

## ABSTRACT OF THE DISCUSSION

**Mr C. A. Murray, F.I.A.** (introducing the paper): I begin with a health warning, in that all the work which we have carried out has been on a sample average product. The results could change significantly with a change in assumptions, product types, countries, types of business, sales and methods. Anyone who is going to take this further needs to be aware of these facts before pricing their own products and examining their costs.

Over a number of years, the margins on equity release products have narrowed. Figure 1 shows the average of the top three customer rates against the 20-year swap rates, where the margin has narrowed from 2.5% in the early 2000s to about 1.5% or slightly less now. Why has that happened? Is it due to competition, or have providers gained knowledge over the period which they did not have before, so that they are able to price more competitively, or is it a combination of both?

The danger is that the product may have moved more with competition without considering its long-term cost. With any product which has a tail risk, there is always the temptation to sell as much as possible, and to let somebody else pick up the tab 30 years later. We wanted to look at whether there was profit being made here or whether there was any risk which had not been taken into account in the pricing.

Concerning lifetime mortgages, in the United Kingdom it is very common for fixed-rate mortgages to be used as a result of the requirements of Safe Home Income Plans (SHIP), which is a voluntary body which covers a code of fairness in terms of mortgages, and which is referred to in ¶2.2.2.2. In other countries variable rates are quite common. For example, in Ireland, Australia and New Zealand these are more common than are fixed rates.

There are products also which have a higher long-term maximum loan to value (MLTV), referred to in ¶2.2.3, which provide for people who want a higher lump sum at outset, but they are charged a higher interest rate to compensate for the increased risk over time. Then there is the fixed repayment option, which is a relatively new innovation, where the amount of money borrowed is, say, 25% of the value of the house, but on death or entry to long-term care there is a fixed repayment made, just a flat amount repaid regardless of whether you die tomorrow or in 30 years' time. Some variants of that have arisen in terms of stepped payments, and so on, to prevent too much selection.

There are many risks involved in this type of business. The risks at which we looked in the paper were those which we call 'interesting' risks. When we say 'interesting', it is probably in the same way as the Chinese describe something as 'interesting' — the old Chinese curse being: "May you live in interesting times."

The 'interesting' risks are mortality, long-term care, early redemption risks and house price inflation. Looking at mortality first, these products have been around, in volume, for only the past ten years. There is very little experience which has arisen which can be relied upon at this stage. Experience is growing over time. In putting this paper together, we took the approach that we were not going to reinvent the wheel in terms of the excellent mortality investigations which have already been carried out by the Actuarial Profession. However, in Section 3 we noted the fact that mortality is going to be heavily dependent on factors such as sales method, type of marketing, product features and social class. We used the latest mortality table for pensioners, and also allowed *P*-spline improvements based on the 50th percentile from the Working Party paper 20 (CMIR, 2006). We put through quite significant adjustments for social class, varying from about 55% for the upper social class down to about 180% for the lowest level. We have used house value as a proxy for social class.

Considering redemptions, where these really hit providers is in the redemption charges. Generally, in the U.K., the mortgage is at a fixed rate, and, for providers to get out of the swap into which they have entered, there is going to be a penalty attached. Some providers provide a mark to market penalty, and others provide a flat redemption charge of 5% to 6% of the mortgage, declining to 2%. The flat redemption charges are a one-way bet on interest rates, in the

sense that, if there is a flat redemption charge which is not as high as it ought to be if it were mark to market, then there would be an incentive for a voluntary repayment.

The other areas which affect providers from early redemptions are the fact that you may never recover your initial costs. However, a benefit of early redemption is that you reduce the cost of the No Negative Equity Guarantee (NNEG).

Providers have to consider a number of items. Each can influence the cost of early redemptions quite significantly. Something which I have certainly noticed is that, where there are variable rate mortgages, you can end up with significantly higher early redemptions taking place, because there are no redemption penalties.

The rates which we have assumed are shown in Table 3.5. The low early redemption rates are because of the higher charges. Usually, the redemption charges are eliminated over time. That leads to a slightly higher redemption rate appearing. As the mortgage grows over time, people lack the ability to pay it off, because it becomes such a significant amount, so you would expect redemptions to start to reduce.

Looking at house price inflation, we took a broad approach in looking at this. We looked at U.K. data, and at OECD data as well, to try to figure out minimum and maximum property growth rates over the long term. We then used these to derive a range of assumptions for pricing. It is worth mentioning that we did not fall into the bear trap of predicting house prices.

I now take you through the OECD data, which was quite informative to us and quite surprising. There is a lot of information in Figure D.1, which is Figure 4.4.1(a) with two additional arrows. I want to draw the two arrows to your attention. The upper arrow points to the number of countries whose house price inflation has gone above price inflation consistently over the last 35 years. You have two groups. The top one consists of the U.K., Ireland, Spain and the Netherlands. The lower arrow points to the rump, which consists of many countries where you might expect that property prices' growth has not been too healthy recently, like Japan and Germany, and many countries where property prices' growth has never been that healthy — for example, Switzerland — in terms of overall price growth.

The message which comes from Figure D.1 is that the U.K. and some other countries have shown quite unusual experiences relative to the rest of the OECD. I do not know why that is. It is very interesting, also, in this figure to see the fact that there have been significant real house price falls in some countries, but not in the ones which you might expect. The most significant house price fall has been in the Netherlands, around 1975 to 1979, when real house prices fell by 50%. That is still the record of all these countries over the last 30 years.

There are also some health warnings to add to Figures 4.4. The further you go back, the worse the indices get in terms of accuracy. A lot of that is a reflection of the fact that houses have become a much more important asset in the economy than they used to be. For example, over the last number of years there have been many refinements to house price indices, particularly in countries like the U.K., for example, where many house price indices have come on-stream, and there is still a matter of debate going on as to which is the right one. Also, the further that you go back, there are a number of countries where there are OECD collective data, which were very much on the basis of estimates provided by central banks, rather than hard data. We did not go back further than 1970, although some indices go back to the 1950s, or even to the 1940s.

We also looked at the OECD data for deflated house prices by GDP per head. This is a rough proxy, trying to come up with some sort of measure against salaries. It is certainly not robust, and the problem is that salary data between different countries tend to be inconsistent. At least this was a consistent measure across countries.

Interestingly, in Figure 4.4.2(a) as compared to Figure 4.4.1(a), the rump has a few more members, with only the U.K. and the Netherlands appearing as the top line, with the rest of the countries falling back into the rump. Even Ireland, where property prices have been quite strong for the last number of years, has fallen back towards the bottom of the pile, given the strong GDP growth there. The Netherlands seems to be unusual. In most countries property prices seem to have grown by at least inflation, but in the U.K. and some other countries house prices have grown a lot more strongly than inflation.

When we looked at U.K. property we used the Nationwide House Price Index, as given in

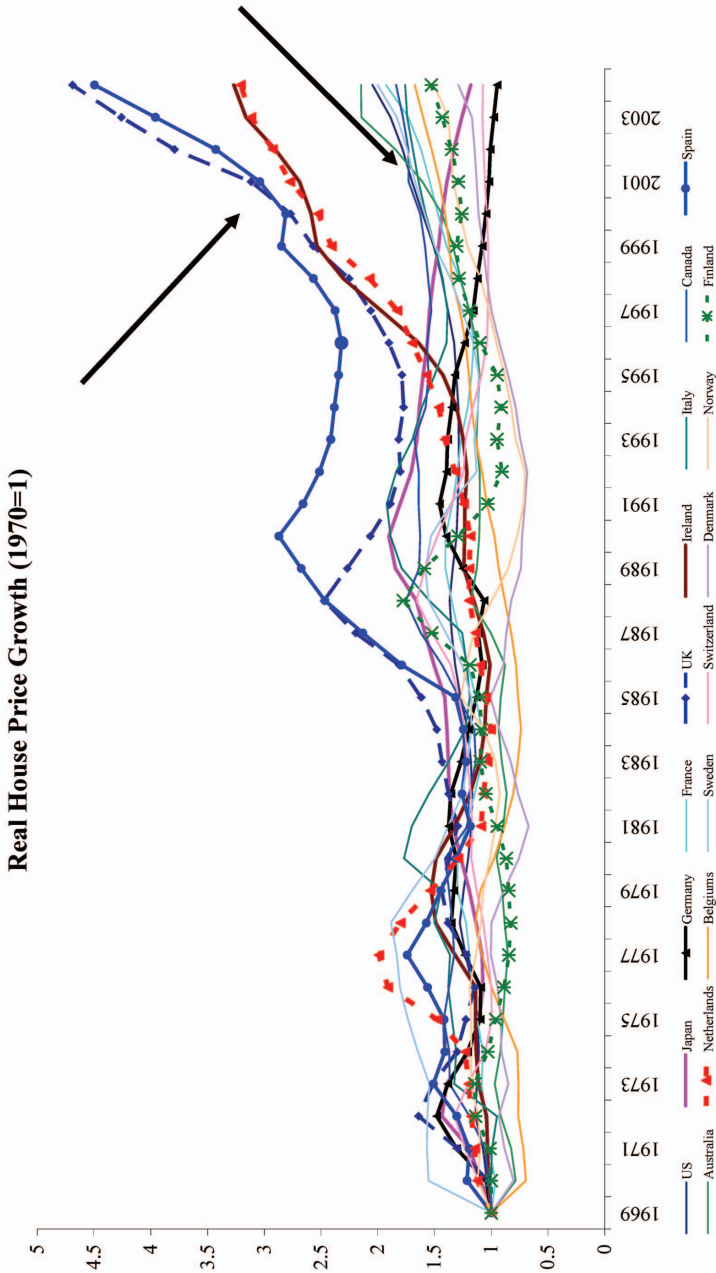


Figure D.1. CPI deflated HPI, all countries (see Figure 4.4.1(a))

Section 4.5. The reason why we chose that index was very much because of its longevity. The Halifax Index has only been around since, I think, 1984, but we wanted to go back a bit further. What surprised us was that, for the annual House Price Inflation (HPI), while it was 9% p.a. throughout that period, the gap between London and the rest of the country seemed to be quite small over the period, certainly a 1% p.a. differential. Obviously 1% p.a. compounds to a much more significant price difference over time.

We derived the volatility of 5% using a one-step autocorrelation, so comparing the property index one quarter behind, we came up with an autocorrelation of 0.66. Then, using a simple desmoothing process, which basically strips out all the smoothing elements which are involved in the construction of the index, we came up with a volatility of 11%.

Smoothing happens with indices, to a certain degree, as these indices tend to be standardised over time. For example, if there is a large house and a small house, there is a way of combining them in the indices, so that they come up with something which is relatively standard from one month to the next. This can lead to some smoothing. Also, some indices may have valuers contributing to them rather than using actual house sales, and valuers are well known for smoothing the indices based on similar house price sales within the last month, or in a different area. The technique which we used was set by Booth & Marcato (2003). In their paper there is a description of desmoothing commercial properties, referred to in ¶4.5.1.

So, what assumptions do you use? We based ours on the OECD, but a likely minimum and prudent assumption would be something close to the CPI. The maximum would be the RPI plus economic growth, which was about 5%. We then had a considerable debate as to what level of desmoothing was appropriate, given the index involved, and also what central rate we should use for our analysis. We settled on 4.5% p.a. HPI and 8% p.a. volatility, and added 3% p.a. for what we called binary risk. This is the risk that individual properties may underperform the index. If you sell a property for more than the value of the loan, you do not participate in the upside, whereas, if you sell it for less, you do participate in the downside.

Moving on to the cost of funds, which is covered in Section 5, many providers, when they sell equity release mortgages, have a hedging schedule set out, based on the expected redemption profile and the tramlines around it. In other words, if the redemption profile differs from what they expected, they are covered by an additional insurance, which I have nicknamed 'tramline insurance'. Provided that they remain within the tramlines of the redemption profile, they are protected in terms of any cost of coming out of the swap.

For the NNEG cost, we used two approaches to option pricing methodology. One was a quasi market consistent/risk neutral technique, and the other was a real world technique. We call it quasi market consistent, because there is not actually a market for this type of risk in the same way as there is, for example, for equity market risk. It is not possible, at the moment, to short property so that you can create a put option. What takes place at the moment is effectively paramutual hedging; simply like the bookmakers, you just find somebody who will take the other side. There are various prices in the market, depending on providers, depending on supply and demand. We looked at this as if there was an ability to short houses and price on that basis. We also looked at a real world model as well. The details are given in Section 7.7.

To summarise, the margins have been getting tighter, but there has been very little experience to go on. There are many risks which are unknown. Certainly, they are not particularly hedgeable, either. We would reiterate that the pricing basis needs to be tailored to the individual company and to the product features. It may be possible that profits are being made, certainly if it is possible to hedge out on ten basis points per annum. If it is on a market consistent basis, there are unlikely to be profits.

This is very much work in progress, in terms of this paper being produced by the Equity Release Working Party, in the sense that we do not believe that this is the end of the story. Developments in the market move very fast. In another few years there could be a market, maybe through REITS, or something like that, and there could be further developments. This is very much an evolution rather than a revolution in terms of our thinking.

**Mr M. Joannes, F.I.A.** (opening the discussion): I have worked in the field of equity release for

many years, and it is good to see the Actuarial Profession continuing to lead the development in this area. This is a very interesting and practical paper, which, I am sure, will be much read and much used in the industry. In my opinion, it is a very useful addition to our understanding of this market, adding to the earlier good work of the Equity Release Working Party (The Actuarial Profession, 2005).

This work is very timely, as we continue to see growth in increasing provider interest in the U.K. equity release market. In particular, more life offices are beginning to focus on its use in the retirement planning process. However, equity release products are still not very well understood in the wider market. Therefore, it is important that the financial services industry and the Actuarial Profession have a clear understanding of the risks associated with these products, and can justify the pricing for them.

There are two particular reasons for being very clear and transparent about the risk assessment and the pricing. They are both product provider issues. The first is that they are long-term products with significant risk at the tail. Therefore, it is incumbent upon us to get the pricing right now. The second reason is as a defence against the misunderstanding of these products in the media. The fact that some of the opinions which appear in the media may be justified, based on what has happened in the past, makes it even more important that we are transparent about pricing and about products today.

However, I think that this paper goes some way to demonstrate that these products can be priced in an objective, proper and transparent fashion, albeit with a considerable amount of unavoidable uncertainty about some of the future risks. In fact, moving away from the product provider's viewpoint, and just thinking about consumers for a moment, this paper reinforces, but I admit with much greater precision and detail, some of the views of a paper written in 2006, for the Financial Services Consumer Panel, entitled, 'Are Equity Release Products Value for Money?'. It concluded — and this is also demonstrated by this paper — that they are good value, in as much as the provider is clearly not making excessive profits. In fact, much of the consumer dissatisfaction with equity release, where it exists, is more likely to come from the suitability of advice rather than from the inherent value of the product.

However, before being overcritical of the advice process, it is fair to say that, with equity release products, as with many insurance products, it is often not clear until after the event what would have been the best course of action and the most appropriate product to purchase. This is certainly a product where the correct decisions are much clearer in hindsight, when you know what has happened to HPI.

Turning to the content of the paper, it is clear that these products are not straightforward to price, and that there is a great deal of uncertainty and potential difference of opinion about the assumptions and the methodology which can be used. As a result, as with most risk products, the providers which use the most aggressive assumptions will generally have the most competitive products. The authors have identified that this is a highly competitive market, and is a potential risk to product providers and, ultimately, to consumers. It is certainly true that more competitive pricing would inherently, you would think, have more risk, although, for many providers, the risks will be looked at in the round. So, for example, a leading mortgage provider with an existing substantial mortgage portfolio will consider it in the light of that, whereas a small new entrant will be considering the HPI risk in isolation.

Therefore, as a starting point in understanding the risk which product providers are taking, it is very useful for them to have this paper as a benchmark, to be able to assess and to ensure that they are satisfied with each element of the pricing basis.

From my experience in this market, I think that the authors have made a good job of identifying and of estimating all the elements of the pricing basis, although it must be understood that these are just one view, and that there will be many different opinions in the market, and, no doubt, here today. As there is very little experience on which to base assumptions, a degree of subjectivity is inevitable.

The paper discusses suitable assumptions, including funding rates, HPI, mortality and the NNEG guarantee. Of these, the most likely source of contention is to be found in valuing the NNEG, and it is this which drives different attitudes to pricing significantly. The paper

demonstrates well that there are a number of different ways of calculating this cost, and, on top of that, the results are very sensitive to the assumptions made. Hence, there can be wide differences of opinion about the true cost of this guarantee.

On the basis of these results, the conclusion of the paper seems to be that lifetime mortgage products can only be sold profitably if you accept a methodology which places a relatively low value on the NNEG risk. In many ways, this is something which is already implicit in the market, and it leads to the existing differences in pricing and the different attitudes to market entry which we see. However, the paper quantifies the potential values of this guarantee, and explains the assumptions which lead to a high value or a low value being placed on it. In particular, the paper points out that the calculation of the NNEG is heavily dependent on your view of future HPI and its volatility. However, HPI is, of course, notoriously difficult to forecast, and even today we see expert commentators differing about the forecast for next year, let alone for the long term. It is clearly a very critical assumption. There are the central HPI estimates to consider, as well as the additional complexities of house price cycles, regional variations and individual house price dispersion, which are identified in the paper. In fact, this is so critical, that it seems to me that this is, potentially, an area worthy of more detailed investigation in its own right.

In summary, whether you agree or not with the authors' pricing assumptions, I believe that they have covered all of the material elements of the pricing basis, and hence, at the very least, have given a good checklist of points to consider. In addition, I believe that they have demonstrated, on a reasonable set of central assumptions, that current pricing is roughly in the right area. Some may argue that competition has squeezed margins too much, and that companies are under-pricing these products; others will argue that this competition is good for consumers. Ultimately, though, all product providers have to carry out these types of calculations using their own assumptions, to ensure that they are comfortable with their own pricing.

**Mr I. J. Kenna, A.I.A.:** I think that this is a very timely paper, considering what we have learnt from Northern Rock and the sub-prime mortgage business. The chief executive of a building society was asked what it was going to do to get new business, and he was very optimistic about the idea of lending money to people who are asset-rich, but income-poor. These are people who might have bought houses for £10,000 30 years ago, which are worth £200,000 now, but who might have retired on modest pensions. I believe that he is thinking of funding annuities rather than lump sums.

I think that the authors have taken rather a generous approach, but, even so, I share their scepticism about equity release. I appreciate that NNEG is probably essential when the customers are likely to be dead, and the company cannot hope to get the difference out of their estates. On the other hand, we must bear in mind that, for ordinary mortgages, there is no such thing as NNEG. If you cannot pay the mortgage repayments, you cannot just go and pitch your keys through the door of the building society or the mortgage bank and say: "We are quits." You are still in debt to the building society or to the mortgage bank. I am sure that, if that concession could be granted by the building society or by the mortgage bank at 0.12%, there would be somebody willing to offer that, but I do not think that they can offer NNEG at anything like 0.12%.

According to the newspapers, average house prices have gone up by about 200% in the past ten years. Average salaries have gone up by about 50%. Average retail prices have gone up about 30%. The wherewithal to pay for the houses has gone up by only 50%.

An uncontrollable house building boom is taking place. No brownfield site is currently safe from the boom, particularly at the top end of the market. On the other hand, some top-end buyers have found themselves priced out of top-end homes. They have been forced into the affordable part of the market. Many people have just slid off the bottom altogether, and are unable to find anything which they can afford.

The demand for homes may well exceed supply. It always has, and it probably always will. What counts, however, is effective demand. One cannot ignore the possibility of a slump in the homes market, particularly at the top end.

I should like to see some results, as in Table 7.7.3 (b), on negative forward rate inflation. On



the whole, though, I consider this to be a very useful paper, and I think that Council could well recommend it to the Financial Services Authority (FSA) for further study.

**Mr C. J. Exley, F.I.A.:** My point is about the risk neutral valuation relative to the real world valuation. The authors dismiss the risk neutral valuation for a number of reasons. We should question why that validates the real world valuation methodology.

If you adopted a scientific approach, you would say the following: "Let us say that I cannot use a risk neutral valuation. If I am going to pick another method, what I should look for is a method which, if I look to a market where there is accurate hedging, like the equity derivatives market, if I apply the same methodology in that market, then I get a correct answer. Therefore, I would think that, if I apply this methodology to the housing market, then I should get a reasonable answer."

If you apply the real world pricing methodology to the equity market, you get nothing like the pricing of equity options, so, why would one think that, if you apply the real world valuation to the property market, one would get correct valuations for these particular types of options?

It should be borne in mind that even the criticisms of the existence of a property derivative market are probably excessive. For example, there is a residential mortgage-backed security market which has a number of options embedded in it, very much like put options on residential property, which you could claim actually provides a market valuation of options. Also, in terms of hedging these options, there are now, also, property derivatives which you could use to go long or short in the property market.

So, on two counts, I think that the paper is a little unfair to the risk neutral valuation method. First, I think that just because you reject that method does not validate the real world pricing. In fact, it gives no justification for it whatsoever. Secondly, I think that the criticism of a lack of ability to long or to short the market is probably overdone, because instruments already exist which allow you to do this.

**Mr L. Edmans** (a visitor; Chairman, Safe Home Income Plans Ltd): As the chairman of SHIP — the trade association for 'safe' equity release providers, I congratulate the authors for a very well constructed and very well thought through paper. The merit in doing what they have done is quite obvious. This is still, despite many years of activity in equity release, a new market in many ways. There are many potential new customers, there are many potential new distributors, and there are already numerous new providers, with rumours of more on the threshold.

What I think that the authors have provided here amounts almost to a text book for incoming providers. As the authors say, it is not for them to tell competitors how to price their products, but it is very useful to have a clear set of yardsticks against which new entrants can gauge the risks which they are taking. The damage which 'ignorant capacity' can do to a developing market is well known. So, while it is absolutely fine for people in a free market to take risks, their understanding of the nature of the risks which they are taking is paramount.

I now extend this principle to the people on the other side of these products, the customers. They, of course, face the inverse of the risks taken by the providers. Mr Murray has already alluded to this. If there was something which I would have liked to have seen emphasised more strongly in the paper, it would have been to see the more specific inclusion of the amount of effort which is required, and which needs to be paid for, to ensure that the customer really does understand the nature of the transaction which he or she, or they, are undertaking. Of course, the time and effort spent doing this is addressed in the paper, but it is described as 'distribution and sales costs', or 'marketing costs'. I know that the authors understand the difference between these and what I am talking about, but there are new providers who might not. It is important that a new provider should understand what is really involved in being a safe long-term player in this market. Anybody who underestimates the importance of making sure that the customers understand exactly what they are doing is making as big an error as mis-pricing their funding costs or their guarantees.

This is not just an error which would affect themselves. This is a market which is intensely sensitive. The customers are often — not universally, by any means, although it is a universal

perception amongst commentators — more vulnerable than the average financial services customers. Also, the objects which they are using as capital — their homes — have intense emotional attachments, not just for them, but for their families, and are often the only significant assets which they have. A new provider who gets it wrong would not just get it wrong for themselves.

A small number of providers and distributors got it wrong in a big way for the customers in the 1980s, when the wrong products met the wrong set of market circumstances, and this has given the equity release market a bad name, which dogs it now. For example, Mr Murray mentioned his report for the Financial Services Consumer Panel, and described it as demonstrating that equity release products are good value. At a recent conference for the financial services industry, that report was described by the director of retail products of the FSA as proving that equity release products are bad value. That is an interesting contradiction. It has to do with the perception which lingers from the late 1980s.

Memories are long, and even good intentions do not get you off the hook. Recently, on the television, the equity release business was taken to task for the second time this year. To my intense mortification, the subject of his first ten minutes was an NPI equity release product, developed and sold by the unit which I conceived in the mid 1990s. As I watched, I wondered: “How could this have happened?” My specification to the people developing the product was entirely clear: “It must be a product which I would be happy to sell to my granny.” We thought that we had built one. Yet, there we were, on the television. What went wrong? Well, as you know, the problem which products of the 1990s were obsessed with eliminating was negative equity. So, what has happened? Instead of negative equity, there have been ten years plus of unprecedented house price boom. In the case on the television, the rate of inflation for the particular property concerned over the period since the transaction took place was more than 17% p.a. How price inflation of double digits like that can be regarded as a good thing amazes me. For any other goods or services, that would be regarded as outrageous. That 17% p.a. is about 5% higher than the national average for the period. For the same period prior to the transaction it was 4% p.a. If the rate experienced since the transaction continues, in another eight years’ time, the quite modest property concerned, worth £76,000 in 1999, will cost more than £1m.

Of course, this is really just life. If the whole property had been sold, not just part of it, there would have been no TV programme made. On what I knew, or believed likely, in 1999, I would still have sold that product to my granny. However, what is crucial is whether the person undertaking the transaction understood the nature of the risk which they were running. The SHIP code — which NPI followed, at a slight distance at that time, because I would not let them join me, as I was worried about the costs — requires that an independent solicitor, chosen by the customer, has to go through the transaction with him or her, and has to certify that they understand what is happening. However, how likely do you think that the possibility that the rate of house price inflation could be more than four times that recently experienced was fully comprehended?

Not at all, I would argue. Expectations of property price inflation in that period were all founded on the recent experience of negative equity. To illustrate this, I now read a short paragraph from an *Inspector Morse* book, written in 1996, which tells you what the public expectation was then:

“Indeed, over the next two weeks, most people in Oxford were destined to be considerably more fortunate than Dawn Charles: she received no communication from the poetry lover of Pembroke; her mother was admitted to a psychiatric ward ... she was (twice) reminded by her bank manager of the increasing problems arising from the large margin of negative equity on her small flat; and finally, on Monday morning, 29 January, she was to hear on Fox FM radio that her favourite consultant, Mr Robert H. Turnbull ... had been fatally injured in a car accident ...”. This was chapter one of the book, the foundation of the whole story. Her assumption was that she could never get out of the negative equity trap, so Ms Charles went on subsequently to become an accessory to blackmail and then to murder in order to try to redress her losses. That was how the public saw the prospects for house-price inflation in the latter part of the 1990s.



The duty which lies on the equity release business now is to make sure that, whatever happens in future — and I would not bet on another eight years of double digit house price inflation; and we have already seen what my powers of prediction are — the customer cannot just say: “I did not understand the risks.”

The effort to make sure that they do understand has to be costed into the products, and, vitally, it is not just to protect the industry’s back, but because it is the right thing to do.

**Mr J. M. Pemberton, F.I.A.:** The authors have, in a very practical fashion, undertaken a careful analysis of the various costs involved in funding lifetime mortgages. From my experience, they have done that well and they have captured those costs well.

For me, the interesting point of the paper is that it highlights the need to focus on the difficult area of valuing the NNEG. I agree with the comments of Mr Murray, that this is an area which would merit further work. Mr Exley noted that there are a number of areas where there are prices to be found associated with options on house prices. In my experience, those go out to about the 15 years’ mark, whereas the negative equity guarantee critical time period is around the 30 to 40 years’ mark. I have been unable to find any market prices out at this longer duration. Part of the further work in this area might involve considering what market data there are relating to implied forward house prices at shorter durations, and how one might extrapolate these through to longer durations.

Another group of people who have looked carefully at the costs of the negative equity guarantee are the rating agencies. The rating agencies have generally taken short-term pricing models from classic short-term retail mortgage backed securities, and have extrapolated these out to 30 to 40 years. In many cases they have taken cautious assumptions, which are, perhaps, appropriate for a five to seven year view, for instance, of nominal house price inflation of 1%, and have projected that out for a 40-year period. Projecting 1% nominal growth of house prices for a 40-year period looks to be a pretty stretching downside scenario rather than a reasonable base case.

Investigation of these models would be helpful from an actuarial perspective, partly because the rating agencies are very instrumental in influencing the prices which funders can actually achieve in the market in laying off risks, particularly on the securitisation of mortgages.

The underlying issue here is the pricing of long-term options on an underlying, with low or indeterminate yield. Other people who have much relevant experience about pricing such derivatives are the commodity traders; their experience, especially that post-Enron, is something from which the Institute could usefully learn.

I find this a particularly fascinating area, as an actuary by background, in that, we find here the overlap of banking models with conventional actuarial models. What we see highlighted in the paper, in the contrasting prices which are set for NNEG between the bases which the authors have chosen, is, to some extent, the tensions between the banking type models and the conventional or modern actuarial models. I encourage further work to explore this area in a first class paper which provides a valuable addition to the literature.

**Mr D. J. Le Grys, F.I.A.:** The current situation with equity release reminds me of what was happening in the long-term care insurance market in the late 1980s and early 1990s. We had realised then that the population was getting older, so getting more infirm, people would need care, and what we needed to do was to develop a long-term care insurance policy, not for everybody, but for the middling rich. The rich can always pay for their care, the poor cannot afford the premiums.

As a result of that, a number of offices went into the long-term care insurance market. They started to cut down the rates, cut down the margins, and they had very little experience to go on. That was the situation.

One day the industry woke up, and said: “Look, there is no margin in this product. The market is not growing anyhow”, and there was a wholesale getting out of the market, until only one or two providers were left, and they are a niche market.

Now we are looking at equity release, and the market is not really growing. More providers

are coming in, more providers and their reinsurers are cutting down on the margins. Looking at the paper, it seems very difficult to see any reasonable profit margin for the providers. If a market is not going to grow, then I would have a fear that a number of offices will say: "It is not worth it, let us exit the market." A really valuable service to the public will be denied.

I make a plea that the experts should have competitive products, but let us be sensible, there has to be a good margin for the provider.

**Mr P. W. Wright, F.I.A.:** One aspect on which the paper does not touch is that many life assurance companies own these mortgage release products as assets. Under FSA rules, assets have to be valued at their realisable value. So, this question of what is the cost of the NNEG cannot be swept under the carpet. You may price a product in one way, but the way in which you value it for solvency purposes, and, indeed, for IFRS and MCEV purposes, is laid down, although the values, as I understand it, can be slightly different between the three purposes. I would maintain that the FSA is almost certainly expecting a market-consistent cost of the NNEG to be included.

Many of the life assurance companies which own these assets use them, as I understand the position, to match liabilities under pension annuities, on the grounds that, if mortality gets lighter, the liability goes up, but to some extent the assets will also increase in value as the spread is earned for slightly longer. There is a basis risk which the actuary has to consider, because the lives under the two products are different.

However, when I read this paper I was not convinced that the authors were of the view that this was a hedge at all; in fact, there seemed to be a suggestion that the cost of the NNEG could go up quite a bit faster than the benefit of earning the spread for longer. I should be interested in hearing their views as to whether they believe that these assets are appropriate to match pension annuities in the course of payment.

**Mr P. R. Swinhoe, F.I.A. and Mr S. M. Gibbs, F.I.A.** (in a written contribution which was read to the meeting): We have some observations from our Australian perspective.

By the way of background, the market in Australia has been growing rapidly in the last three years. At 30 June 2007, there were 32,000 reverse mortgages on issue, outstandings totalling \$1.8 billion (£800 million). This is a crowded market, with some 20 providers. Unlike the U.K., most reverse mortgages are on variable interest rates. Equity release products, other than reverse mortgages, have made little impact.

We focus, in these remarks, on the following aspects of the pricing of reverse mortgages:

- house price volatility;
- long-term care entry;
- early redemption; and
- real world vs. market consistent approach.

We have obtained data on repeat sales of houses in major cities. This means that we know what a house was bought for, what it was later sold for and how long it was until it was sold. That enabled us to compare the performance of individual houses with the performance of the market. Figure D.2 shows the distribution of actual houses' growth relative to average house price growth, with some smoothing by us.

The important conclusions are that:

- the expanding funnel of doubt stops expanding after eight years; and
- the distribution is very broad.

The top of the distribution includes some unusual effects, such as properties being amalgamated for development purposes and major home improvements. It is the bottom of the distribution, however, which is interesting when it comes to pricing the NNEG. It, too, has unusual effects, for example properties being sub-divided for a second house to be built. The data are of sales of the property with the original address, which would have lost value once a large part of the garden had been removed. We recommend disregarding the low extremes of the

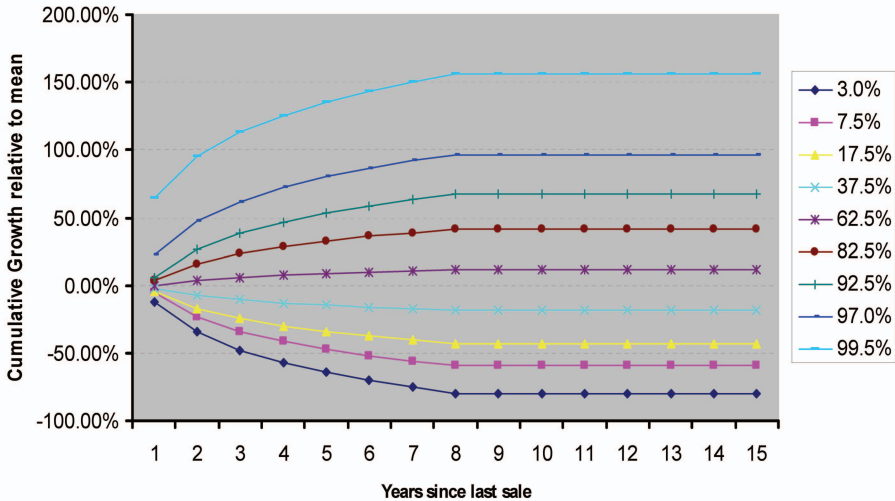


Figure D.2. Australian house price volatility

distribution as representing effects which would not apply to homes subject to a reverse mortgage. Clearly, however, some properties under-perform the market by a large amount. We acknowledge that stratifying the market would reduce the spread around the mean, but we do not believe that the reduction would be large.

In our view, for Australia, the individual house price volatility adds a lot more than the 3% which the authors propose for the U.K. in Section 7. House price volatility is a major driver of the cost of the NNEG, particularly given the very long term of the guarantee. We are sceptical that the Australian and the English housing markets have very different volatilities. Therefore, we caution that the individual house price assumption needs to be set with care. Any further evidence on which to base this assumption would be welcome.

On modelling house prices, our approach involves:

- projecting the average house price — based on published HPI; and
- overlaying an individual house price deviation from the mean.

The Australian Institute of Health and Welfare produced a report in 2001, giving usage rates for aged care facilities and the mortality of those in aged care. It enabled us to separate out the mortality rates of those not in aged care from the general population. Figure D.3 shows how much better mortality rates are for those not in aged care. They diverge significantly from the general population over age 80, supporting the authors' comments in Section 3.4.

Figure D.4 shows the rates of entering aged care in Australia. Since entry to aged care involves some degree of choice, more so than death, the rates of entry to aged care will vary from country to country. They will be influenced by social factors, such as the family's willingness to care for an aged family member and the availability of aged care accommodation. These factors are unlikely to remain constant over time within a country.

We can see that the Australian population rates of aged care entry are very much higher than those proposed for U.K. reverse mortgages in Table 3.4. We prefer to model them as an explicit decrement rate rather than as an uplift to mortality rates.

So, our approach on aged care assumptions involves:

- population aged care entry rates;

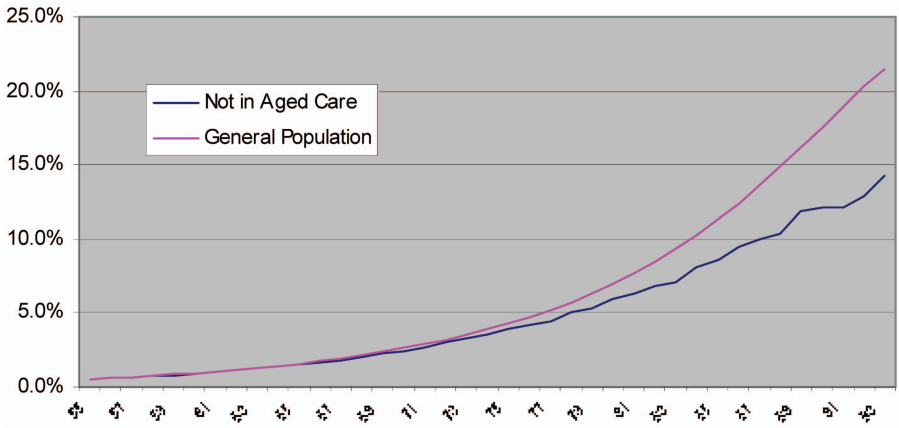
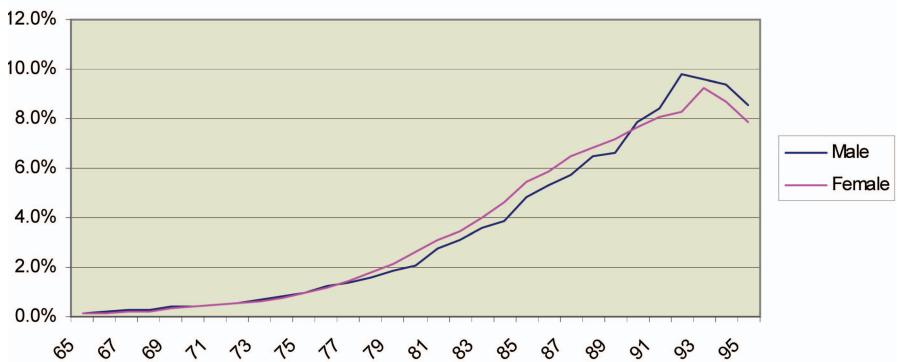


Figure D.3. Australian male mortality — those in long-term care and the general population



Source: ‘The probability of using an aged care home over a lifetime (1999-2000)’, Mason, F., Liu, Z., Braun, P., Australian Institute of Health and Welfare, September 2001

Figure D.4. Australian aged care admission rates

- a factor for selection by those taking a reverse mortgage; and
- future improvements in line with mortality improvements.

The United States of America has its Home Equity Conversion Mortgage Scheme, for which termination statistics are published. In Figure D.5 we have disaggregated deaths on an approximate basis to estimate U.S. prepayment rates, including aged care entry. The data set comprises 16 years of loans. However, the data are more scarce at longer durations.

The main observations are:

- The rates are much higher than U.K. rates.
- There is a select period of around three years across age groups.

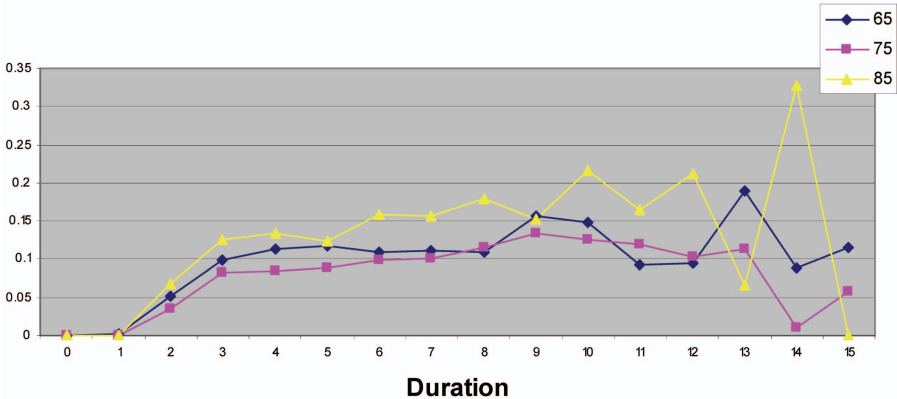


Figure D.5. U.S. pre-payment rates; mobility rates by age at origination and duration

- There are higher rates for 85 year olds from the start, driven by higher admission rates to aged care.
- The rates for 65 year olds are initially higher than for 75 year olds, due to a higher incidence of voluntarily moving house.

Early indications of Australian prepayment rates are that they are closer to U.S. rates than to U.K. rates. The variable rate nature of the Australian market may be a driver of the different behaviours.

Finally, on market consistent modelling, we believe that, given the level of market related risk in the NNEG, a market consistent approach to modelling mean house prices is appropriate. In doing so, our preferred method is:

- to model 'real world' property values based on historic information, and to allow for judgement and correlations with other economic variables;
- to obtain present values through the use of stochastic deflators; and
- this enables us to obtain a risk-neutral, or market consistent, valuation of the NNEG.

**Mr C. B. Golding, F.I.A.** (closing the discussion): I think that everyone would agree that the Equity Release Working Party has produced a paper which is both informative and practically useful. The paper contains a considerable amount of information on the equity release products in the marketplace today, and the fundamental principles which should be followed in pricing these products.

As the authors point out in the paper, the equity release market is one which has grown rapidly and has become far more competitive in recent years. It will be interesting to see whether pricing hardens in the light of recent developments in the credit markets, or whether the trend to become more competitive continues. I suspect that pricing may harden.

As Mr Le Grys said, it will be interesting also to see whether the market has become overheated, with too many entrants into the marketplace, and whether pricing will harden at some point, as new players start to fall out, realising that they cannot make enough money out of their products. I am not sure that this will be the case.

Product development in the equity release market has been quite dramatic over the years. In the recent past, we have seen impaired life mortgages and protected equity mortgages. I suspect that there will be more and more developments in equity release products over the coming years.

The paper focuses primarily on the pricing of these products. As noted, there is some scepticism about how the products should be priced, but I think that the authors have done an absolutely fantastic job in bringing together all the different threads and all the different strands.

If we look at the various elements of the pricing, the authors have chosen to use standard mortality tables as their basis for pricing. I think that that is a reasonable starting point. As the paper points out, you would then make adjustments to allow for your customer base, the socio-economic classes of your underlying customers, and you would make adjustments to other factors, for example if you had impaired life mortgages.

The paper looks at mortality improvements, and uses a *P*-spline approach. No one has commented on that. I imagine that some people would agree with that approach and that some people would disagree. What the paper does not mention is that, quite often, providers will also make adjustments with mortality improvements by socio-economic class. So, historically, providers would have assumed that the higher socio-economic classes would also have higher improvements in mortality. I am not sure whether that is necessarily shown to be the case in the latest ONS/GAD life tables. However, that has been the assumption underlying equity release providers in the past.

The long-term care and other early redemption assumptions are crucial to the pricing of these products. Our Australian friends have made some comments on the assumptions which should be used for long-term care and early redemptions, based on the Australian experience. I am not sure that these are wholly relevant to the U.K. If you look at the U.K., I would suspect that there is a tendency for people to want to remain in their own homes. So, there is a social acceptance for individuals to remain in their own homes rather than to move into care homes. Also, the state sector focuses on domiciliary care, and the private sector does not necessarily provide the sort of care home structure which might exist in Australia. So, there are differences between Australia and the U.K., and I do not think that you can necessarily ascribe an Australian experience to what happens in the U.K.

They also consider that other early redemption rates should be higher, based on the Australian experience. If you look at the U.K., early redemption rates vary considerably by product type. In Australia, equity release mortgages are primarily variable rate products, whereas, in the U.K., they are primarily fixed-rate products. They are entirely different animals. I suspect that, if you look at the few providers, such as Northern Rock, with variable rate mortgages, then they might have a different experience.

I suppose that one of the key areas of debate, both among the authors and more widely, is on the house price growth and the volatility assumptions. It is fair to say that there are differences in opinion on how you should price NNEG guarantees. If you look at the underlying data on volatility from the Nationwide, which are available on a quarterly basis from 1973, and on an annual basis from 1952, then the volatility of house prices in the U.K. has been relatively low, even at times when there have been quite wide swings in the economic cycle.

It is difficult to see that the Equity Release Working Party has been imprudent in terms of its assumptions. It has gone from an observed average volatility rate of 5% (over the period since 1973) up to 11%. Part of that is to de-smooth the Nationwide index, and there are arguments about whether you should de-smooth a transactional-based index in the first place. That is certainly debatable.

Looking at the Australian contribution, they thought that the 3% addition to the volatility assumption was not prudent enough for individual house price dispersion around the average. I am not sure that we can actually tell from Figure D.2 what they have actually been doing. If you look at a graph of dispersion around the mean, you will get quite a wide dispersion of house prices around the mean for individual house price volatility. That is not the same thing as adding 3% to the overall volatility assumption, which is the assumption in the paper, and you would expect to see a much greater number for the dispersion around the mean than a 3% addition to the overall rate. We need to be careful that we are not double counting, and that we are looking at the same figures.

The assumptions on the cost of funds and solvency were alluded to by Mr Wright, and also



the valuation of these products within a life framework. The paper has looked at this primarily from a banking and credit institution standpoint. It has not looked at a life company holding these as assets. I leave it to the authors to answer Mr Wright's question, as to whether they are suitable assets to match annuities. My view is that they are.

Mr Edmans made a very interesting contribution to the discussion, looking more at the practicalities of selling these products to the end consumer. That does drive the administration cost, which is referred to in the paper. Clearly, it turns on the nature of the distribution if it is an IFA product, or whether it is sold through a direct sales force. I expect that, overall, the costs are not that dissimilar if you look at the two different sectors. In one case they are priced into the product, and, in the other case, you may well be paying an additional fee if you go to an IFA to supply that advice. Clearly, it is important to give the end consumer proper advice, and I think that we all support what Mr Edmans said.

The equity release market is one where the expertise of actuaries is greatly valued by providers. The paper highlights some of the key issues facing actuaries in providing advice to either their employers or to their clients.

**Mr G. M. Hosty, F.I.A. (replying):** One of the things which we tried to address in the paper is the wide range of views which persist in the market about the pricing of some of the risks which are inherent in the products. To an extent, that has been repeated in the discussion.

Mr Kenna said that he would like to see some sensitivities on negative house price inflation. Clearly, the negative equity costs, which have been one of the central points of analysis, would be very hefty indeed in that situation. He pointed out that, at 0.12% for negative equity, it would appear to be very good value to the consumer. What we would say with regard to that is that, with equity release mortgages, the loan to value ratios are much lower than you would see in the mainstream mortgage market. They are intended to be set at a level where negative equity is very unlikely to come about.

I suppose that one of the reasons why we have discussed the negative equity cost, and the two approaches — the market consistent or risk neutral approach, and the real-world approach — is because they come up with wildly different answers. It is not clear which of these approaches should be taken by any organisation pricing in this area.

Maybe Mr Exley reached the wrong conclusion on what we had written when he said that we were dismissing the risk neutral approach. We are not doing that. What we are doing is to set out the way in which we feel that risk neutral market would work, but then to arrive at half an answer, because all that we do is some analysis. We say that, if there were a market, it would behave like this. We borrowed techniques from the equity market, and we applied them to the housing market.

The whole point of the market consistent approach, though, is that, if you price a risk, or if you mis-price a risk, then someone out there in the market will take that off you at that price. Supply and demand will lead the market to a sensible pricing of the risk. Because we do not have a fluid market in equity release risks or hedging instruments, all that we do in our paper is get to half of the answer.

We come up with the prices for the negative equity risk of 70, or maybe 100, basis points. We look at these, and we apply some commonsense views to them. So, if we have house price inflation at something around CPI over the next 30 years (which, from our analysis, has been demonstrated to be right at the bottom of the OECD experience), then we are still looking at 30 years, so at the tail of the mortality curve, before we see negative equity rising on any of the mortgages.

So, to apply 70 to 90 basis points across an entire portfolio of mortgages allows you to build up a very significant store to pay for those claims when they arise. That is not to say that we dismiss the answers which come out of that. We are saying that there is no market there to correct this, and it is for other people to come in and to say: "That is a bet which I would quite like to take."

Equally, we feel that with 12 basis points, when we look at the real-world assumptions, what we have with the negative equity guarantee is genuinely a very valuable guarantee, and a valuable

protection for consumers, which our experience in the U.K. has shown, is very important. At 12 basis points, it would seem to understate the value of that. So, what we are trying to do is to bring about the debate on the pricing of these risks, so that people can contribute and, maybe, can arrive at some consensus.

Our concern, as practitioners in the market, is that we see different organisations pricing the risks in completely different ways and coming up with different answers. On the one hand, you get some of our competitors which, we feel, are overpricing those risks, and, therefore, are coming up with very uncompetitive products, and we do not mind that too much! What we do mind, I suppose, are the competitors which, in our view, underprice the risk and come out with products which are far too competitive, and we feel that that may unsettle the market.

That, I think, is the point made by Mr Le Grys, that, if we underprice these risks, and providers in the years to come look backwards and say that they have made a loss on the products which they are selling today, then that does not do anybody any favours. We have been trying to stimulate that debate.

I suppose, staying on the same theme, that whenever we debate equity release pricing, we always seem to end up on negative equity as, particularly for actuaries, the favourite part of the subject. There are other risks in the product which are as great or greater, but we always end up with negative equity risk.

Looking at the Australian contribution, I am not really familiar enough with the Australian housing market to comment on what volatility assumptions might be appropriate. As you have seen in our paper, we did look at the experience throughout western Europe. We looked at quite a few different markets.

We reached the view that house price inflation in the U.K. has been wholly exceptional over the past 30 years, and we would not anticipate that to continue. Beyond that, we have tried to avoid taking any opinion on where the housing market is going in the future. Whether the housing market is going to crash next year or will continue to boom, we do not know any more than any one else.

In 2005 there was a consensus that the housing market was overheated, and that a crash was imminent. All we have seen since then is continued growth. We talk about the oversupply of property, the building boom which is going on, yet all the projections demonstrate a housing shortage. It is not really clear where this is going to balance out, so we have avoided that.

We believe, looking at our historic analysis, that the volatility assumption of 11% is about right. The authors debated fully about house price volatility assumptions, and it was a very broad debate. We all consulted experts and colleagues to try to reach a view on it. The fundamental issue is that we are trying to second guess where the market will end up should there be a market at some point in the future, and we all have different opinions on that.

Certainly, looking at the historic volatility demonstrated by the Nationwide Index, it is around 5% over a 40 to 50 year period. That is a mathematical fact derived from the index. We, then, have a question as to whether the Nationwide Index should be de-smoothed and whether we should apply what is in Booth & Marcato (2003) in the way in which it is applied to commercial property indices. My understanding is that the Booth & Marcato method is applied to commercial indices because so much of the data used in the commercial index are based on valuations rather than on transactions.

With the Nationwide Index, it is a transactional index. The fact that house prices demonstrate a smooth path within the Nationwide Index does not reflect anything other than the fact that your house prices, in practice, demonstrate a smooth path. By and large, you know, more or less, what your house is going to be worth next month if you know what it is worth this month, because it is a very slow moving market. So, should we de-smooth that or not? We sat on the fence and we half de-smoothed it. If we had fully applied 'Booth & Marcato', we would have been at 11%. We thought that that was overstating the situation for the residential property market, and we settled for an 8% volatility for the index itself.

The point, then, as to the variability of individual properties within the index is that: we looked at the differences between the different regions; and we looked at the differences between

different property types; and it was on the strength of this analysis that we added an additional 3%, and ended up with an 11% assumption.

Moving on from the negative equity assumption, one of the other key risks to which providers are exposed, which we have not discussed with equity release mortgages, is the remortgaging risk. With an equity release mortgage, you have given someone a lifetime mortgage at a fixed rate of interest. Many providers now have a mark to market early repayment charge, if a customer redeems early, but the majority of providers still have flat rate charges, such as the '5, 4, 3, 2, 1' early repayment charge structure. Once a customer is out of that early repayment period, if interest rates have fallen they can remortgage at no cost, or even during the interest rate period at a far lower cost than is being carried by the provider. Despite all our debates about negative equity, to me that is one of the greatest risks being carried by providers, and it attracts very little attention. If we are to protect providers from losses in the future, then that is one area where, as actuaries, we can demonstrate that the risks are significant indeed, and ought to be either priced for or addressed in the product structure.

Some comments were also made in the written contribution on the long-term care assumptions which we made. Reference was made to Table 3.4. Summarising the point, it is that Mr Swinhoe and Mr Gibbs see far higher entry levels into long-term care in Australia than we see in the U.K. I believe that that is the case anyway, because the costs of long-term care in Australia are much lower. I am no expert on that, but I would say that there is a misunderstanding in terms of how Table 3.4 is applied. You need to refer to the 2003 report and the technical supplement to that to see, in detail, the approach which we have taken. Essentially, we have done exactly as Messrs Swinhoe and Gibbs have suggested. We have looked at the different mortality rates for people who are at home compared with those who are in care, and have identified that the much heavier mortality for the people who are in care means that you allow for a higher rate of incidence than is demonstrated, but those people tend to die a lot sooner, and, therefore, the overall impact on your mortality assumption is relatively low. If you like, the people who are going to die next year very often move into care this year, so, when you allow for that in your overall pricing basis, it is only a relatively modest addition to mortality.

With regard to the U.S. experience which is quoted, it is something at which I have looked before. I know that remortgaging rates are much higher in the U.S.A. It is a variable-rate product. I believe that there are incentives for brokers to remortgage, and the structure of the product means that it is much more capable of being remortgaged; and, at the same time, products are much less flexible in the U.S.A. than they are in the U.K. So, if someone is moving house or drawing down additional funds, then they end up remortgaging. The U.S. experience is not especially relevant when we look at the situation in the U.K.

I think that Mr Edmans was right to say that the paper does not really cover the cost of distribution properly. That is in our expenses section. In the expenses section we have not really rationalised the expenses which we have set down. We have just set the expenses down, and have said that each office will have its own view on these things. I am not dismissive of the cost of distribution, or of the importance of distribution, for the equity release market. It is very important indeed.

I think that there is an aspect of this in which actuaries play an important part. These are very-long-term products, and the amount which the customer repays depends on compound interest over a very long and indeterminate period, the customer's lifetime. Also, making sure that this is properly understood by customers is something which we can undertake, which, maybe, people from other disciplines might not.

I think that the illustrations which are provided for equity release mortgages at the moment, and the format prescribed by the FSA, do not go far enough to explain those risks to customers. I would prefer to see illustrations of what might happen over people's potential lifespans, rather than just over their average life expectancy, as at present. By definition, if we get our numbers right, half the population will live beyond their average life expectancy, so, only to illustrate that far seems to miss out half of the argument, and perhaps the worst half of the argument, from the point of view of repayments.

Mr Wright asked a question on the use of equity release mortgages as an asset to back pension annuity liabilities. I cannot offer the authors' view on this, because it is not a point which we have debated and on which we have come to a conclusion. My personal opinion is that he is right, and that there is an overlay of risk; if mortality improves, then it increases the negative equity risk. So, the starting point is that it depends on what you have done with the negative equity risk. If you have been able to hedge it somehow, or if, within your overall balance sheet, you feel that you have a hedge position, then you might be comfortable about that. At that level, it is an asset which enables you to diversify your investments. The yield is very attractive compared to a lot of long-term fixed-interest stocks. It is a very long-term fixed-interest investment. There is much appeal there. I agree with the point that negative equity needs to be carefully considered. I would also say that I think that it is only appropriate for a certain proportion of an annuity fund to be invested in equity release mortgages. Apart from the obvious liquidity issues, the main risk which you may be carrying, the negative equity risk, is in the tail, probably among the longest-term assets which you would be holding. If you take a static situation, by the time when you get to the tail of your investments, you find that you have a much greater weight of equity release mortgages than you would have done earlier on, unless you have traded out of the position. So, I would say that it is appropriate. It depends on the provider and the circumstances, but maybe, 15% to 25% investment would be acceptable. Anything more than that would feel to be too much for me.

**The President (Mr N. J. Dumbreck, F.I.A.):** Thank you very much Mr Hosty. As others have already said, the authors have given us a very useful and readable paper. What the discussion lacked in quantity of contributions it more than made up for in the quality of those contributions. It remains for me to express my thanks to the authors, the opener, the closer and to all who participated in the discussion.

#### WRITTEN CONTRIBUTION

**The authors subsequently wrote:** The authors would like to correct the statement made in ¶3.3.1, that medium cohort improvements were assumed in the Profession's Report into Equity Release Mechanisms, 2005. In fact, the 2005 Report assumed a modified version of the mortality improvements developed by the Government Actuary's Department for the 2002-based national population projections for the U.K. (GAD, 2003, see Section 3.2 of the Technical Supplement to that report). These improvements are closer to the *P*-spline improvements assumed in the paper (p-s50ac), and so the statement in ¶3.3.1 and in Table 3.6, that the proposed improvements basis is significantly stronger than in the previous report, is incorrect.

#### REFERENCE

GAD (2003). *National population projections for the United Kingdom*. Government Actuary's Department.