borrowers from Danish mortgage bank BRF (which holds 7.8% of outstanding Danish mortgage debt). As Figure 1 shows, borrowers of all age groups hold interest-only mortgages, but younger and the older families are the most likely to have them. Young Danish owner-occupier families are generally highly indebted, and their debt falls only gradually with age (Lunde 2007). The high frequency of interest-only mortgages among younger owner-occupiers worsens this situation.

Figure 1: Interest-only mortgages as a % of all owner-occupier mortgages by age of borrower. Danish mortgage bank BRF, end-September 2007



Source: BRF internal statistics.

Research into behaviour and intentions of interest-only borrowers: England

In 2004/05, reflecting official concern with the spread of interest-only mortgages in the UK, the Survey of English Housing included a question about how interest-only borrowers planned to pay off their mortgage. The results are shown in Table 9. A high proportion—more than one third—planned to repay the principal by selling the mortgaged dwelling, implying continuing high levels of debt when purchasing the next home; a further 5% did not know how they would repay. Some 16% however expected to transfer to a repayment mortgage.

The UK’s Financial Services Authority commissioned more detailed research in this area, which was published in December 2006. The FSA research set out to determine who the interest-only borrowers were, how they intended to repay their loans (including how firm their intentions were), and how well they understood interest-only mortgages. A survey was conducted of 857 recent interest-only borrowers (that is, borrowers for whom banks had no record of a repayment vehicle). Most of the borrowers surveyed had obtained an interest-only loan (52%) on remortgaging; 29% were moving home and only 12% were first-time buyers. The main reason borrowers chose such loans was because the monthly payments were low.

In contrast to the 36% found by the Survey of English Housing only 18% of borrowers planned to sell the mortgaged house to pay off the mortgage (FSA, 2006).

Table 9: Expected method of principal repayment, interest-only borrowers in England (2004-2005)

| <i>Method</i> | <i>Percentage</i> |
|--|-------------------|
| Proceeds from sale of mortgaged dwelling | 36 |
| Savings/investments | 26 |
| Change to repayment mortgage | 16 |
| Other | 9 |
| Don’t know | 5 |
| Sale of a different property | 4 |
| Expected inheritance | 2 |

Although most borrowers had a good understanding of what an interest-only mortgage was and the risks involved, ‘a significant minority had no idea or definite plans on how they would pay back the capital they borrowed. A large proportion of these borrowers suggested that dealing with finance was best left to the experts, and many had taken an interest-only mortgage because it was recommended to them by a professional.’ (FSA, 2006, p. 2) Of those who did have a plan for paying back the mortgage ‘in a number of cases the credibility of this repayment strategy may be open to question.’ Only 22% had formal arrangements in place to repay the principal, while 65% had other plans, including selling property or switching to a repayment mortgage. Some 13% had only a ‘rough idea’ or ‘no idea’ of how they would repay the loan. Such borrowers tended to be in lower social classes and more reliant on professional advisers (FSA, 2006)

Lengthening mortgage terms

Mortgage terms in developed economies have traditionally been in the range of 15-30 years. However these terms are lengthening and now in many countries average 25-30 years (Table 10). Mortgages with terms of up to 50 years, or even longer, are available in some countries (eg Spain, UK and France). As with interest-only mortgages, the chief benefit of longer mortgage terms to the borrower is lower monthly payments. On the other hand, the longer the mortgage term, the higher the interest rate (with fixed rates and a normal yield curve).

The useful life of dwellings is long—often measurable in centuries rather than decades or years. It therefore seems natural for lenders to offer mortgages with long terms, especially compared to traditional unsecured bank loans. However, it also seems clear that there is a need for some limit to mortgage terms, because buildings need to be maintained and renovated; because of the risk of moral hazard; and because when people reach retirement they are less able to pay the interest charges.

Table 10: Typical mortgage terms (alphabetical)

| | 1995 | 2005 |
|-------------|--|--|
| Australia | 25 years | 25-30 years |
| Denmark | 60% 30-year bonds 25% 20-year bonds 10% 10-15 year bonds | 83% 30-year bonds 13% 20-year bonds 2% 15 years 2% 10 years |
| Finland | 15 years | 20 years |
| Germany | 20-30 years | 20-30 years |
| Greece | 15 years | 25 years |
| Ireland | n/a | Average 26 years |
| Netherlands | n/a | 30 years |
| Portugal | 25 years | 30 years |
| Spain | 10-15 years | 20-25 years but available up to 50 |
| UK | 20-25 years | 25 years but available up to 50 |

Source: country experts’ reports; van Dijkhuizen

The trend toward lengthening mortgage terms probably reflects both higher demand and greater supply.

The risk of a standard annuity mortgage increases with the mortgage term, as the longer the mortgage term the more slowly the borrower pays down the principal and accumulates equity (although equity accumulation also depends on house price inflation). A mortgage with later principal payments than an annuity loan, such as an interest-only mortgage, has a longer duration and is therefore more risky over the same term^{xi}. For fixed-interest mortgages, the duration is also sensitive to unexpected interest rate changes. Therefore, the longer the duration and in general the longer the term, the higher the interest-rate risk.

The introduction of ‘flexible’ mortgages^{xii} in many markets (in which buyers can make over- and under-payments within certain parameters) complicates the picture—the curve of household equity no longer rises smoothly over time, but can exhibit spikes and falls. For the lender and the investor in such mortgages, the duration – and perhaps also the term – is unknown in advance. This uncertainty causes the lender/investor to add a special risk premium to the interest rate. Further, the longer the mortgage term, the greater the interest-rate risk, and the greater the risk that during the course of the loan the borrower(s) will suffer some kind of negative shock, such as divorce or job loss, that could cause them to default.

Borrowers’ growing propensity to remortgage can also have the effect of lengthening *de facto* mortgage terms, if they do not remortgage to the term of the original loan. The increased ease of refinancing in many countries makes it likely that many, even most, consumers will extend or replace their original mortgages. Evidence from Denmark, for instance, suggests that a significant proportion of borrowers increase their mortgage term when remortgaging. A 2005 survey of homeowners who refinanced found that, while the average time left on their previous loans was 22 years (out of the 30 years typical—and maximum permitted—in Denmark), the average term of the new loans was 27.5 years—thus increasing the effective mortgage term by 5.5 years. (Bjerremann Jensen and Friisenbach 2006)

6. Conclusions: choice and risk

Mortgage borrowers today have a much greater choice of product features than did borrowers 10 or even 5 years ago; at the same time, in most countries, the extent of mortgage debt is also rising rapidly. Interest-only mortgages and mortgages with longer than traditional terms both clearly offer lower monthly repayments than traditional mortgages. This can widen access to owner-occupation and facilitate movement up the housing ladder on an individual level, but the collective impact is often to increase prices so restricting access.

The findings from available statistics and our survey suggest that increasing affordability problems as much as wider availability of products have led to the growth in use of both longer term and interest-only mortgages. Managed effectively such mortgages can assist households to enter owner-occupation and to improve their housing conditions – but they also extend debt into less certain times of life. Taken together with other opportunities, notably the greater capacity to borrow and remortgage, they may increase risks and costs to the borrower very significantly. Purchasers accumulate equity more slowly with interest-only mortgages, and leave themselves open to interest-rate and other shocks for longer periods with extended-term mortgages. The evidence suggests that borrowers may not be fully aware of these problems, particularly because they are most concerned with the size of payments early in the loan.

The profusion of mortgage types also makes increased demands on consumers' financial acumen--especially since a mortgage is the largest financial product most households have. Research into the attitudes and knowledge of holders of interest-only mortgages in the UK and Denmark indicates that most borrowers do understand the nature of the contract and the risks involved in general terms. The ignorance of a minority of borrowers is, however, worrying as is the growing complexity of products and mortgagors, which leads to an increasing reliance on professional advice.

In stable markets and stable economies, growth in indebtedness, and longer-term debt in particular, is almost certainly desirable both for individuals and the economy. However this growth in debt, plus the change in the composition of the debt—moving away from standard annuity borrowing and towards more product flexibility—means that the system is more vulnerable to any sudden structural changes in incomes, inflation and employment. Declines in house prices cause particular problems: a fall of sufficient magnitude would move marginal interest-only borrowers into negative equity – and the numbers involved will be greater the larger the numbers of non-traditional mortgages. Thus these innovations clearly carry with them greater risks for mortgagors and the housing market alike, especially when we consider households' ability to increase their housing debt by remortgaging and increasing debt when house prices rise.

In this context the current economic environment across most advanced countries is of particular concern. Rising house prices and greater access to funding has clearly resulted in households taking on larger commitments for longer periods of time. While most may have a cushion in the form of housing equity, there must be major concerns especially for those buying or remortgaging at the height of the boom about their capacity to maintain repayments in the face of worsening economic conditions. The likelihood is that the inflation rate is going to rise, increasing repayments; house prices will stabilise or fall; and unemployment will rise - all putting pressure on individuals to sell into an already uncertain market. These effects are part of unwinding the disequilibrium in world housing markets. But the additional attribute of this cycle lies in the rapid growth of non-traditional products which put both individuals and the market at greater risk. The finance market will have to move quickly and efficiently to ensure further innovation to address these risks.

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ⁱⁱ **Negative amortisation mortgages:** The payments do not cover even the interest on the loan; the unpaid interest is added to the debt. At the end of a specified period (usually five years), the loan is recast and payments are computed on the new, higher loan balance.

ⁱⁱⁱ **Interest-only mortgages:** payments cover only interest charges. At the time of repayment the mortgagor must make a repayment equal to the original loan. Interest-only mortgages can be offered with either adjustable (variable) or fixed interest rates. Many are time limited but can be renegotiated.

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^v Experts have been tracking movements in national mortgage markets for some time, and several studies have tried to identify the most efficient market(s). Diamond and Lea (1992) found that the USA and UK did well compared to other advanced countries on the criterion of intermediation efficiency, while Pannell (2003) praised

the Danish system, because it is easy for borrowers to refinance and there is almost no funding risk to lenders. Miles (2004) advocated the US model of predominantly fixed-rate mortgages, because these protect borrowers from interest-rate shocks. The Mercer Oliver Wyman report for the European Mortgage Federation (2003) found that Danish and German lenders had the lowest operating costs. Given that mortgage providers operate within different sets of regulatory and market constraints in each country, there are clearly many different ways of being 'efficient'.

^{vi} In the UK, subprime mortgages are often known as *adverse credit mortgages*.

^{vii} **Option ARMS:** An American term, meaning 'option adjustable-rate mortgages'. These mortgages give the borrower a variety of payment options each month, including interest-only and negative amortisation options. These options remain open for a specified period, often five years. The British term for similar mortgages is "flexible mortgages".

^{viii} Interest-only mortgages where the entire amount of principal is due at the end of the interest-only period are known in the USA as 'bullet loans' (the principal being the 'bullet').

^{ix} Less, of course, any extraordinary partial repayments that may have been made over the course of the loan.

^x Recent legislation introducing a system of covered bonds has relaxed this restriction, and in October 2007 Danish mortgage bank Nordea announced that it would start to offer mortgages with a 30-year interest-only period.

^{xi} **Duration:** A measure of the average time to the bond investor's receipt of payments. This is a time measure as it is the weighted average of the lengths of time to the payments, using the respective present values of the payments as weights. The duration of a loan or bond expresses the sensitivity of their present values to unexpected changes in interest rates.

^{xii} **Flexible mortgages:** the British term for option-ARMS: a mortgage where the borrower has a variety of payment options each month, including interest-only and negative amortisation.