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MORTGAGE – RELATED INSURANCES

REPORT OF THE PECUNIARY LOSS WORKING PARTY

TO THE

GENERAL INSURANCE CONVENTION

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MORTGAGE-RELATED INSURANCES

REPORT OF THE PECUNIARY LOSS WORKING PARTY

A. THE TRADITIONAL PRODUCT - MORTGAGE INDEMNITY GUARANTEE

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SECTION A:

THE TRADITIONAL PRODUCT –

MORTGAGE INDEMNITY GUARANTEES

A. THE TRADITIONAL PRODUCT - MORTGAGE INDEMNITY GUARANTEE

1) Introduction

1.1 Actuarial involvement

Mortgage Indemnity Guarantee (MIG) Insurance is a class of business which appears to have received relatively little actuarial attention in the past, although it has been transacted for a considerable number of years. This lack of actuarial investigation may be associated with the fact that MIG was historically perceived as profitable, even after the payment of substantial commissions to the lending institutions, and may even have been regarded as "money for old rope". The apparent profitability was reinforced by the accounting conventions employed, and latterly profits may have been more apparent than real.

1.2 Nature of insurance

The purpose of MIG insurance is to indemnify a lender against certain losses which can arise as a result of lending to a borrower who subsequently defaults on the loan. The insurance is normally effected at the inception of the loan by the payment of a single premium, the cost of the cover being met by the borrower, either as a lump sum or as an addition to the amount of the loan. The cover then lasts for the duration of the mortgage, which is often nominally 25 years although in practice few loans last for the full term.

1.3 Long term nature of the business

A fundamental characteristic of MIG business is that a single premium is paid at the inception of the mortgage, to cover the possibility of a claim arising during the rest of the term of the contract, which may be up to 25 years. This feature distinguishes MIG from almost all other classes of non-life business, although there are some parallels with extended warranty insurance. The long term nature of the business adds considerably to the complexity of assessing profitability and poses particular problems with respect to the establishment of unearned premium reserves and additional reserves for unexpired risks, if required. These aspects of the business are likely to be of particular interest to actuaries, and offer scope for the application of actuarial and statistical techniques. This section of the report aims to describe the basic features of MIG business and to examine what may be regarded as the current approach to reserving within the constraints of traditional accounting methods. Consideration of the theoretical and practical inadequacies of this approach is deferred to section B.

1.4 Changes in the mortgage market

The market in mortgages has grown considerably in the last few years. Originally the domain of Building Societies, the market of providers has been expanded to include banks, mortgage corporations and subsidiaries of life assurance companies. As the market has expanded, lending conditions have been relaxed in the competition to attract business, and the demand for MIG insurance has grown accordingly.

There has also been an increase in the number of different types of mortgage offered by a single lender. This has been a consequence of the de-regulation of the Building Societies and new lenders competing for a share of the market. Features available include higher income multiples and self-certification of income. The major lenders also introduced tighter arrears procedures to "catch a problem" before it developed, since in order to obtain wholesale funding these lenders were having to perform to standards imposed by outside financiers.

1.5 Trend in claims experience

Recent years have seen very significant increases in both the number and amount of claims on this class of business. Various reasons for this can be cited, including the following:-

1. Greatly increased competition within the domestic mortgage market. This is illustrated in the table below and the pie charts on the next page.
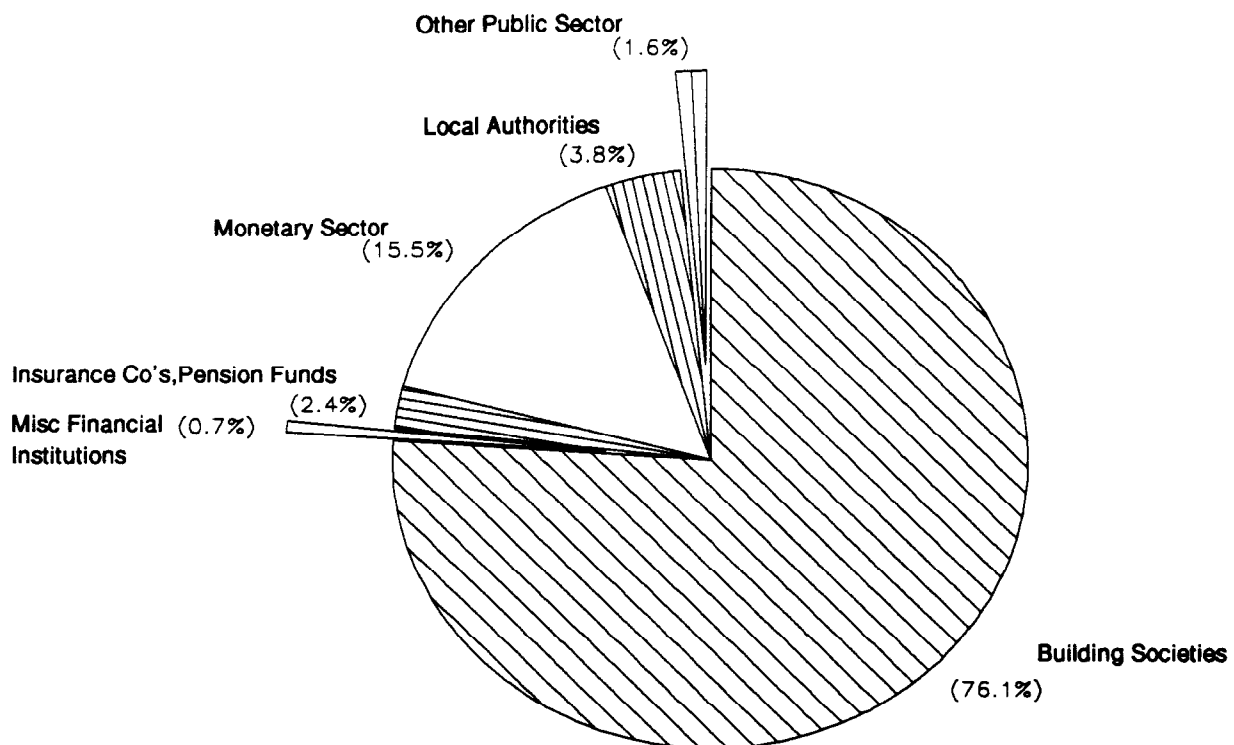
Net new advances for house purchase

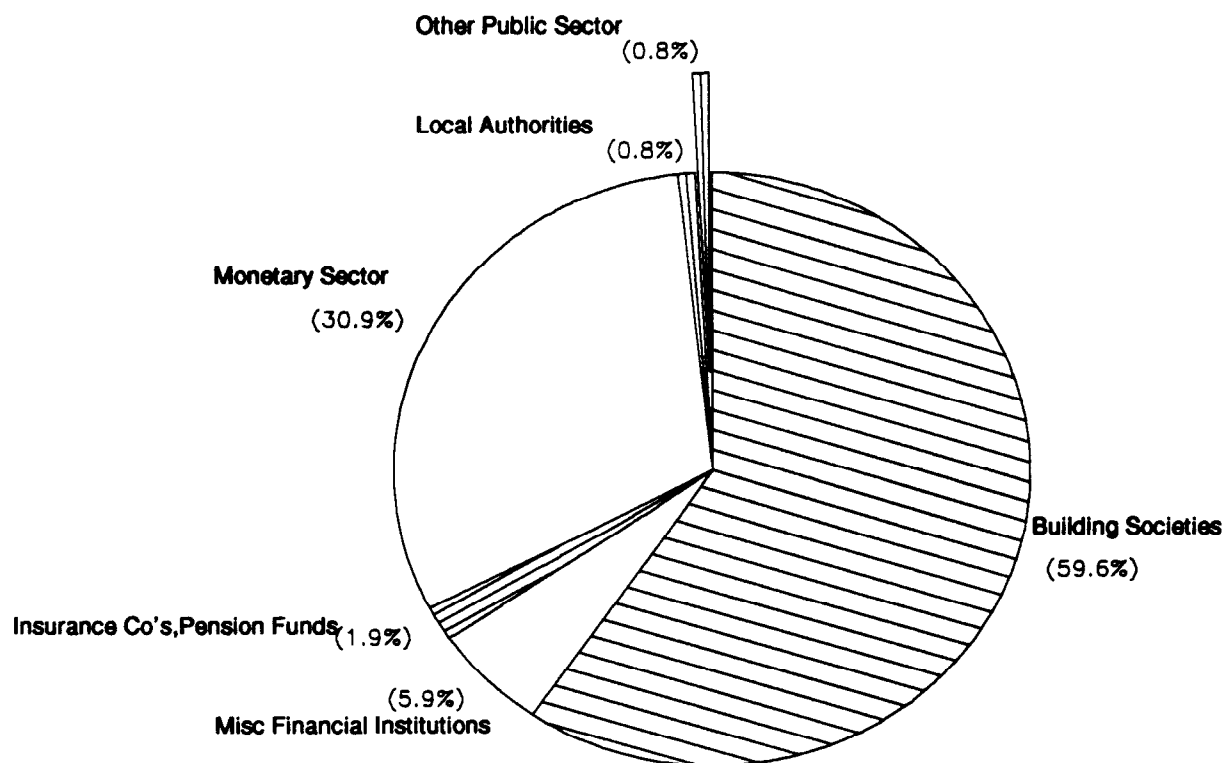| LENDER	1984		1989	
	£m	%	£m	%
Building Societies	14,572	85.36	24,041	71.14
Monetary Sector inc. banks	2,043	11.97	7,158	21.18
Misc. Financial Institutions	445	2.61	2,546	7.53
Insurance Co's,Pension Funds	250	1.46	119	0.35
Other Public Sector	(43)	(0.25)	129	0.38
Local Authorities	(195)	(1.14)	(200)	(0.59)
Total	17,072	100.00	33,793	100.00

Source: Housing Finance, May 1990.

2. Lowering of lending standards by Building Societies and other institutions in providing higher income multiples and a greater proportion of advances in excess of 90% of valuation.
3. High levels of unemployment - see graph of unemployment rates.
4. Increase in marital breakdowns - see graph illustrating numbers of divorces.
5. Stagnation of house prices in certain areas.
6. Interest rates at a high level relative to rates of inflation.

The increase in claim cost has meant substantially reduced profits, because insurers were slow to recognise the trend in claims experience and increase rates accordingly. By the time the rates were increased, because of the long term nature of the business, a considerable amount of unprofitable business had already been written.
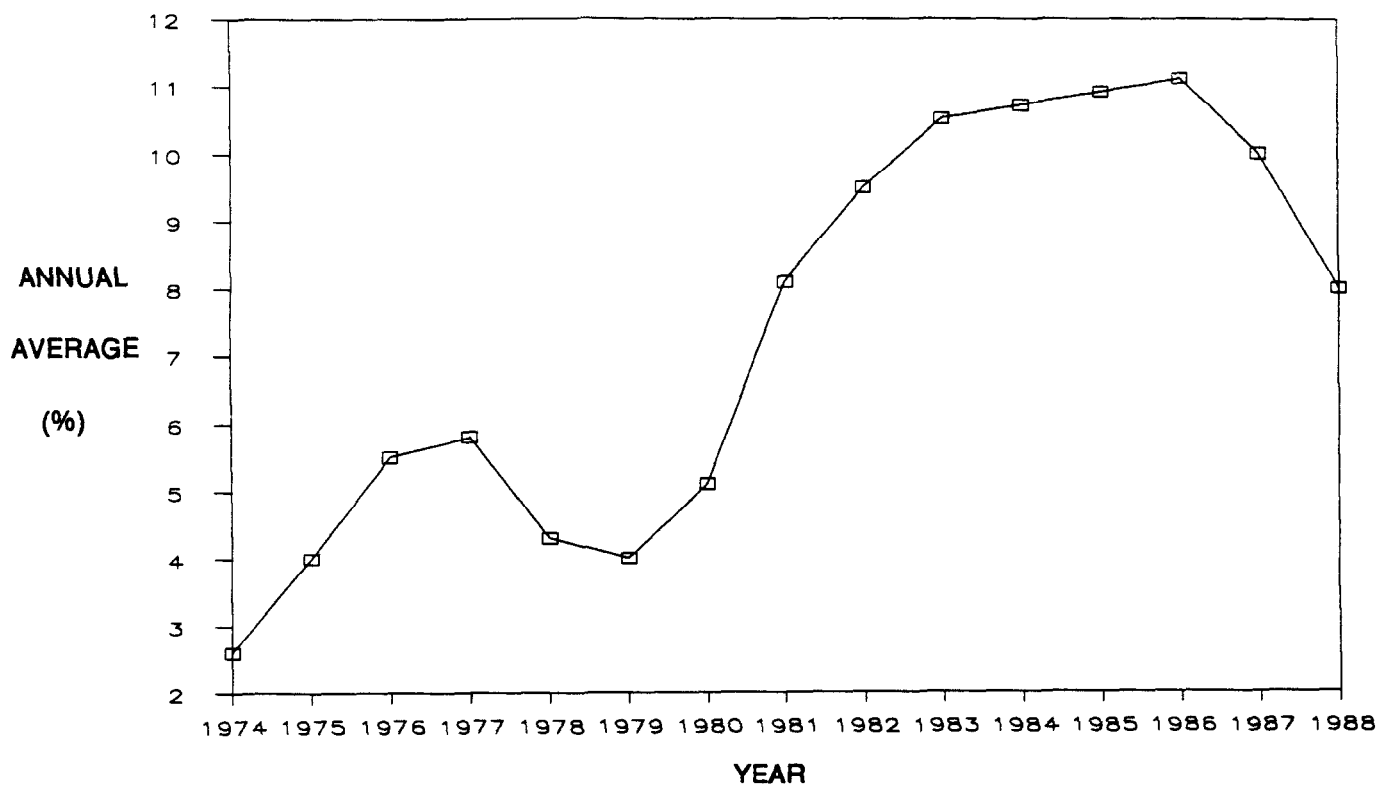
BALANCES OUTSTANDING AS AT 31.12.84

Other Public Sector (1.6%)

Local Authorities (3.8%)

Monetary Sector (15.5%)

Insurance Co's, Pension Funds (2.4%)

Misc Financial (0.7%)
Institutions

Building Societies (76.1%)

BALANCES OUTSTANDING AS AT 31.12.89

Other Public Sector (0.8%)

Local Authorities (0.8%)

Monetary Sector (30.9%)

Insurance Co's, Pension Funds (1.9%)

Building Societies (59.6%)

(5.9%)
Misc Financial Institutions

Source: Housing Finance, May 1990

RATES OF UNEMPLOYMENT IN THE UK

NUMBERS OF DECREES ABSOLUTE GRANTED
IN ENGLAND & WALES

Source: CSO Statistics
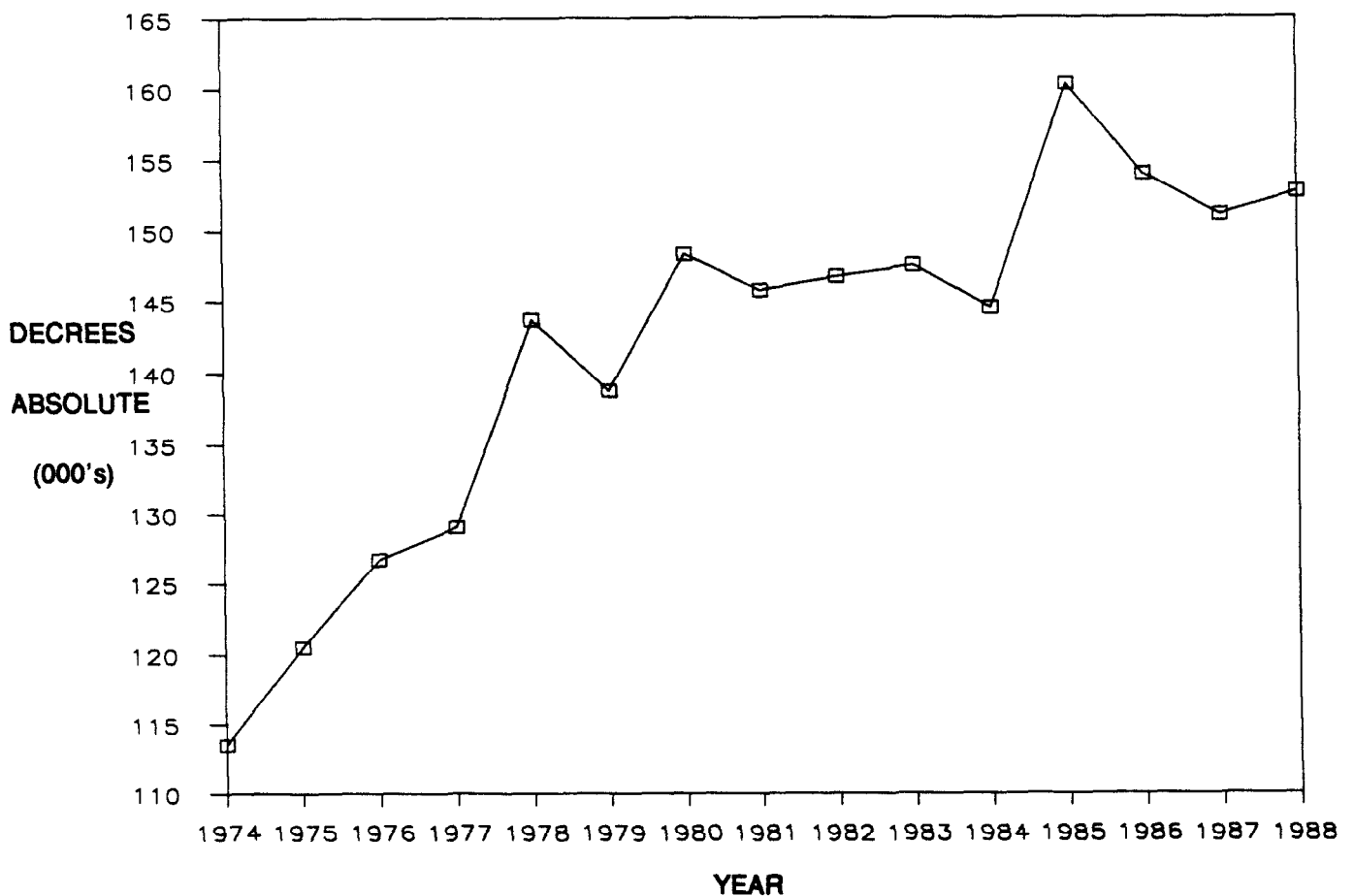
2) Description of the policy

2.1 Normal advance

The amount which a lender will advance on a particular property is related to the valuation of the property. The lender will normally be willing to advance between 70% and 80% of the valuation - the "normal advance" - without mortgage guarantee insurance, but will probably be willing to advance a higher percentage - possibly up to 100% - provided that mortgage guarantee insurance is taken out on the excess over the normal advance.

2.2 Policy cover

An MIG insurance is for the benefit of the lender, not the borrower, and covers certain losses which may arise as a result of the lender selling the property following default on mortgage repayments by the borrower, or as a result of a compulsory purchase, demolition or closing order. A claim will arise if the proceeds of the enforced sale are insufficient to cover the outstanding debt, which comprises the following items:-
i)   Principal plus unpaid interest due to the lender.
ii)   Legal charges incurred by the lender in the recovery (or attempted recovery) of the sum due.
iii) Estate agent's commission on sale.
iv)   Any other costs, such as essential repairs and insurance premiums.

2.3 Circumstances giving rise to claims

The reason for a claim may be simply the delinquency of the borrower - i.e. for some reason the borrower ceases making mortgage payments, and by the time the property is sold the accumulated outstanding debt exceeds the sale proceeds. Clearly, the longer the period of arrears before the sale is completed, the greater the amount outstanding.

However, a default case is more likely to give rise to an MIG claim if there has been a decline in the value of the property. The following are possible reasons for such a decline in value:-
a)   A general decline in property values throughout the country.
b)   A regional decline in property values.
c)   A decline in the value of a particular property caused by, for example:

    i)   Deterioration due to lack of maintenance.
    ii)   Deterioration of immediate surroundings or adjacent property.
    iii) The imposition of a compulsory purchase order, eg for redevelopment.
    iv)   Damage or structural fault.
    v)   Negligent or fraudulent initial value.
    vi)   Defective or imperfect title.
    vii) The basis and manner in which the property is sold.

Some of these may be covered by more specific insurance. Others can be recovered from the legal and professional advisors of the lender. Essentially, MIG is underwriting the lender's lending criteria and administrative procedures, and it is important that these should be thoroughly understood.

2.4 Block policies

The single premium required for MIG insurance is paid at the inception of the loan; it may be paid in cash by the borrower or added to the amount of the advance. The lending institution normally has a single block policy with the insurer, covering all the cases which have been placed with that insurer. New cases are added to the policy continuously, and the premiums in respect of them are remitted to the insurer at intervals, say monthly or quarterly. Full details of each case covered by the policy are maintained by the lender, but are not passed to the insurer unless and until a claim is made. Thus the insurer does not keep records of the individual mortgages covered under the block policy, but merely records the total premium received in respect of mortgages incepted in a particular period. (This is known as a "no records" block policy.)

Although block policies are important, the reason for their existence is primarily the use of archaic accounting systems. Modern financial instruments (eg securitization) require greater information and, accordingly, this is now being kept by lenders and made available to insurers.

2.5 Premium rating

The premium charged is calculated as a percentage of the excess of the actual advance over the normal advance. Historically, the percentage rate used varied according to the term of the mortgage and the percentage of the valuation advanced. In 1986, typical rates were as follows:-

% of Valuation Loaned	Term of Mortgage	
	20 years or less	Over 20 years
95% or less	£2.30%	£3.30%
Over 95%	£2.80%	£3.80%

Following the realisation that the rates charged were generally inadequate, rates were generally increased in 1987. The term of the mortgage was dropped as a rating factor, being largely irrelevant since most claims arise at the earlier durations, and a greater variation in rates according to the actual percentage advanced and the percentage level of the normal advance was introduced. The following premium rates, again expressed as a percentage of the excess advance, are typical of those now used by leading UK underwriters:-

% of Valuation Loaned	Normal Advance		
	70%	75%	80%
90% or less	£3.00%	£3.50%	£4.00%
90% to 95%	£4.00%	£4.50%	£5.50%
Over 95%	n/a	£7.00%	£8.00%

These rates generally apply to the first mortgage on a property, on a repayment or endowment basis. In theory, interest only loans are subject to an additional loading of £1%, although this is waived in many cases.

Ideally, the portfolio should satisfy the following conditions:
a) An even geographical spread of loans.
b) A maximum guarantee, expressed as a percentage of the valuation.
c) A minimum premium per guarantee.
d) No refunds (except in special circumstances).

When requested to quote for MIG insurance, the insurer will require a copy of the lender's detailed lending criteria. An indication of what this should include is set out in Appendix 1, along with notes on mortgage product profiles and premium refunds. The insurer will also require details of the lender's procedures for handling arrears of payments.

The important principle of this business is that the building society acts in the same manner as an underwriting agency. The insurance company effectively gives the building society its set of rates and "the pen". What the insurer does is underwrite the administrative procedures of the building society. The building society receives commission for the service, in the same way that underwriting agencies receive commission.

Theoretically, the rating is controlled through the granting of bonus or profit commission. If the block of business underwritten is good then the building society receives more commission and vice versa. In practice the ability to identify the good and bad risks is only partial.

Whenever a building society changes its practices, the commission element should in theory be reviewed. This is rarely done in practice. To some extent the absence of typical agency controls by the insurer is a weakness in the system.

2.6 Commission terms

Traditionally, the commission rates paid to lenders by insurers on mortgage guarantee business have been high. The basic rate of commission was 20%, to which was added 10% "special commission" and a further amount of "profit commission" calculated in accordance with a formula. The total commission payable was normally limited to 40% of the premium. However, the formulae for calculating the "profit commission" were apparently generally crude and did not correctly take into account the long term nature of the business. This tended to be very advantageous to the lenders, particularly when the volume of business and hence the premium income were expanding. Following the revision of premium rates, the commission payable was limited to 30% and the existing profit-sharing arrangements were phased out. However, some insurers are understood to be considering the re-introduction of profit commission on a more realistic basis.

In the case of a broker introduction, no separate brokerage is generally offered; the scale rate is quoted and the broker is invited to negotiate his share.

3) Claims procedure

3.1 Process leading to a claim

The process leading up to the reporting of a claim can be a lengthy one and will comprise the following stages:

a) The mortgage repayments fall significantly into arrears. Lenders vary in the action they take on arrears and how soon they seek re-possession. The lender may initially try to assist the borrower to keep the loan in force, for example by re-scheduling repayments. Some borrowers fall into arrears from the outset - which perhaps reflects badly on the lender's lending policy.

b) The property is re-possessed by the lender. This may be achieved fairly easily with the agreement of the borrower, or it may be necessary to take legal action to achieve re-possession. The latter may take years if the borrower "pretends" to the court that he will pay off the arrears over a period.

c) The property is placed on the market. This stage is likely to last for months or in some cases years, as the properties are often in less popular areas or of poor quality and are less attractive to purchasers because they may have been standing empty for some time.

d) The property is sold. For insurance purposes the claim is incurred on the completion date of the sale, since it is only then that the computations to determine whether the lender has made a loss can be carried out. Clearly not all repossessions ultimately lead to MIG claims.

e) The exact amount of the claim is calculated and the claim is reported to the insurer.

It is clear that there will be a period of some months or even years between the commencement of the arrears and the completion date of the sale.

3.2 Calculation of claim amount

The loss which the lender would sustain in the absence of MIG is calculated as follows:

> Amount of advance
> \+ Interest payable on loan from commencement of mortgage to date of completion of sale
> \+ Outgoings in respect of period of arrears and expenses of sale
> \- Total repayments made by the borrower
> \- Sale proceeds of property

Frequently, depending on the provisions of the policy, the lender has to bear the "Normal Loss", calculated as follows:

> Normal advance
> \+ Interest payable on normal advance from commencement of mortgage to date of completion of sale
> \- Proportion A of repayments made by the borrower
> \- Total sale proceeds of property.

The proportion A is calculated as normal advance/actual advance.

If the result of this calculation is negative, the "Normal Loss" is taken as zero.

The claim amount is calculated as the total potential loss to the lender less the "Normal Loss". It is worth noting that the "Normal Loss" does not include any proportion of the expenses associated with the re-possession and sale, but does take account of the whole of the sale proceeds. Two examples of claim calculations are included in Appendix 2.

3.3 Claims settlement

Once reported to the insurer, Mortgage Guarantee claims are usually settled quickly, as the amount of the claim will have been calculated by the lender on the agreed basis as set out in the policy. This rapid settlement is reflected in the low level of outstanding claims reserves for reported claims required at the year end. It should be noted that accounts in arrears and properties in possession are not outstanding claims, but potential claims; a claim can occur only when the property has been sold.

3.4 Delays in reporting

As noted above, claims are usually settled quickly once notified to the insurer. However, there may sometimes be significant delays in lenders reporting claims and requesting settlement. This may arise because of difficulties in assessing the expenses of the sale and outgoings during the period of arrears or because the lender has a backlog of claims awaiting processing. In normal circumstances the volume of IBNR claims at the year end may be expected to be fairly small, but any backlog of claims in the lender's hands will of course increase the IBNR provision required. It may be worth making enquiries as to whether exceptional volumes of claims are awaiting processing by the lender at the year end.

4) ## The incidence of claims

4.1 Date of origin

Any particular case subject to mortgage indemnity guarantee will give rise
to at most one claim - unlike extended warranty business where there can
be a number of claims during the life of a policy. It will be seen that
during the period leading up to the notification of a claim to the insurer,
there are a number of significant dates, such as:
>   date of first missed payment
>   date of re-possession
>   date of completion of sale.

In what follows, the date of completion of the sale has been taken as the
date of origin of the claim, as that is the earliest date at which the
computations to determine whether the lender has made a loss can be
carried out. If any earlier date were to be used, for example if the
insurer were to be notified of all re-possessions with MIG cover and treated
them all as claims, a large number of nil claims would result, since not all
such cases would give rise to eventual losses.

It is of course true that a proportion of cases in arrears or in possession
will in due course give rise to MIG claims. If the relevant proportions
could be estimated and statistics relating to cases in arrears or in
possession with MIG cover were available, estimates of the number and
amount of such "pipeline claims" at a particular time could be made.

4.2 Pattern of incidence

In theory, a claim can occur at any time during the term of the mortgage,
but in practice very few claims will be incurred in the year the policy is
written because there is inevitably a delay between the repayments falling
into arrears and the property being sold. A high proportion of claims are
incurred in the third, fourth and fifth years of the mortgage, and very few
claims are incurred after year ten. This pattern of incidence seems
reasonable on general grounds, for the following reasons:-

a) As the duration of the loan increases, the repayments will decrease in
    real terms, making them seem less onerous to the borrower.
    Therefore, if repayments are to fall into arrears, this is likely to
    happen at an early stage.
b) If a property is repossessed at a later duration, it is more likely that
    there will be an increase in the property value sufficient to discharge
    the losses.
c) The average life of a mortgage is often quoted as being about seven
    years, although we have been unable to find a statistical justification
    for this. However, a market research survey conducted for the
    Building Societies Assocation indicated that mortgage holders had lived
    at their current address for an average of about six years, and
    clearly most loans are repaid before the end of the term when the
    borrower moves house. It is likely that only a relatively small
    proportion of loans will survive beyond duration 10, say.

4.3 Distribution of claims over the term of the policy

It is important to make a detailed analysis of the incidence of claims in order to assist in the determination of a reasonable basis for the earning of premiums. For each claim, the date the mortgage was granted must be ascertained and recorded so that an analysis by underwriting year may be carried out. The tables which follow contain data provided by two insurers, suitably doctored, and illustrate the development of the numbers and amounts of claims for each year of writing, together with the gross written premium figures for each year of writing.

In the case of company A, the distribution is given according to the year of payment of the claim, year of payment 1 being the calendar year of writing. In the case of company B, the distribution is by year of origin, ie year of completion of sale. Clearly in some cases the claim will be paid in a year later than the year of origin, and so a distribution by year of payment may be expected to show claims at later durations than a distribution by date of origin, but it will be seen that the figures exhibit many of the same features.

4.4 Features of the distributions

The information tabulated is as follows:-

Tables 1A and 1B	- numbers of claims for companies A and B respectively
Tables 2A and 2B	- claim amounts
Tables 3A and 3B	- average claim amounts
Tables 4A and 4B	- claim amounts as a percentage of gross written premiums.

It should be noted that for Tables 1, 2 and 3, a diagonal in the table corresponds to the claims paid (company A) or originating (company B) in a particular calendar year, so that for example the last diagonal corresponds to 1989 in each case.

The following features may be noted particularly:

a) There is a concentration of claims in years 3, 4 and 5.
b) Years of writing 1980 and later exhibit significantly higher claim ratios than earlier years, and more claims are arising later in the policy term.
c) Certain diagonals (calendar years of payment/origin) stand out as containing particularly high figures. It appears that the figures for 1986, 1987 and 1988 were exceptionally high. Part of the explanation for this is no doubt that this was a period when the housing market was buoyant and when repossessed properties could be sold fairly easily, thus realising the loss. If the market is depressed and properties cannot be sold, the resultant MIG claims will be deferred until more favourable conditions return - hence the current time-bomb situation!
d) In general, the average claim amount for a particular year of writing increases with calendar year of payment/origin. If we ignore cells where the number of claims is very small, it also appears to be generally true that for a particular calendar year of payment/origin, the average amount increases with year of writing. The factors affecting claim amounts will be discussed in more detail in the next section.

TABLE 1A

COMPANY A

NUMBERS OF CLAIMS

Year of writing	Written premium						Year of payment					
		1	2	3	4	5	6	7	8	9	10	11
1972	500,136		1	4	13	7	5	2	3	5		1
1973	390,488		3	37	29	14	8	3	3	3		
1974	251,318	1	6	24	19	17	6	1	2	2	2	1
1975	461,665		9	44	45	35	4	2	2		1	
1976	823,205		5	49	44	23	12	5	5	1	3	
1977	816,920		1	22	18	10	1	2	1	2	4	2
1978	1,196,559		4	6	5	10	5	11	4	3	3	5
1979	876,172	1	2	5	14	20	12	5	5	4	2	2
1980	713,653			26	66	32	29	9	9	9	2	
1981	1,275,670	1	6	70	68	67	42	41	30	9		
1982	1,815,485	1	15	89	155	197	138	79	54			
1983	2,085,493	2	8	69	180	153	114	48				
1984	2,517,582		15	201	260	188	125					
1985	3,299,740	1	65	207	230	156						
1986	4,449,647	4	40	176	214							
1987	6,860,151	21	48	77								
1988	7,938,462	12	8									
1989	4,903,298	7										

TABLE 1B

NUMBERS OF CLAIMS

COMPANY B

Year of writing	Written premium	Year of origin													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
1975	1,615,000		15	66	81	22	11	2		1		1			1
1976	1,877,000		19	99	52	24	3	3			3	1	2	3	
1977	2,076,000		13	15	11	10	2	7	3	4	6	4	5	1	
1978	2,505,000		5	10	15	16	13	8	6	5	3	3	1		
1979	1,695,000			17	46	38	12	13	8	13	9				
1980	1,770,000			73	110	58	42	20	15	14	9				
1981	2,798,000		38	149	195	129	93	53	31	11					
1982	4,169,000	11	59	370	398	255	194	96	18						
1983	5,913,000	11	98	435	493	308	160	40							
1984	6,950,000	11	177	627	473	326	79								
1985	7,859,000	14	210	509	430	124									
1986	13,027,000	24	203	617	259										
1987	17,374,000	19	143	195											
1988	22,406,000	20	56												
1989	18,949,000	4													

TABLE 2A

CLAIM AMOUNTS

COMPANY A

Year of writing	Written premium				Year of payment							
		1	2	3	4	5	6	7	8	9	10	11
1972	500,136		35	1,580	8,968	5,157	1,645	2,340	2,120	6,389		1,398
1973	390,488		2,904	28,705	24,407	9,914	9,436	5,078	2,922	4,451		
1974	251,318	1,077	4,163	20,099	27,018	14,768	7,088	2,796	4,031	1,249	1,309	2,396
1975	461,665		6,492	37,420	42,751	35,578	5,641	3,681	2,571		2,633	
1976	823,205		3,570	36,058	35,539	26,796	12,647	5,725	5,242	155	1,633	
1977	816,920		218	17,142	8,557	10,678	2,620	1,685	713	2,127	4,933	6,958
1978	1,196,559		1,676	4,325	8,583	12,297	8,528	16,979	4,272	4,087	17,420	15,126
1979	876,172	1,303		5,599	21,516	35,498	17,033	5,272	15,897	8,776	5,056	7,265
1980	713,653		1,065	41,803	144,085	67,291	59,626	13,449	23,085	19,816	3,762	
1981	1,275,670	1,756	10,286	184,922	187,026	171,651	101,259	150,089	113,858	27,480		
1982	1,815,485	1,814	32,573	235,795	364,809	599,687	576,142	315,723	208,201			
1983	2,085,493	2,101	15,715	161,659	584,000	587,667	456,618	195,480				
1984	2,517,582	2,140	35,786	630,307	995,834	762,464	498,917					
1985	3,299,740	2,140	166,243	749,346	993,383	647,762						
1986	4,449,647	17,341	140,769	808,766	921,258							
1987	6,860,151	81,444	193,325	332,759								
1988	7,938,462	42,525	28,703									
1989	4,903,298	37,639										

TABLE 2B

CLAIM AMOUNTS

COMPANY B

Year of writing	Written premium	Year of origin													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
1975	1,615,000		8,213	45,128	74,992	17,561	9,427	2,053		6,216	3,173	2,721			1,396
1976	1,877,000		9,642	68,454	38,795	22,289	4,247	5,900				1,266	4,170	2,318	
1977	2,076,000		6,143	8,847	6,768	8,348	2,671	11,734	2,075	5,256	15,344	14,638	13,885	1,753	
1978	2,505,000		3,677	10,455	10,547	31,934	12,514	13,480	9,249	6,355	6,447	13,536	2,519		
1979	1,695,000			19,590	72,162	71,135	18,406	34,958	16,197	33,540	30,822				
1980	1,770,000			152,795	218,881	147,220	115,146	47,126	38,091	43,956	29,497				
1981	2,798,000		69,924	348,629	551,093	332,797	286,821	171,869	87,673	43,253					
1982	4,169,000	24,492	117,275	842,521	1,158,368	819,322	721,962	364,958	66,862						
1983	5,913,000	32,848	241,834	1,247,955	1,680,790	1,242,500	712,854	183,804							
1984	6,950,000	21,439	508,389	2,370,473	2,098,718	1,461,093	393,792								
1985	7,859,000	40,397	722,997	2,157,351	2,068,827	658,991									
1986	13,027,000	90,748	861,246	3,258,646	1,655,842										
1987	17,374,000	62,096	806,384	1,086,317											
1988	22,406,000	24,983	259,458												
1989	18,949,000	13,121													

TABLE 3A

AVERAGE CLAIM AMOUNTS

COMPANY A

Year of writing	Year of payment										
	1	2	3	4	5	6	7	8	9	10	11
1972		35	395	690	737	329	1170	707	1278		1398
1973		968	776	842	708	1180	1693	974	1484		
1974	1077	694	837	1422	869	1181	2796	2016	625	655	2396
1975		721	850	950	1017	1410	1841	1286		2633	
1976		714	736	808	1165	1054	1145	1048	155	544	
1977		218	779	475	1068	2620	843	713	1064	1233	3479
1978		419	721	1717	1230	1706	1544	1068	1362	5807	3025
1979	1303	533	1120	1537	1775	1419	1054	3179	2194	2528	3633
1980			1608	2183	2103	2056	1494	2565	2202	1881	
1981	1756	1714	2642	2750	2562	2411	3661	3795	3053		
1982	1814	2172	2649	2354	3044	4175	3996	3856			
1983	1051	1964	2343	3244	3841	4005	4073				
1984		2386	3136	3830	4056	3991					
1985	2140	2558	3620	4319	4152						
1986	4335	3519	4595	4305							
1987	3878	4028	4322								
1988	3544	3588									
1989	5377										

TABLE 3B

AVERAGE CLAIM AMOUNTS

COMPANY B

Year of writing					Year of origin									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1975		548	684	926	798	857	1027		6216	1058	2721			1396
1976		507	691	746	929	1416	1967				1266	2085	773	
1977		473	590	615	835	1336	1676	692	1314	2557	3660	2777	1753	
1978		735	1046	703	1996	963	1685	1542	1271	2149	4512	2519		
1979			1152	1569	1872	1534	2689	2025	2580	3425				
1980			2093	1990	2538	2742	2356	2539	3140	3277				
1981		1840	2340	2826	2580	3084	3243	2828	3932					
1982	2227	1988	2277	2910	3213	3721	3802	3715						
1983	2986	2468	2869	3409	4034	4455	4595							
1984	1949	2872	3781	4437	4482	4985								
1985	2886	3443	4238	4811	5314									
1986	3781	4243	5281	6393										
1987	3268	5639	5571											
1988	1249	4633												
1989	3280													

TABLE 4A

COMPANY A

CLAIM PAYMENTS / WRITTEN PREMIUMS %

Year of writing	Written premium	Year of payment											TOTAL
		1	2	3	4	5	6	7	8	9	10	11	
1972	500,136	0.0	0.0	0.3	1.8	1.0	0.3	0.5	0.4	1.3	0.0	0.3	5.9
1973	390,488	0.0	0.7	7.4	6.3	2.5	2.4	1.3	0.7	1.1	0.0	0.0	22.4
1974	251,318	0.4	1.7	8.0	10.8	5.9	2.8	1.1	1.6	0.5	0.5	1.0	34.3
1975	461,665	0.0	1.4	8.1	9.3	7.7	1.2	0.8	0.6	0.0	0.6	0.0	29.7
1976	823,205	0.0	0.4	4.4	4.3	3.3	1.5	0.7	0.6	0.0	0.2	0.0	15.4
1977	816,920	0.0	0.0	2.1	1.0	1.3	0.3	0.2	0.1	0.3	0.6	0.9	6.8
1978	1,196,559	0.1	0.1	0.4	0.7	1.0	0.7	1.4	0.4	0.3	1.5	1.3	7.8
1979	876,172	0.0	0.1	0.6	2.5	4.1	1.9	0.6	1.8	1.0	0.6	0.8	14.1
1980	713,653	0.0	0.0	5.9	20.2	9.4	8.4	1.9	3.2	2.8	0.5		52.3
1981	1,275,670	0.1	0.8	14.5	14.7	13.5	7.9	11.8	8.9	2.2			74.4
1982	1,815,485	0.1	1.8	13.0	20.1	33.0	31.7	17.4	11.5				128.6
1983	2,085,493	0.1	0.8	7.8	28.0	28.2	21.9	9.4					96.2
1984	2,517,582	0.0	1.4	25.0	39.6	30.3	19.8						116.1
1985	3,299,740	0.1	5.0	22.7	30.1	19.6							77.5
1986	4,449,647	0.4	3.2	18.2	20.7								42.5
1987	6,860,151	1.2	2.8	4.9									8.9
1988	7,938,462	0.5	0.4										0.9
1989	4,903,298	0.8											0.8

TABLE 4B

COMPANY B

CLAIM PAYMENTS / WRITTEN PREMIUMS %

Year of writing	Written premium	1	2	3	4	5	6	7	8	9	10	11	12	13	14	TOTAL
							Year of origin									
1975	1,615,000	0.0	0.5	2.8	4.6	1.1	0.6	0.1	0.0	0.4	0.2	0.2	0.0	0.0	0.1	10.6
1976	1,877,000	0.0	0.5	3.6	2.1	1.2	0.2	0.3	0.0	0.0	0.0	0.1	0.2	0.1		8.3
1977	2,076,000	0.0	0.3	0.4	0.3	0.4	0.1	0.6	0.1	0.3	0.7	0.7	0.7	0.1		4.7
1978	2,505,000	0.0	0.1	0.4	0.4	1.3	0.5	0.5	0.4	0.3	0.3	0.5	0.1			4.8
1979	1,695,000	0.0	0.0	1.2	4.3	4.2	1.1	2.1	1.0	2.0	1.8					17.7
1980	1,770,000	0.0	0.0	8.6	12.4	8.3	6.5	2.7	2.2	2.5	1.7					44.9
1981	2,798,000	0.0	2.5	12.5	19.7	11.9	10.3	6.1	3.1	1.5						67.6
1982	4,169,000	0.6	2.8	20.2	27.8	19.7	17.3	8.8	1.6							98.8
1983	5,913,000	0.6	4.1	21.1	28.4	21.0	12.1	3.1								90.4
1984	6,950,000	0.3	7.3	34.1	30.2	21.0	5.7									98.6
1985	7,859,000	0.5	9.2	27.5	26.3	8.4										71.9
1986	13,027,000	0.7	6.6	25.0	12.7											45.0
1987	17,374,000	0.4	4.6	6.3												11.3
1988	22,406,000	0.1	1.2													1.3
1989	18,949,000	0.1														0.1

TABLE 5

Calendar year of payment/ origin	COMPANY A			COMPANY B			Co. A Index of ave pyts (1983=100)	Co. B Index of ave pyts (1983=100)	AEI	RPI	Ave. House Price Index
	No. of claims	Total payments	Average payments	No. of claims	Total payments	Average payments			Index=100 in 1983		
1975	56	41,836	747	0	0	0	34	0	38	34	42
1976	69	56,155	814	15	8,213	548	37	26	44	42	45
1977	87	79,567	915	85	54,770	644	41	31	48	49	49
1978	122	105,571	865	193	149,589	775	39	37	55	57	57
1979	118	105,524	894	94	68,880	733	40	35	63	61	74
1980	62	58,491	943	56	48,939	874	42	41	57	70	85
1981	40	51,426	1286	47	44,785	953	58	45	86	82	87
1982	68	101,279	1489	189	359,878	1904	67	90	94	92	89
1983	187	415,943	2224	388	819,232	2111	100	100	100	100	100
1984	224	545,736	2436	758	1,841,241	2429	110	115	109	105	108
1985	350	808,975	2311	1219	3,455,236	2834	104	134	116	110	116
1986	710	2,137,203	3010	1742	6,057,439	3477	135	165	124	116	133
1987	878	3,337,530	3801	1796	7,412,628	4127	171	195	134	120	155
1988	893	3,726,660	4173	1858	8,891,331	4785	188	227	147	126	190
1989	702	2,909,226	4144	797	4,395,209	5515	186	261	160	136	217

4.5 Factors affecting average amounts of claims

The average amount of a mortgage guarantee claim may be expected to depend on:

i) the level of house prices at the date of the sale;

ii) the amount of the original mortgage, which in turn depends on the property value at the purchase date and the percentage advance;

iii) the level of interest rates prevailing during the period of arrears;

iv) the length of the arrears period, which in turn depends partly on the lender's arrears control procedure and partly on the state of the housing market (ie how quickly a repossessed property can be sold).

The interaction of these various factors is complex, and it is not easy to model the average amounts of mortgage guarantee claims. It is of some interest, however, to examine the past progression of average amounts from one year of payment/origin to another, and Table 5 sets out the average payments for companies A and B. The progression of these average payments has then been expressed in index form, taking the 1983 average as 100 in each case. For comparison, the table also shows the values of the Average Earnings Index (AEI), the Retail Price Index (RPI) and an Index of Average House Prices, with the 1983 value adjusted to 100 in each case.

It will be noticed that the average amounts for Company B appear to have been increasing more rapidly than for Company A; it is assumed that this reflects differences between the two underlying portfolios. However, for both companies, the average claim amount has been increasing more rapidly than either the AEI or the RPI, and for Company B the rate of increase has also outstripped the Index of Average House Prices.

5)   Earned premiums and the reserves for unexpired risks

5.1   Nature of MIG

Under MIG insurance, the single premium paid at the outset covers the possibility of a claim arising at any time during the currency of the loan. At the end of each year, it is necessary to set aside reserves to cover claims which are expected to arise in the future on contracts already in force. This type of business differs from annual premium classes in that the unearned premium for MIG relates to unexpired risks extending over a number of future years. For each year of writing, the unearned premium reserve should be calculated in accordance with the expected distribution of claims. If the unearned premium reserve seems likely to prove inadequate, consideration should be given to setting up an additional provision for unexpired risks.

5.2   The current approach

The conventional approach, constrained by accounting and taxation requirements, is to use an undiscounted unearned premium reserve, and to take investment income into each year's revenue account as it emerges. Possible alternative approaches will be considered in Section B.

The traditional approach suggested here is that of spreading the actual written premium forward over a number of years, in line with the expected distribution of claims. If the premium is adequate, this should lead to the release of some profit each year. However, if the premium is inadequate, losses will emerge, and in the later years of exposure there may still be losses after taking account of investment income, since the investment income attributable to a given year of writing will decline as the UPR declines. In this case, the establishment of an additional reserve for unexpired risks may need to be considered.

It should be noted that a UPR approach which spreads the written premium in proportion to the expected claims profile takes no account of investment income, which is brought into account in the year it is earned. However, the rating basis may anticipate the investment income to be earned in the future, in which case the traditional UPR method will be wrong. Either an additional reserve for unexpired risks will be required at the outset, or investment income must be used to supplement the effectively discounted provision.

5.3   Features of the claim distribution

From the previous section, it is clear that claims are not evenly distributed over the life of the contract, so that it is not appropriate to assume that the premiums are earned uniformly over the term of the loan. The following features of the distribution are significant:

a)   Very few claims are incurred after year 10. This is partly because a high proportion of people move house within 10 years of the mortgage being granted, so that the mortgage ceases, and partly because at the later durations the increase in the value of the property is more likely to compensate for the repayments lost and the expenses of re-possession.

b)   Very few claims are incurred in the first year. This is because there is inevitably a delay between repayments falling into arrears and a claim being incurred, so that even where repayments fall into arrears from the outset, the claim may not arise in the first year.

c)   There is a concentration of claims in years 3, 4, 5 and 6, with a peak in years 4 and 5. After year 6, the proportion incurred in each year decreases rapidly.

d)   The average amount of a claim tends to increase with year of development.

5.4   Basis for earned premiums and the UPR

It is desirable to choose a basis for unearned premiums which will not require frequent alteration from one year to another, although of course it will be necessary to keep the claims experience under review and to modify the basis for earned premiums in line with any significant changes in the distribution of claims.

It is assumed that commission will be treated as being earned at the same time as the premium to which it relates, so that the percentages set out below will apply equally to gross premiums, commission, and premiums net of commission. The earned premiums net of commission will be available to pay the claims incurred in the relevant period.

As an example, for companies A and B, the percentages applied to the total written premiums and corresponding commission in each year to give the distribution of earned premiums are as follows:

Year	1	2	3	4	5	6	7	8	9	10
Company A %	0	5	15	20	20	15	10	7	5	3
Company B %	1	7	33	35	14	5	5	0	0	0

% earned in year:

The percentages of written premiums and commission which are deemed to be unearned at the end of each year are then as follows:

% unearned at end of year:

Year	1	2	3	4	5	6	7	8	9	10
Company A %	100	95	80	60	40	25	15	8	3	0
Company B %	99	92	59	24	10	5	0	0	0	0

5.5   Additional provision for unexpired risks

As mentioned above, if there is felt to be a danger that the net unearned premiums will prove insufficient to meet the cost of the future claims, then consideration needs to be given to the establishment of an additional provision for unexpired risks.

The considerations to be taken into account in deciding whether an additional provision for unexpired risks is required and if so at what level it should be set are complex. A projection of the future claims experience will be required, and this is likely to be far from straightforward, because the level of future claims will depend on future economic circumstances. The incidence of "catastrophe" years in the future will need to be considered, although one possibility would be to allow for these by establishing some form of contingency fund. Essentially, the projected claims should then be compared with the unearned premium reserve, but it will be appropriate to make an allowance for future investment income on the UPR.

In conjunction with the possible establishment of an additional provision for unexpired risks, it will be appropriate to consider the volume of "pipeline claims" - ie future claims which may be expected to arise from cases currently in arrears or possession. The cost of these future claims should normally be covered by the UPR, but if the UPR is felt likely to be inadequate, an additional provision should be established. If suitable statistics are available relating to proportions of cases in arrears or possession which subsequently become claims, it should be possible to establish the additional provision on a statistical basis, and this should enable tax relief to be obtained.

6) Outstanding claims reserves

6.1 Reserve for outstanding reported claims

As mentioned previously, claims are usually settled quickly once reported. There will normally be only a relatively small volume of outstanding reported claims at any time, and for each such claim the amount is likely to be known fairly accurately. It will therefore be appropriate to use the total of the case estimates as the reserve for the outstanding reported claims.

6.2 IBNR claims

At any point in time the claims IBNR will be those cases where the sale of the property has been completed but the claim has not been notified to the insurer for settlement. There will always be some such cases since there will be a delay while the various elements of the claim calculation are obtained. However, long delays can sometimes arise or a distortion in the pattern of reporting may occur as a result of, say, a backlog of claims in the hands of the lender. When a provision for IBNR claims is being made at the year end, it is advisable to enquire of the lender whether there are any special circumstances which might distort the pattern of claims reporting.

In the absence of any special features, the provision of IBNR claims may be based on the experience in earlier years and the number of late reported claims received by an early stage of the new year. The numbers of late-reported claims notified in earlier years may be used to project the total number of IBNR claims at the latest year-end, and the payments on previous late-reported claims may be used to derive the expected average amount of an IBNR claim. The product of the number of claims and their average amount will of course give the provision required. If the expected number of IBNR claims is significant, it may be worth subdividing them according to delay in notification and calculating a separate average amount for each group, since the average amount may be expected to vary with the delay in notification.

7) Reinsurance

Ideally, insurers would like to be able to get stop loss cover to protect their net MIG accounts. MIG business has traditionally been very profitable, but can, and has, turned very sour in periods of economic recession. The losses usually materialise well after the housing market has slumped, as the lending institutions are naturally reluctant to force sales on a depressed market, and tend to wait until there are signs of an upturn in the market before realising the value of their repossessions. There is thence an accumulation of losses from several different underwriting years at once. The aspect of moral hazard is also difficult to overcome, and reinsurers are therefore reluctant to offer such cover.

The only form of cover that reinsurers are normally prepared to offer is quota share. From the insurer's viewpoint this may be thought of as giving away too much profitable business. However, given the current perceived uncertainties regarding the future housing market, this proportional basis does have the merit of equitably sharing the risks between the parties.

SECTION B:

RECENT DEVELOPMENTS &

A LOOK INTO THE FUTURE

B. RECENT DEVELOPMENTS AND A LOOK INTO THE FUTURE

I. FUTURE MARKET DEVELOPMENTS
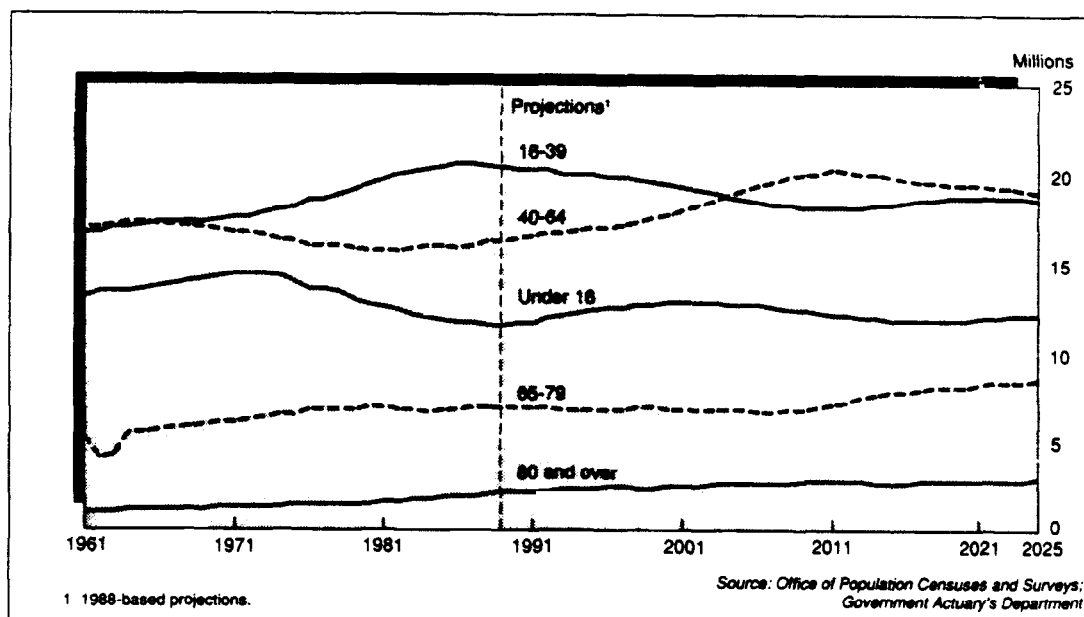
1) What is the future of the mortgage market?

The future of the mortgage market hinges on a variety of issues including

- Demand for owner occupation in the longer term
- Supply of housing on to the market
- Demand for mortgages
- Supply of mortgage finance.

1.1 The demand for owner occupation in the longer term is heavily dependent on the number of new home owners entering the market. The new borrowers, ie new entrants to the housing market, are likely to be dominated by the younger generation. Demographic forces suggest that there will be fewer young people in the next 10-15 years, thus reducing the demand for housing and hence the demand for new mortgages.

The graph below, illustrating population projections in selected age bands, shows a decrease in the 16-39 age group until 2011. After this date the number in this band begins to increase again following the earlier trend of the under 16 year olds.

Population by Selected Age Bands

Source: Office of Population Censuses and Surveys;
Government Actuary's Department

1 1988-based projections.

The last few decades have seen a large increase in the home ownership sector. In particular, this has been enhanced in recent years by the sale of council houses, and the continuation or otherwise of this trend will be an important feature. The number of owner occupied dwellings in the UK more than doubled between 1961 and 1988, so that nearly two-thirds of all dwellings were owner occupied in 1988.

The increase in home ownership among the older generation has resulted increasingly in houses being inherited by younger people on the death of parents or grandparents. This in turn leads to less demand for properties from the younger generation (assuming property is being passed down to grandchildren say). To add to this, reducing family sizes will lead to a greater amount of property being passed down per receiver.

Many young people are unable to afford to buy a property by themselves, especially in the south, and so more people are buying a property between two or even three, thus reducing the demand for houses. The percentages of males aged 25-29 and females aged 20-24 co-habiting have also increased over the last few years. However, this is unlikely to have a marked effect on the demand for housing as it is compensated by the fact that the age of marriage has increased with the number of marriages decreasing.

Divorces are on the increase, and marriages are on the decrease - see below.

Marriages, Remarriages and Divorces : by sex

Great Britain
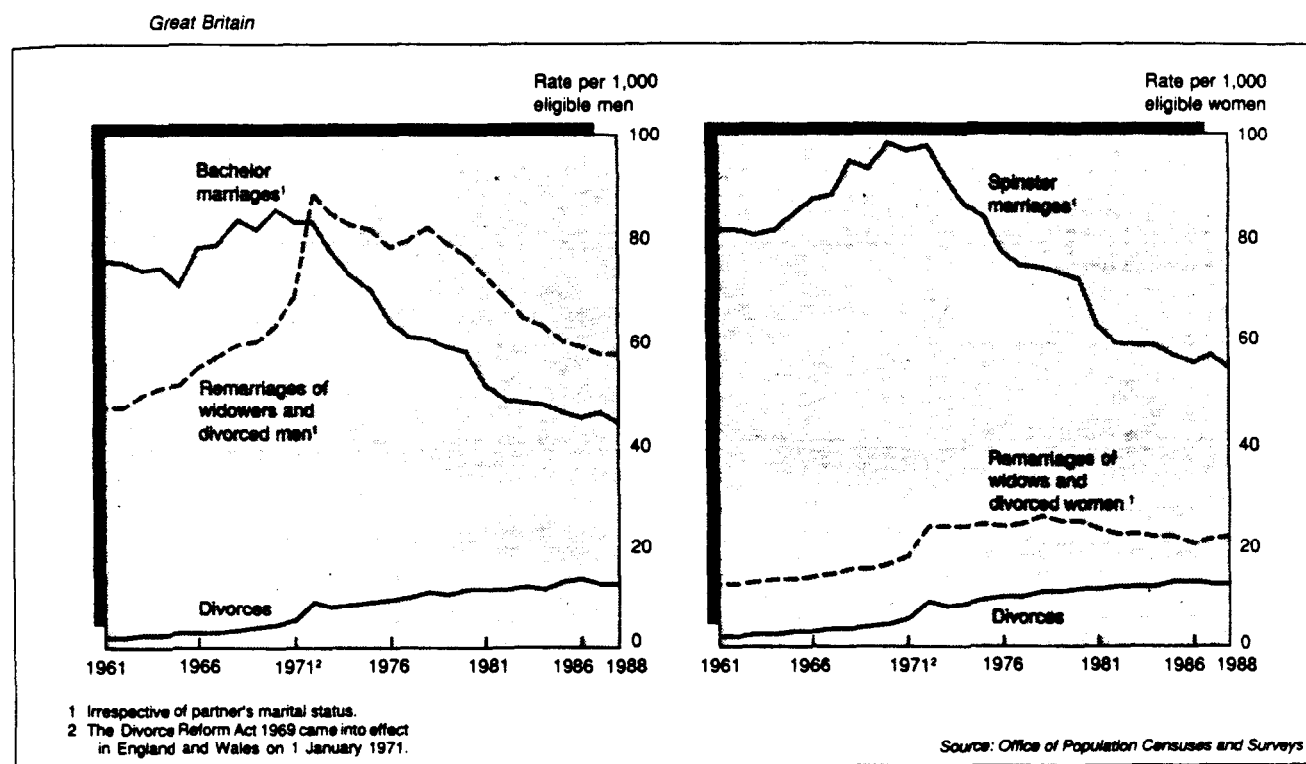
The rate of formation of new households is expected to decline in the 1990s, although the total number of households will continue to increase. A high proportion of new households are expected to be single person households.

A recent survey indicated an unsatisfied demand for owner occupation. Owner occupation is likely to rise most rapidly amongst lower income or social groups, younger age groups, single people, and in particular parts of the country.

1.2   The supply of housing to the market is a strong influencing factor on
the mortgage market.   The increase in houses being left in wills may lead
to a surplus of housing as fewer young people require to find new homes.
A surplus of housing will drive house prices down and hence reduce
mortgage demand.   The table below shows the change in tenure since 1961.

<div align="center">Housing Tenure - Great Britain</div>

	April 1961	April 1971	April 1981	Sept 1989
Owner occupied				
- '000s	6,885	9,427	11,693	14,874
- %	42.3%	50.1%	55.8%	66.0%
Public sector				
- '000s	4,201	5,733	6,502	5,395
- %	25.8%	30.4%	31.0%	23.9%
Private sector rented and others				
- '000s	5,187	3,673	2,326	1,671
- %	31.9%	19.5%	11.1%	7.4%
Housing Association rented				
- '000s	-	-	449	613
- %	-	-	2.1%	2.7%
Total dwellings				
- '000s	16,273	18,833	20,971	22,553

Source: Housing Finance from Housing and Construction Statistics,
          various issues.

This can also be seen in graphical form below:-

<div align="center">Stock of Dwellings by Tenure</div>

United Kingdom
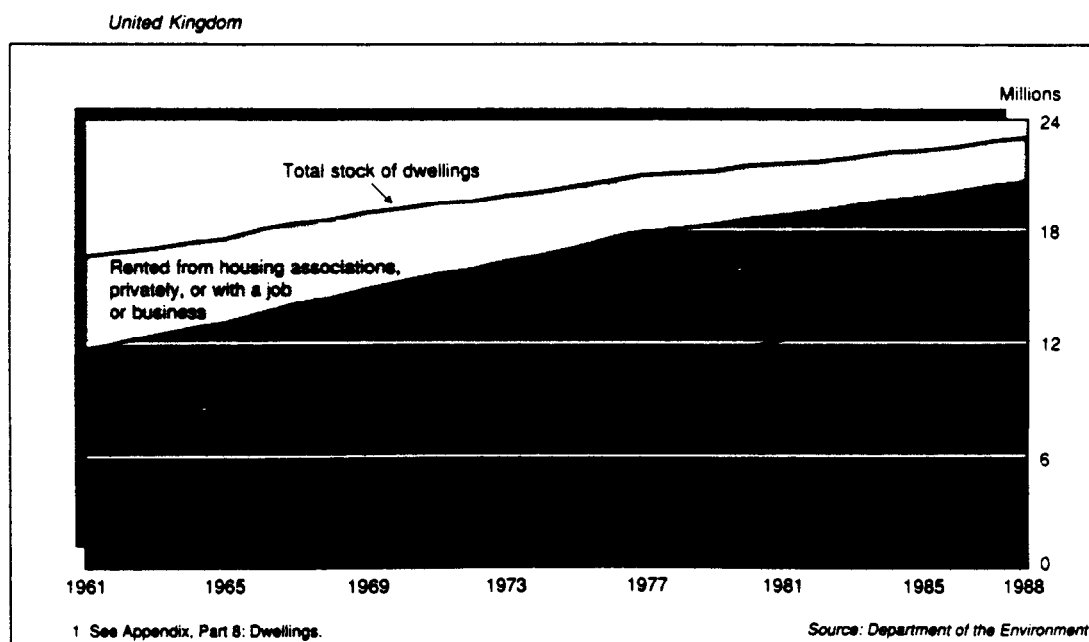
It is not only the overall supply to the housing market which is important, but also the location and type of properties. In a non-sought after location, property prices will be low and hence also the demand for mortgages. The availability of jobs and amenities also affects house prices.

1.3 The demand for mortgages may reduce in the future, as more young people inherit property, resulting in fewer younger people requiring mortgages or young people requiring lower mortgages.

An opposing factor is the effect of remortgaging. Could it be the trend that more people are remortgaging their properties to provide them with money to use for other things? It is estimated that approximately 50% of the current mortgage activity is in remortgages. Also, inheritors of properties may buy second properties (possibly outside the UK).

The Government can have a great effect on the demand for mortgages by changing the rules as to the amount of tax relief given or manipulating interest rates. This was seen just before August 1988, when dual tax relief was being abolished and the demand for mortgages rose considerably. In many cases the decision to buy or move was brought forward due to this change in law, and was one factor underlying the lack of activity in 1989.

1.4 The supply of mortgage finance varies as different lenders want to come into the market.

The table below shows the source of mortgage or loan, by head of household, in 1986.

Great Britain						*Percentages and numbers*
	Age of head of household					
	Under 25	25—29	30—44	45—59	60 and over	All households
Source of mortgage or loan						
(percentages)						
Building society	*88*	*86*	*81*	*75*	*67*	*80*
Local authority	*2*	*2*	*4*	*9*	*20*	*6*
Insurance company	*4*	*3*	*3*	*5*	*4*	*4*
Bank	*6*	*9*	*12*	*11*	*5*	*11*
Other source	*1*	*1*	*2*	*1*	*4*	*1*
Sample size						
(= 100%)[1] (numbers)	157	516	1,909	1,027	223	3,832

1 Because mortgages or loans can be raised from more than one source, the sum of the percentages may exceed 100 per cent.

Source General Household Survey

2) What is the future of the Building Societies?

A few years ago, nearly all domestic property lending was by Building Societies. However, recent times have seen other players entering the domestic lending market.

Looking at the present and into the future, the takeovers, mergers and acquisitions and conversions to banks all have their effect on Building Societies.

How will the growth of alternative funding sources such as wholesale funding and securitization affect the survival of Building Societies? But also, how will the situation of the Building Societies affect the overall mortgage market?

Currently, Building Societies have a very "caring" image in comparison with banks and insurance companies, but how will this change in the future? If alternative lending can be provided more cheaply, then how far will this "caring" image have an effect?

Traditionally Building Societies have been able to lend at competitive rates as they have a large source of cheap finance, namely depositors' savings. This is still so, but may change in the future, as other financial institutions come up with attractive packages for depositors.

Further changes that may have an effect are the abolition of the composite rate of tax payable on Building Society interest, which may make Building Societies less attractive relative to their competitors for tax payers, and the introduction of Tax Exempt Special Savings Accounts (TESSAs).

3)   What is the future of MIG?   How will it develop?

Changing levels of lending in terms of loan to value ratios (eg due to inheriting wealth) will affect the premium income from MIG policies. If the average loan to value ratio drops significantly, then to what extent will the premium rating structure need to be changed to cater for expense contributions etc?

Higher numbers of remortgages will increase the demand for MIG, if remortgages are required in the relevant loan to value band. However, it is thought that an increasing number of top up mortgages are taken out without any corresponding guarantee protection, although often the risk is covered by charging a higher rate of interest.

Changes in lenders' practice may reduce the demand for MIG. For example, at least one Building Society charges a higher interest rate on the loan for a period instead of charging an MIG premium. Other lenders may in the future consider charging less standardised interest rates as a substitute for MIG insurance. Theoretically, the present value of the additional interest payments should equal the amount of the MIG premium.

If borrowers are required to take out creditor insurance, or if credit protection is packaged with MIG, this should reduce the number of MIG claims which arise as a result of sickness or unemployment, and the changes in the risk would need to be reflected in the rates charged for the MIG. There may be a growth in such packaged insurance products in the future.

Mortgage guarantee policies are currently rated in bands of loan to value ratios from 75% to 100% in 5% bands (often with 75%-90% at the same rate). As a result of lenders keeping the information and the insurers selling the policies, there is usually little relevant statistical information available. It is likely that very few companies are able to analyse their experience by loan to value ratio, even to see if the premium rating structure is correct. With more data available from the lenders, in the future more complex rating may be applied. With competition from other sources, there is likely to be a move to much more complex rating structures in the future and building societies will have to start collecting the information required if they want to obtain competitive rates from insurers.

Below are set out what could be important rating factors regarding ability to pay, but, without better information, their effect is difficult to quantify.

. occupation
. loan as a multiple of salary
. earnings prospects.

Lesser factors may be sex, marital status and other attributes which may be regarded as discriminatory.

Also, how should second mortgages be dealt with? The existence of a second mortgage is likely to reduce the funds available to enable payment to be made on either loan.

4) What is the effect of new mortgage products?

Many new mortgage products are coming on to the market, many of which the current MIG is not designed to cope with.

Changes in underwriting/lending criteria are likely to affect the experience of the MIG (eg increasing maximum multiple of salary from 3 to 4 times), but to what extent are the insurers made aware of any changes made by the lenders? And how should rates be determined when the same MIG product is used for a variety of lenders? This may be dealt with by changing the commission rate payable to the lender.

New products such as low start loans are likely to result in higher claim amounts for MIG claims because of the added accrued interest (although the incidence of risk should be reduced in the earlier years). MIG rates need to be tailored to cope with this. In addition, often life insurance premiums are rolled up into the outstanding loan, adding further to the debt.

The incidence of claims can be affected by the nature of the mortgage product also (in addition to the effect of the interest roll-up on claim amounts). In the case of low start and/or roll-up of premiums, there are likely to be fewer claims in the first few years, when the repayments are lower, but once the interest rate is increased to the normal rate, there is likely to be an influx of claims. In such cases, it would be necessary to attempt to change the earned premium pattern.

There is also an increase in foreign currency and ECU mortgages. If these were to be covered by MIG policies, factors such as variability of currency and interest rate fluctuations would come into play.

On loan to value ratio, some lenders will lend more than 100% of value. MIG rates do not currently cater for this in general.

In current times, lenders are always trying to find new ways to lend. Most of these will not be compatible with the guarantee given by a traditional MIG policy.

At the end of the day, it is necessary to assess whether the issues above are short or long term phenomena - or are we just in a part of a cycle? Also, can insurers keep pace with innovation in the mortgage market?

II. ACCOUNTING, TAX, AND RESERVING

In this section we consider:

. How should MIG be accounted for - in the absence of accounting and taxation constraints?

. How should companies reserve for MIG?

. What techniques should be used?

. What changes in accounting rules are likely or desirable?

Rationale

MIG business is unusual as exposure extends way beyond one year. It does not therefore easily fit in with the current tax and accounting environment. This section discusses the existing accounting treatment of MIG and ways in which the normal accounting rules could be adapted for MIG. It includes a discussion of the recent Insurance Companies (Credit Insurance) Regulations 1990 and their effect on accounting for MIG.

Different Types of Accounts

There are several different types of accounts, intended for the consumption of different interest groups:

Companies Act report and accounts
Statutory returns to the DTI
Tax accounts
Management accounts

Because they all have different purposes, different considerations apply for these different types of accounts.

Companies Act Report and Accounts

These are intended for those who have provided, or may in future provide, the capital of the company - that is, the existing and potential shareholders. The intention of these accounts is to show how the capital has been used, to record the income and outgo over an accounting period, the assets and the liabilities at a point of time, and generally to show a so-called true and fair view of the company.

These accounts identify and measure in aggregate the company's profits within a given accounting period, and its assets and liabilities at a point of time. Companies Act accounts deal with everything on the basis of the accounting period rather than by reference to underwriting or exposure periods.

While some companies may provide more than the minimum information in their accounts, there is in general no separate identification of business written or exposed in different periods, no separate identification of different types of business, no separate identification of inwards business and outwards reinsurance, and no separate identification of business from different territories or in different currencies.

The ABI's SORP on accounting for insurance business specifies that inwards and reinsurance business should be accounted separately, and gross premiums should be analysed into principal classes of business and geographical areas, but many companies do not follow the SORP. In any case there is no separate identification of profits from particular groups of business.

The directors' report may, however, include comments on these matters to explain the overall result. For example there may be reference to reserve strengthening on prior years' business or comments on extraordinary factors.

It is unlikely that the amount of detail disclosed will increase, so the effect of any changes in the accounting of MIG alone will not be apparent from the published accounts. However, companies may show the statutory MIG equalisation reserve separately in published accounts (see below).

Traditional Accounting

Traditional UK accounting methodology shows balance sheet reserves made up of provisions for the following items (in the case of 1-year accounting):

- reported outstanding claims (including reserves for deficiencies in individual case estimates),
- incurred but not reported claims (which may be included in the provision for outstanding claims), and
- unearned premiums and any additional reserve for unexpired risks.

The revenue account profit is the income (inward premiums net of commission and reinsurance plus investment earnings) less outgo (claims payments net of reinsurance recoveries plus expenses) plus or minus changes in year-end balance sheet reserves.

For MIG, IBNR is confined to claims in the course of being processed by the lender, since there is no claim until the property is sold, and the claim amount can then be determined. Pipeline or potential claims are a grey area, but they may be estimated in a similar way to pipeline premiums (estimates of renewals). The real difficulty with MIG accounting is the estimation of the reserve for unearned premiums and unexpired risks.

In the case of 3-year accounting, the reserves simply consist of the fund (premiums received less claims paid) for the open years (possibly augmented where an underwriting loss is contemplated) together with a combined reserve for outstanding claims and unexpired risks for the closed years. The revenue account profit or loss is simply the amount transferred out of or into the fund at the year end.

Value Added Accounting

A topical debate within the insurance industry is the basis for measuring and attributing profits and stating the assets and liabilities of a company. The traditional form of accounting, described very briefly above, shows the profit (this term is intended to include a loss as well) which arises during the accounting period.

There is also 'value added' accounting which is intended to show the increase in the value of the company through the business it has taken on during the accounting period. There are arguments on both sides concerning the matching of the incidence of effort and risk to the recognition of profit. It is not the purpose of this paper to go into this debate, except to note that these two forms of accounting each have their own followings.

As regards MIG business, it is unlike most non-life business in having a potential exposure period which is very long in comparison to the accounting period. If a realistic pattern of earned premiums is used (by which we mean one which closely represents the relative proportions of claim amounts in the various exposure periods of a cohort of policies), then the traditional 1-year accounting basis provides a significant deferral of the recognition of underwriting profits or losses.

Since, under the value added accounting method, this profit or loss is (or should be) capitalized as the present value of all estimated future cash flows, there can be a very great deal of difference between the traditional profit arising during an accounting period and the value added profit.

A small but increasing number of companies are now showing value added accounts in addition to or instead of the traditional accounts in respect of their life business. We believe this trend will continue and spread to non-life business, at least to some extent. For most classes of business this would simply mean discounting the technical reserves and allocating investment income among the shareholders' funds and the various classes and cohorts of business. It is arguable whether there should be any allowance for renewals of existing policies or, as in MIG and other block business, the continuation of new policies from existing sources. However, for MIG business, it would mean projecting the claim experience over a much longer period than for other classes, and the level of uncertainty in this is likely to be considered too high.

It may be noted that, for MIG business, if a catastrophe occurs, and a particular year of account experiences an accumulation of claims relating to various years of writing, then, under the value added method, the resultant loss will have to be set against the current year of writing, since the results for those earlier years will already have been anticipated. This effect could of course be mitigated by the use of equalisation reserves.

A 3-year funded basis, in conjunction with discounted reserves, is a possible compromise between the two approaches.

Statutory Returns to the DTI

These are intended to form one aspect of the regulation of the insurance industry by the DTI, on behalf of the consumers of insurance - the policyholders. The DTI returns force companies to maintain records in a minimum level of detail and to publish this information.

This increases the possibility of informed comment by independent third parties. While it is impossible to arrive at a conclusive judgement of a company from its DTI returns alone, they do give a tremendously better picture than the very limited information in the Companies Act accounts.

DTI Risk Groups

A survey of the 10 top UK insurance companies' recent (1987 and 1988) DTI returns (Forms 31 and 33) shows that four companies (see below) identified contract guarantees and bonds - presumably covering mortgage indemnity guarantee - as a separate risk group within the pecuniary loss accounting class. Any other companies which write MIG include it in a miscellaneous risk group.

Because of the long-term nature of MIG it seems appropriate to identify it as a separate risk group. The DTI now insists that private motor is split between comprehensive and non-comprehensive, and we can see equally valid reasons for segregating MIG business from shorter term pecuniary loss business. In fact the DTI does now require credit insurance to be accounted separately. Although

separate Forms 31 and 33 are not specifically required for credit insurance, we believe companies are likely to produce them anyway. Despite this, for most insurers the financial significance of MIG business is relatively low compared with their other classes of business.

Earned premium patterns

The Form 31 ratios of exposed to written premiums for risks incepted in the financial year were as follows:

Eagle Star	6%
CIS	0%
GRE	16%
Legal & General	4%
Sun Alliance	15%

All figures except those for Legal & General were taken from the risk group 'Contract Guarantees and Bonds'. Legal & General's figures were taken from their risk group 'Other Pecuniary Loss': the low value in the table suggests that this risk group is predominantly mortgage indemnity guarantee business.

The practice in some companies (for example Eagle Star and CIS) is to spread the earning of commission according to the same pattern as that for net premiums. We do not know the treatment of commission in all companies, and if a different treatment is used for commission and net premiums then the variations in the above table could be due to this. For example, GRE's 16% could be made up of 10% commission, assumed all earned in the first year, together with 6% first year's risk exposure.

Alternatively the high values for GRE and Sun Alliance could be due to the presence of much shorter term contracts, or they could reflect the use of a simplified pattern of earned premiums of approximately 1/7th each year for 7 years. We understand that some companies use such a simplified basis. We hope that this paper will help to encourage the use of a more appropriate basis for unearned premium reserves in those companies which at present use a rough and ready approach.

Tax Accounts

The purpose of these is to agree with the Inland Revenue (in the UK) and other tax authorities (outside the UK) the tax bill(s) of the company, on the appropriate tax basis. These accounts are based on the Companies Act accounts but are not themselves publicly available.

The tax authorities would need to be convinced of any changes in the basis for recognizing profits which affected the tax computation. We think it very unlikely that there will be any changes to the basis of taxation, although discounted claims reserves have been a favourite for pre-Budget speculation for many years. It would be illogical (though not necessarily out of the question) to introduce taxation based on anticipation of investment profits without also allowing for anticipation of underwriting losses.

Management Accounts

These are internal records which the managers of the company keep in order to run the business as they see fit. They are therefore much more detailed than other forms of accounts. The records contain information which most managements regard as commercially sensitive, so remain confidential to management and professional advisers, and therefore unpublished.

We believe that MIG business should be segregated from other business because of its peculiar characteristics. It is not known how all companies treat MIG, but we believe that most are already keeping MIG separate.

To perform their function effectively, managers need regular feedback on the outcome of their actions. The accounting period is a somewhat artificial concept, brought about by the desire for regular reporting. For published accounts, a year is reckoned to be suitable, but for internal purposes monthly reports are desirable.

It is also important to segregate business written not only at different times but also at different premium rates. MIG premium rates have not changed very frequently, probably because the exposure base for the rates and the cost of claims are linked by similar inflationary factors. However when the rates have changed, their structure has changed quite markedly.

Management accounts need to be structured so that it is possible to estimate the ultimate result of a block of business as quickly as possible. Then, any corrective action that is deemed necessary can be taken. This could include changes in rates, underwriting, claims handling or general administration procedures, or withdrawing from the business altogether. The definition of a block of business includes identification of risk/rating factors such as source of business (building society) or geographical location of risks.

Claim Emergence Model

One way of estimating the ultimate result is to establish a model of claim emergence from a given cohort of business. The model should indicate the expected cost of claims at any point of time, together with ranges representing the variability inherent in the experience. Comparison of actual against expected experience would provide evidence of a final profit being in accordance with previous assumptions, or not as the case may be. This comparison is subject to some difficulties because of the possibility of pipeline claims which have not yet been reported.

The claim emergence model could be based on a simple chain ladder approach, or could be more sophisticated, involving economic forecasts of the factors involved in the future claim experience. However economic forecasting is notoriously difficult, particularly over the period of at least seven years which would be required for mortgage-related business.

Effect of Inflation

As has been mentioned already, the effect of inflation on the frequency and severity of claims is different in MIG from that of almost every other class of non-life business. High inflation of house prices should reduce both the frequency and the severity of claims.

Availability of Statistics

Any model has to make some assumptions about the composition of the portfolio, both initially and as it develops over a period of time. As has been said before, traditionally the lenders have provided very little information to the insurers - though it is believed that the more sophisticated lenders, mainly the new entrants to the mortgage market, do keep detailed statistics on their book of loans.

Ideally, a knowledge of the composition of the portfolio of risks at any point of time, including up to date estimates of the market values of properties and the

amounts of mortgage arrears, would enable a better projection to be made of future loss costs.

Incidence of Risk

The incidence of the risk is difficult to identify. It can be thought of as a combination of a 'normal' attrition risk - such as divorce or illness which are not related to the circumstances of the general economy - and an 'economic' risk. The premium charged needs to cover both types of risk.

The normal risk may be relatively stable and predictable. This would be where a few borrowers get into financial difficulties because of their personal circumstances. This can be considered the 'development year' risk, and past patterns may be of most value in assessing this risk and establishing earned premium patterns.

The economic factor is likely to be a cyclical feature. Analysis of development triangles will probably be of little help in assessing this 'financial year' risk. This risk is in the nature of a catastrophe risk, and could be dealt with in the accounts by a claims equalisation reserve to pool the losses of a number of underwriting periods. In effect the catastrophe element of the premium is earned over a much longer period than the normal element.

Equalisation Reserves :
The Insurance Companies (Credit Insurance) Regulations 1990

It is believed that UK companies do not establish equalisation reserves for MIG business, even internally. There is no reason why they should not, although the current tax regime does nothing to encourage the deferment of profit in this way.

The idea of equalisation or catastrophe reserves is not unique to MIG business. Companies would presumably welcome the tax relief - if it were available - on equalisation reserves, although on the other hand it would limit the disclosed profits which might hinder their dividend policies.

The Insurance Companies (Credit Insurance) Regulations 1990 came into force on 1 July 1990. They were brought in to implement the EC Directive on Credit and Suretyship Insurance (87/343/EEC). The effect of the regulations is to oblige insurers transacting credit insurance to establish equalisation reserves to provide for above average fluctuations in claims and to maintain a higher minimum guarantee fund. The equalisation reserves are to be maintained in accordance with one of four specified methods (at the option of the insurer). The regulations are believed to be the first regulations to impose equalisation reserves on UK insurers.

It is here assumed that MIG business does come within the scope of the regulations, since it is "insurance against risks of loss to the persons insured arising from ..... the failure ..... of debtors of theirs to pay their debts when due", and therefore authorised under class 14.

The regulations exempt insurers whose credit business is below a specified threshold from the requirement to hold the higher minimum guarantee fund and an equalisation reserve. However, all credit insurers must (from 1 July 1990) include in their DTI returns information on the technical results and technical reserves of their credit insurance business. Form 15 has been amended for this purpose and Forms 29A and 29B have been introduced (depending on whether 1-year or 3-year accounting is used). Rules for how the reserve is to be calculated, built up, and used are specified in the regulations (four methods). Similar rules would be required if tax relief were to be given. Whether tax

relief will be given is not yet clear. The equalisation reserve is an additional technical provision, while the higher minimum guarantee fund is an allocation of shareholders' funds. At present, as a general rule, technical provisions receive tax relief but the statutory minimum solvency margin and guarantee fund do not.

Equalisation Reserves : The Four Methods

Method 1

The equalisation reserve is built up by annual contributions of the lower of 75% of the technical surplus for the year and 12% of premiums received in the year. Contributions to the equalisation reserve stop when the reserve reaches 150% of the highest annual premiums received over the previous five years. Any technical deficit in a year is charged in full to the equalisation reserve. No limit on this charge is set in the regulations.

Method 2

Here the equalisation reserve is built up by annual contributions of 75% of the technical surplus for the year (in this case with no limit imposed by premiums received in the year). Contributions to the equalisation reserve stop when the reserve reaches 134% of the average (rather than the highest) annual premiums received over the previous five years. Any technical deficit in a year is charged in full to the equalisation reserve. Again, no limit on this charge is set in the regulations.

Method 3

Here the insurer must calculate an average and a standard deviation for its claim ratio to earned premiums over a reference period of between 15 and 30 years, based on its own experience. Presumably the reference period can be chosen by the insurer. The required equalisation reserve for any financial year is calculated at six times the standard deviation of the earned claims ratio multiplied by the earned premiums for the year.

While the equalisation reserve is below this level, transfers to the equalisation reserve must be made of 3.5% of the required level. After any such transfer into the equalisation reserve, there are then loss-sensitive transfers to or from the equalisation reserve. These are equal to the shortfall or excess (as the case may be) of the actual claims below (or above) the expected claims (that is, the product of the average earned claims ratio and the earned premiums for the year). For transfers to the equalisation reserve, there is an upper limit so that the required level of the equalisation reserve is not exceeded. For transfers from the equalisation reserve, there is no upper limit (except that the equalisation reserve presumably cannot be negative).

If an underwriting loss has never been made during the reference period used to calculate the average and standard deviation of the claim ratio, no equalisation reserve will be necessary. The required equalisation reserve and the transfers from it (but not to it) may be reduced if the average claims ratio and the expense ratio (presumably the current expense ratio) indicate a safety margin in the premiums. The regulations do not specify the reductions involved.

Method 4

Here again the insurer must calculate an average and a standard deviation for its claim ratio to earned premiums over a reference period of between 15 and 30 years, based on its own experience. As for Method 3, the required equalisation reserve for any financial year is calculated at six times the standard deviation of the earned claims ratio multiplied by the earned premiums for the year.

While the equalisation reserve is below this level, transfers to the equalisation reserve must be made whenever there is a shortfall of actual claims below the expected claims (see under Method 3). Transfers to the equalisation reserve must be equal to the shortfall of claims, but subject to an upper limit so that the required level of the equalisation reserve is not exceeded.

Whenever there is an excess of actual claims above expected claims, transfers from the equalisation reserve must be made, equal to the excess of claims but subject to an upper limit so that the transfers cannot be made out of the equalisation reserve to bring it below the minimum level (equal to half the maximum required level).

Again, if an underwriting loss has never been made during the reference period used to calculate the average and standard deviation of the claim ratio, no equalisation reserve will be necessary. The required equalisation reserve and the transfers from it and to it may be reduced if the average claims ratio and the expense ratio (presumably the current expense ratio) indicate a safety margin in the premiums. The regulations specify that the safety margin must be at least 1.5 standard deviations and the reduction factor is the ratio of 1.5 standard deviations to the actual safety margin.

General Comments

The options are clearly in pairs: Methods 1 and 2, and Methods 3 and 4. The reasons for the variations of method within each pair are not obvious, but possibly they are designed to cater for particular circumstances.

Why should insurance companies have a choice of method? Without adequate experience, a company could not use Methods 3 or 4, and these are presumably regarded as better methods than Methods 1 and 2. In due course, a company could build up enough experience to use Methods 3 or 4. Could the company change methods in mid stream? If so, what rules would there be (if any) for transferring from one method to another?

The regulations specify the transfers which must be made while the equalisation reserve is below the required amount and when there is an excess of claims. The regulations do not say whether transfers to the equalisation reserve may be higher than those specified if a company wishes to build up the reserve faster.

Moreover, suppose the equalisation reserve brought forward is greater than the required amount for the year and there is a claims shortfall so that no transfer from the equalisation reserve is needed. Presumably a company may (but need not?) transfer funds out of the equalisation reserve for general use provided the reserve does not fall below the required amount.

Aussie Rules Equalisation Reserves

Other countries have equalisation reserves - such as Finland, West Germany, and Australia. The rules for Australia in respect of MIG are as follows:

The minimum solvency margin in respect of MIG business is 2% of the aggregate risk exposed. The aggregate risk exposed is calculated as the sum, for contracts written in the last 20 years and still in force, of the excess of the amounts borrowed over 66.7% of value (residential property) or 60% of value (commercial property).

The equalisation reserve is built up and drawn upon as follows:

.   Each year 25% of earned premium is transferred to the equalisation reserve.
.   For any year, if claims incurred exceed 35% of earned premium, the excess may be drawn down.
.   After the above transfers have taken place, the amount transferred to the reserve 10 years previously may be drawn down for general use. However, this is subject to the extent to which it has been depleted by previous drawings down (which operate on a first in first out basis).

Release of Profits

Neither the shareholders nor the tax authorities would be keen on an accounting basis which tied up shareholders' capital or deferred the tax revenue for too long a period. The profits from a given cohort of business should therefore be computed as soon as they can be determined with sufficient certainty.

'Sufficient certainty' depends on the circumstances of the company. If a company writes predominantly MIG business then revisions of past estimates of profits could be a material factor in its current year's profits. So it will wish to delay the recognition of profits compared with a large company which only writes a small amount of MIG business.

Investment Income

The treatment of investment income depends on the attitude taken to the 'profits arising' vs 'value added' theories of accounting. Under the profits arising theory, investment income should only be recognized once it has actually become receivable. But the value added theory anticipates the investment income which is expected to flow from existing funds, allowing for the amount and timing of future cash flows.

III. FORECASTING FUTURE EXPERIENCE

This is a key area in both the determination of current premium rates and the provision for future claims.

There is no obvious relationship between the past and the future. The nature of the business is that there are likely to be a number of years with low incidence followed by a year or two of high claims. However, there is no guarantee that this will occur in the future. It is possible that there could be a fundamental change in the housing market leading to a readjustment of house prices at a much lower level. However it is not really possible to make any definite quantification of this type of risk. It would seem best to include this in some form of contingency allowance.

Before looking at the factors that affect the potential future experience, it is necessary to consider the situation in which a Mortgage Indemnity Guarantee insurance will become payable. This can be simply expressed as the case where the proceeds from a forced sale of the house net of all associated charges do not cover the amount of the mortgage outstanding.

1) WHAT FACTORS AFFECT THE EXPERIENCE?

In this section we list the various factors that could have an impact on the experience. Many of them are inter-related and this will be considered in the following section.

(i)   Divorce

The incidence of a divorce is likely to lead to the sale of the house; thus if various other factors are adverse this could result in a claim. Marital breakdown generally means one partner leaving the matrimonial home. The remaining partner's income to service the mortgage and other outgoings reduces. The other partner has to finance new accommodation so is reluctant to continue to pay the mortgage on the old house. Eventually the house may be sold but arrears may have built up.

(ii)   Unemployment

Unemployment is likely to lead to an inability to service the mortgage. However, the immediate impact of this may be mitigated by a Mortgage Payment Protection Policy, although the period for which claims will be paid on unemployment is likely to be limited to a maximum of around two years. In addition, the DSS may pay interest on mortgages in the cases of unemployment. However, this is strictly restricted to interest payments so that in the case of a repayment mortgage no payment of outstanding capital would be made. The possible impact on the Mortgage Indemnity Policy will be dependent upon how long the unemployment lasts. Consequently re-employment prospects are crucial. These prospects will be dependent on such factors as age, location, skills etc.

(iii)   Interest rate changes

Increases in interest rates may lead to inability to service the loan at the new high interest rates, especially for recent mortgages where money is usually tighter.

(iv)   Sickness and accidents

The impact on the ability to service the mortgage may be mitigated by the existence of external insurances, eg PHI or Creditor protection, and by any DSS benefits payable.

(v)   House prices

Really this is one of the major determinants of whether a claim will arise for even if all the other factors lead to a sale of a house, if there has been a rapid increase in house prices it is unlikely that there will be any claim under a mortgage guarantee policy.

(vi)   Real incomes

The important factor here is the real disposable income. This could be affected not only by the factors mentioned above but also by other factors such as changes in taxation or social security.

(vii)   General activity in the housing market

Clearly if it is difficult to sell a house it will be more likely that a claim will be made, as the price which can be obtained will be lower than in a buoyant market.

(viii)   Attitudes of lenders

This will vary from one lender to another. Some lenders may take a fairly aggressive attitude to arrears and foreclose quickly or alternatively institute remedial action quickly. Other lenders may take a more relaxed view and allow arrears to build up. Clearly the latter approach may lead to a larger number of claims under the insurance, and also to larger average claim amounts.

(ix)   Underwriting control

It is virtually impossible for the insurance company to exercise any underwriting control in terms of weeding out undesirable risks. The insurer is dependant on the financial underwriting adopted by the lender. The greater the degree of financial underwriting, the more likely the mortgagor is to be able to service the loan. The financial criteria adopted by the lender are also of relevance; in particular lending multiples are important.

(x)   Different types of mortgage

Different types of mortgage may well exhibit different experience. It seems reasonable to assume that there is a greater risk with deferred interest schemes especially where these schemes result in the outstanding loan increasing. Equally there is likely to be an increased risk for loans which initially offer a genuine discount on the current interest rate eg schemes for first time buyers where the initial interest rate is 1% lower for the first year. There must be some risk that in current conditions the borrower will overstretch in the expectation that by the end of the first year interest rates will have reduced.

The above gives an illustration of two different types of mortgage. In recent years, we have seen the introduction of a number of different types. Each of these different products may be expected to exhibit different experience.

2) INTERACTION OF FACTORS

A number of factors have been listed in the previous section. However, these are not independent. There is a considerable amount of inter-relation between the factors. For instance, a significant rise in interest rates may lead to one or more of the following events:

(i)   fall in real house prices;
(ii)   fall in real disposable incomes;
(iii)   rise in unemployment;
(iv)   new mortgage products;
(v)   less stringent financial underwritng.

Data is available over a long period for the pure economic factors. This is summarised in the accompanying table. To illustrate the inter-relation between various factors, graphs have been drawn for some of the factors, as follows:

(i)   House prices, earnings and RPI for the period since 1956;
(ii)   House prices, earnings and RPI for the period since 1971;
(iii)   House prices/earnings ratio for the period since 1956;
(iv)   House prices, earnings and mortgage rate for the period since 1956;
(v)   House prices relative to. mortgage rate since 1956.

There does not appear to be a clear relationship in any of the graphs.

It could be argued that many of the factors detailed are not really factors themselves but results of a change in another major factor - the current economic climate. Thus possibly the major determinant of future experience may be the financial circumstances of the particular year. However this is extremely difficult to quantify.

An alternative approach might be to look at statistics on arrears and repossessions. Statistics are available from the Council of Mortgage Lenders. However, there are limitations to these statistics. Data are only available from 1979 onwards. The data are based on returns from the largest societies and then grossed up so that there may be inaccuracies in the figures. In addition figures for later years are estimates. There are a number of other comments about the accuracy of the data in the notes produced with the figures. An increase in arrears may lead in the future to an increase in repossessions but difficulties in selling houses may lead to deferment of the claims under the MIG policy. In fact, claims may not start appearing until there is an upward movement in the housing market.

We have talked so far about national statistics. However, in many cases, individual lenders may be stronger in particular regions. Thus, in these cases, account must be taken of any particular regional characteristics eg local population changes, employment prospects, regional house prices. The existence of a single source of employment in a significant area could be a major source of future problems. There have been some historic examples of problems eg Corby with British Steel and Aberdeen with North Sea Oil.

House Prices,Mortgage Rates,Average Earnings & Consumer Prices

Year	Average Price (All) (Houses)	Average Earnings	Inc. in RPI (%)	Average Mortgage Rate (%)	Av. House Price Increase (%)	Av. House Price/ Earnings Ratio	"Real" House Inc. (%)	"Real" House Price Index	RPI	Mortgage Index	Av. House Price Index	Average Earnings Index	RPI	Mortgage Rate rel. to RPI	House Price rel. to RPI	Mortgage Rate rel. to Earnings	RPI-Adj House Price Increase %
												<-- Index=100 in 1971 -->	<---- Index=100 in 1971 ---->		
1939									100.00								
1940				5					105.00								
1941				5					110.25								
1942				5					115.76								
1943				5					121.55								
1944				5					127.63								
1945				4.71					133.64								
1946				4					130.99								
1947				4					144.54								
1948				4					150.33								
1949				4					156.34								
1950				4					162.59								
1951				4					180.10								
1952				4.4					176.54								
1953				4.5					184.48								
1954				4.5					192.78								
1955				4.76					201.96								
1956	2230	697	4.9	5.64		3.20		98.56	100.00	213.95	36.38	39.78	59.04	63.81	61.61	94.70	
1957	2280	731	3.7	5.64	2.24	3.12	-3.22	93.48	104.90	225.30	37.19	41.72	61.94	64.26	60.05	95.39	-1.41
1958	2340	756	3.1	5.64	2.63	3.10	-2.85	90.79	108.78	238.09	38.17	43.15	64.23	65.46	59.43	97.44	-0.45
1959	2360	793	0.5	5.77	0.85	2.98	-4.65	86.57	112.15	251.63	38.50	45.26	66.22	67.16	58.14	98.25	0.35
1960	2480	848	1.1	5.81	5.08	2.92	-0.09	85.98	112.71	256.46	40.46	48.46	66.55	70.70	60.79	97.10	3.94
1961	2710	896	3.4	6.31	9.27	3.02	2.79	88.37	113.96	283.28	44.21	51.14	67.28	74.35	65.70	97.82	5.68
1962	2890	922	4.3	6.31	6.64	3.13	0.31	88.65	117.83	301.15	47.15	52.63	69.57	76.44	67.76	101.06	2.25
1963	3100	966	1.9	6.06	7.27	3.21	1.14	89.66	122.90	319.40	50.57	55.14	72.56	77.73	69.69	102.30	5.27
1964	3390	1040	3.2	6.06	9.35	3.26	3.11	92.44	125.23	338.76	55.30	59.36	73.94	80.90	74.79	100.78	5.96
1965	3740	1114	4.8	6.66	10.32	3.36	3.44	95.62	129.24	361.32	61.01	63.58	76.31	83.62	79.95	100.35	5.27
1966	4040	1187	3.9	6.98	8.02	3.40	0.97	96.56	138.44	380.54	65.91	67.75	79.97	85.36	82.41	100.75	3.97
1967	4270	1230	2.5	6.98	5.69	3.47	-1.20	95.39	140.72	413.52	69.66	70.21	83.09	87.89	83.83	104.02	3.12
1968	4650	1326	4.7	7.46	8.90	3.51	1.34	96.67	144.24	444.37	75.86	75.68	85.17	92.14	89.07	103.68	4.01
1969	4850	1430	5.4	8.06	4.30	3.39	-3.50	93.29	151.02	480.27	79.12	81.62	89.17	95.11	98.73	103.91	-1.04
1970	5190	1595	6.4	8.59	7.01	3.25	-1.46	91.94	159.18	521.48	84.67	91.04	93.98	97.98	90.08	101.15	0.57
1971	6130	1752	9.4	8.59	18.11	3.50	8.77	100.00	160.36	566.28	100.00	100.00	100.00	100.00	100.00	100.00	7.96
1972	8420	1964	7.1	8.29	37.30	4.29	28.88	129.88	186.28	613.06	137.36	112.10	108.40	98.96	125.56	98.57	28.25
1973	11120	2249	9.2	9.59	32.07	4.94	20.51	162.90	198.44	671.64	181.40	128.37	117.17	101.26	154.82	92.42	20.94
1974	11130	2659	16.1	11.06	0.09	4.19	-9.87	137.61	216.89	746.00	181.57	151.77	127.95	102.97	141.91	86.81	-13.79
1975	12119	3320	24.2	11.08	8.89	3.65	-1.98	135.09	251.58	828.75	197.70	189.50	148.55	98.52	153.09	77.23	-12.33
1976	12999	3823	16.5	11.06	7.26	3.40	-3.42	130.47	312.47	920.40	212.06	218.21	184.40	86.10	114.94	74.49	-7.93
1977	13922	4170	15.8	11.06	7.10	3.34	-3.96	125.43	364.02	1022.11	227.11	238.01	214.94	83.98	105.67	75.83	-7.51
1978	16297	4749	8.2	9.55	17.08	3.43	6.85	134.46	421.54	1119.72	265.86	271.06	248.90	79.44	106.81	72.95	8.19
1979	21047	5503	13.4	11.94	29.15	3.82	15.37	155.12	466.10	1253.42	343.34	314.10	269.31	82.19	127.49	70.47	13.89
1980	24307	6725	18	14.92	15.49	3.61	0.50	155.89	517.22	1440.43	396.53	383.86	305.39	83.29	129.64	66.27	-2.13
1981	24810	7497	11.9	14.01	2.07	3.31	-10.47	139.56	610.32	1642.23	404.73	427.91	360.36	80.48	112.31	67.77	-6.79
1982	25553	8166	8.6	13.3	2.99	3.13	-9.10	126.87	662.95	1860.66	416.85	466.04	403.25	81.48	103.37	70.50	-5.16
1983	28593	8693	4.6	11.03	11.90	3.29	0.78	127.86	741.68	2065.87	466.44	496.18	437.93	83.31	106.51	73.53	6.98
1984	30812	9447	4.9	11.84	7.76	3.26	-3.68	123.19	776.80	2310.47	502.64	539.21	466.07	89.07	108.73	76.67	2.73
1985	33188	10069	6.1	13.47	7.71	3.30	-5.08	116.94	813.81	2621.69	541.40	574.71	480.52	98.36	112.67	80.56	1.52
1986	38121	10790	3.4	12.07	14.86	3.53	2.49	119.86	863.46	2936.13	621.88	615.87	509.83	101.77	121.96	84.25	11.09
1987	44220	11848	4.1	11.81	16.00	3.80	3.93	124.69	982.82	3276.02	721.37	664.84	527.16	109.74	136.84	87.02	11.43
1988	54290	12782	4.9	11.06	22.75	4.25	10.54	137.83	936.56	3638.01	885.48	729.57	552.99	116.16	160.15	88.06	17.02
1989	62135	13932	7.7	13.46	14.47	4.46	0.89	139.06	1006.6	4127.69	1013.62	795.21	606.57	122.39	170.19	91.66	6.29

Notes

"Real" = House prices deflated by mortgage rates
Average Price (All Houses) from Table 16 at mortgage approval stage
Average Earnings from Table 5 of BSA July Bulletin on House Prices & Earnings
Average mortgage rate for 1989 based on first 10 months data [source Housing Finance No. 5]
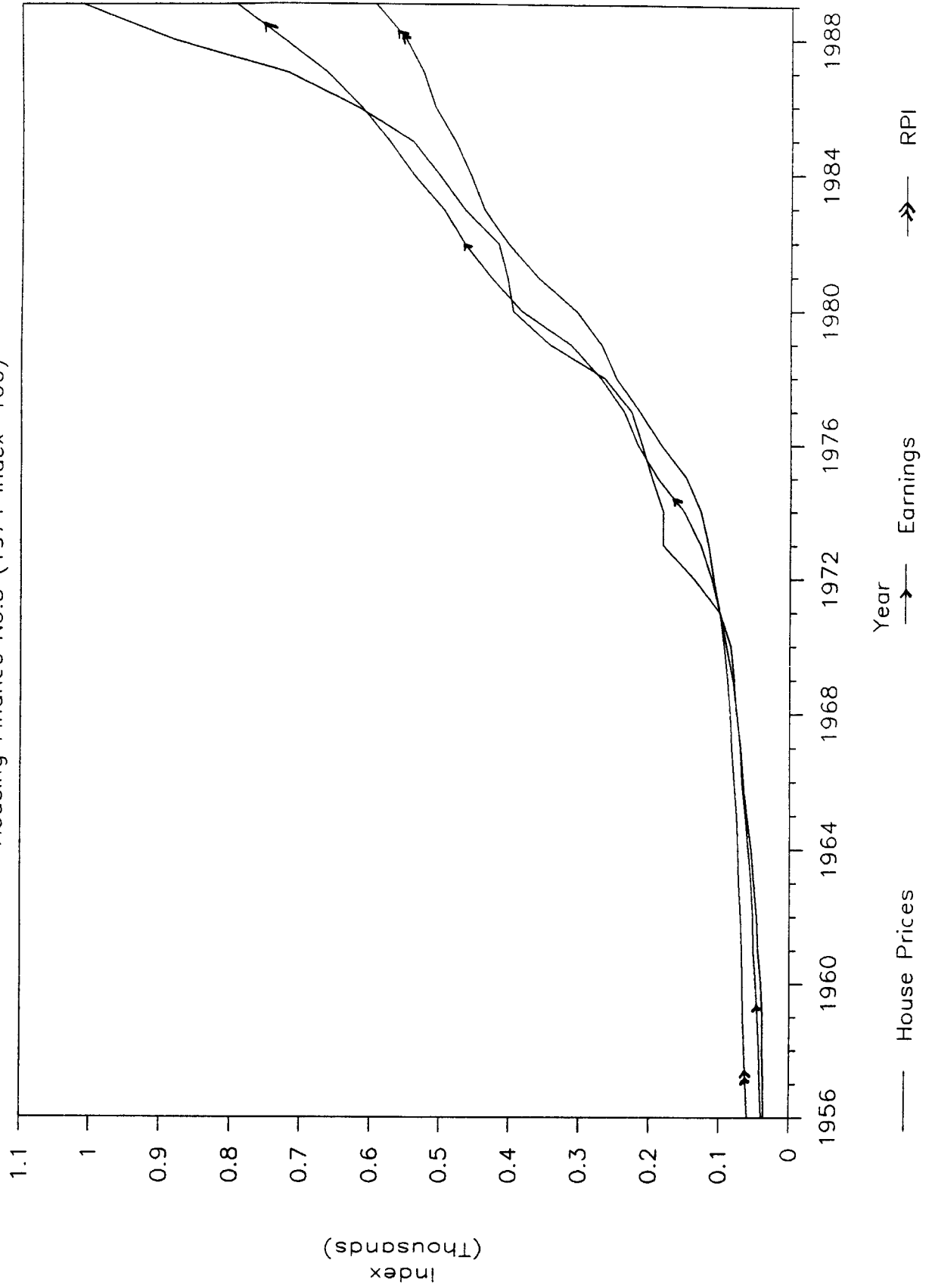
House Prices & Earnings

Housing Finance No.5 (1971 index=100)

Index (Thousands)

Year

House Prices — Earnings RPI

House Prices & Earnings

Housing Finance No 5 (1971 index=100)

Index (Thousands)

Year

House Prices   Earnings   RPI
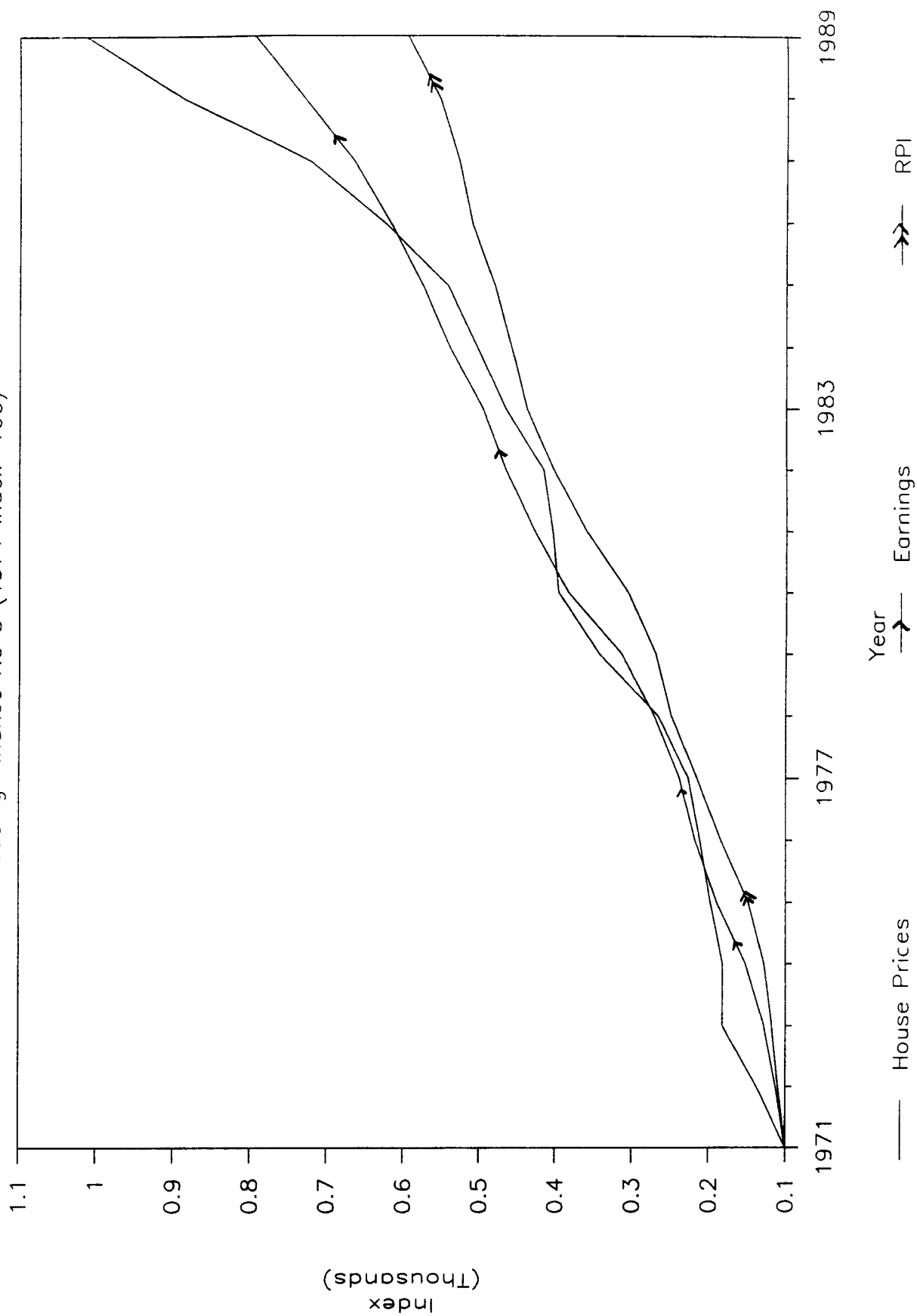
House Prices & Earnings

Housing Finance No.5
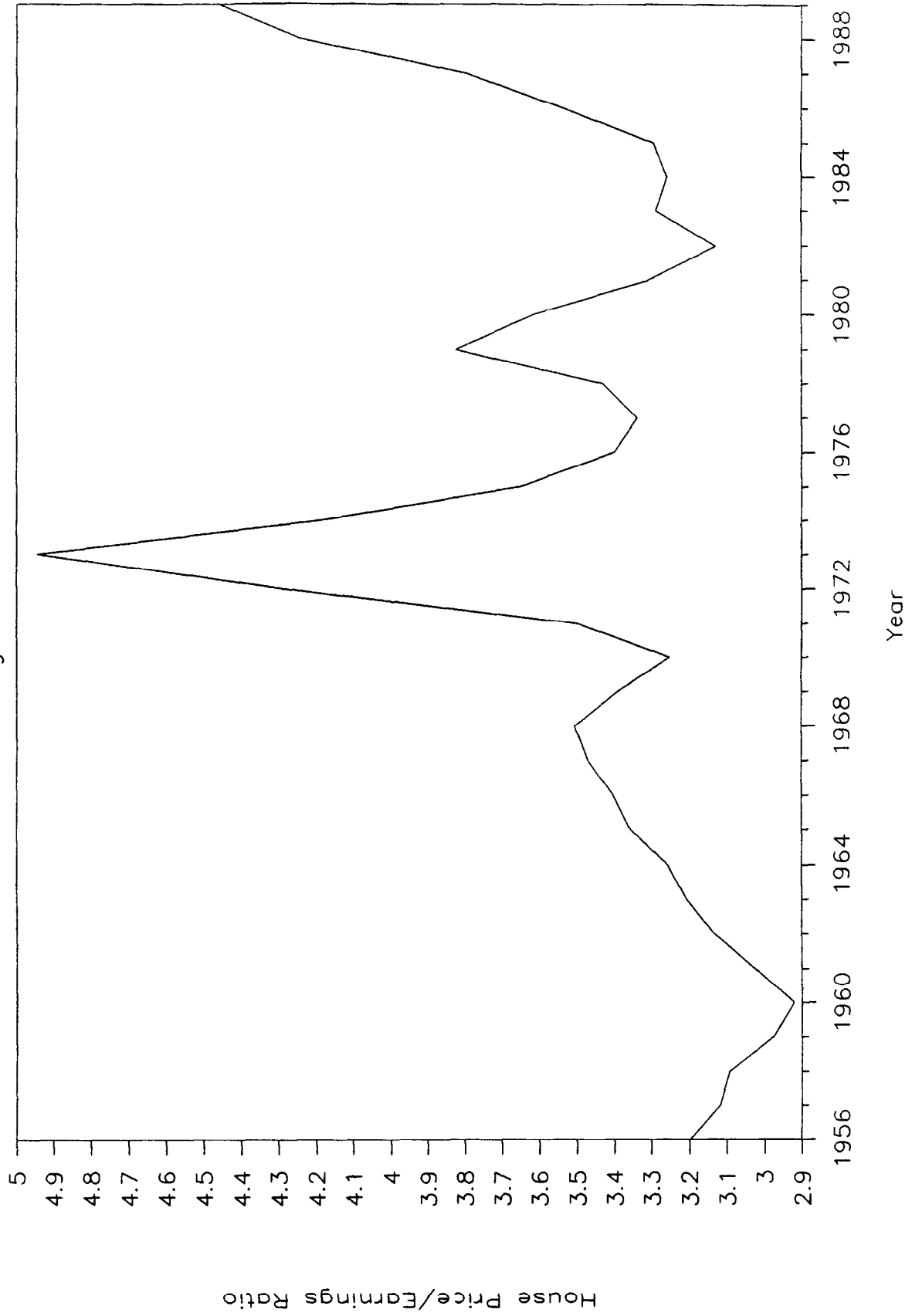
House Prices & Earnings & Mortgage Rate

Housing Finance No.5 I(71)=100

Index

Year

Mgges/RPI ——   HPI/RPI ↠   Mgges/Earnings ⇉
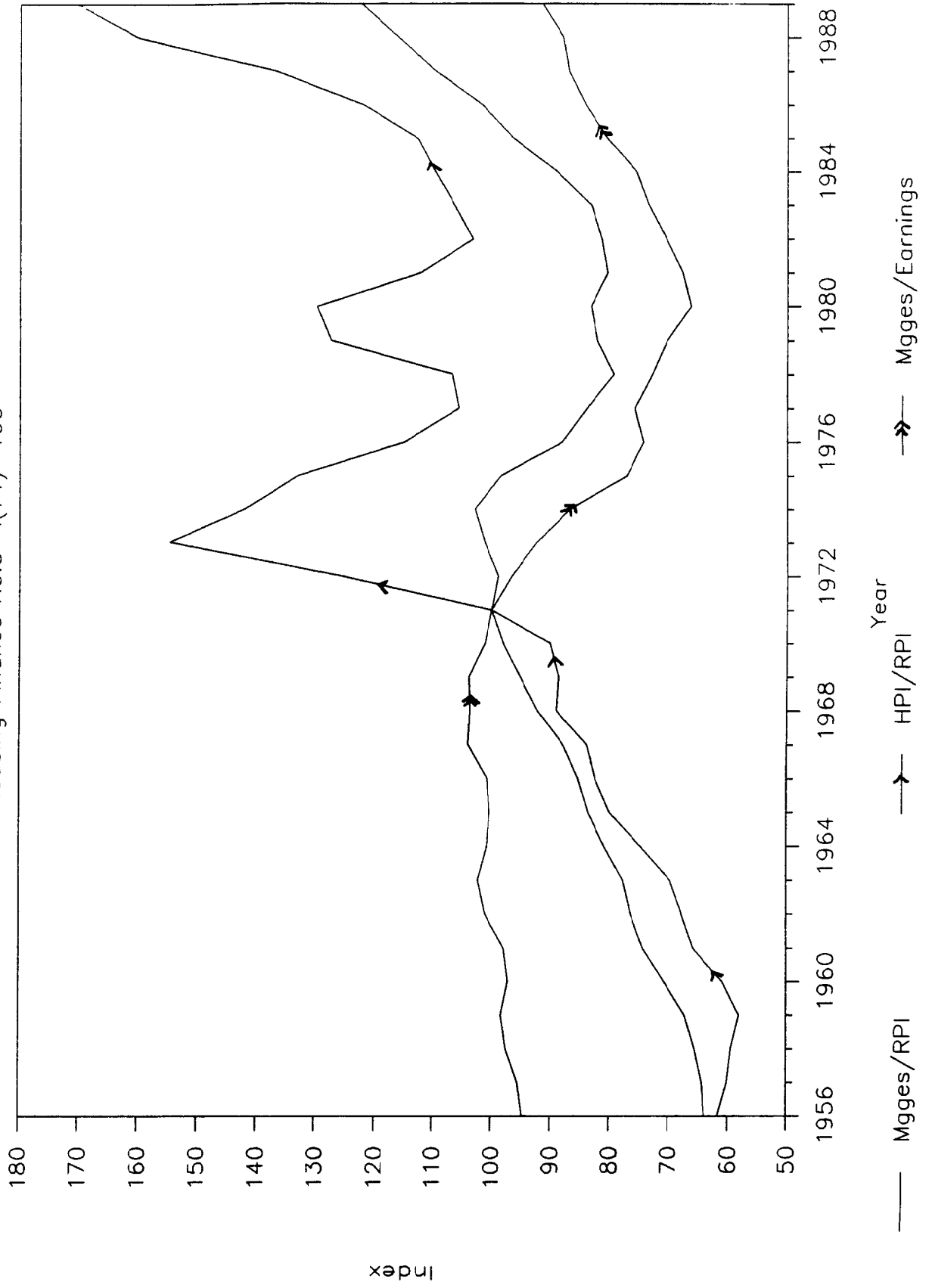
House Prices Relative to Mortgage Rate

Housing Finance No. 5 , I(71)=100
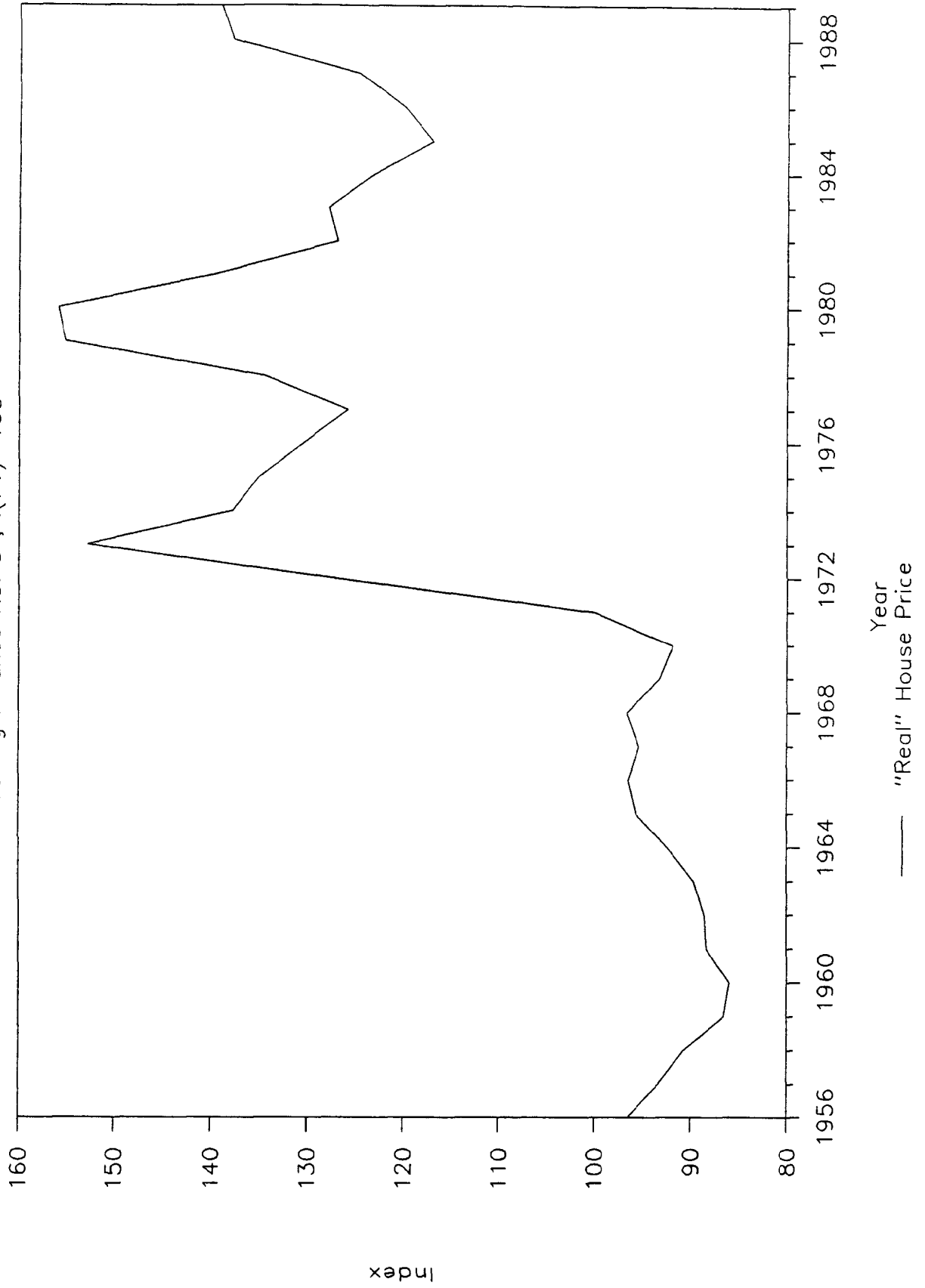
IV.   DIVERSIFICATION

1)   HOW CAN THE RISK BE DIVERSIFIED?

As mentioned in earlier sections, claims under MIG can be conveniently classed as either "economic" or "normal". The former category covers losses which arise as a result of financial problems induced by rising interest rates, falling house prices, or unemployment. These are all essentially economic. One can expect these to increase in times of economic recession. The "normal" losses are those that arise as a result of divorce or sickness which might be expected to occur independently of the economic environment. Economic losses are likely to affect the whole MIG portfolio and it is against this risk that the insurer will be looking for diversification.

There are several potential avenues the MIG insurer might try to reduce the accumulation risk.

a)   Product diversification
b)   Geographic diversification
c)   International diversification
d)   Reinsurance

a)   Product diversification

Additional products may be sold in conjunction with the MIG policy to reduce the exposure of the MIG to the economic loss potential. In particular the use of creditor insurance, which provides short-term relief on mortgage repayments in the event of unemployment, is likely to improve MIG experience.

The MIG may be linked with mortgages of a deferred nature in order to give the overall MIG book some staggering of exposure over time. However this may give rise to increased loss potential as the loan will also increase in value over the deferred period.

Mortgages denominated in ecus/foreign currency may help to spread the risk associated with the MIG book.

b)   Geographic diversification

A good spread by region of the UK will undoubtedly reduce the chances of the total portfolio of MIG business being affected by an economic downturn. This may be achieved by restricting the proportion of the lending in any one postcode area. However, the proportion of loans requiring MIG cover will also vary by area.

c)   International diversification

Whilst this does have the obvious advantage of reducing the overall susceptibility of the portfolio to the economic risk, it does necessarily entail a considerable alteration in product specifications to fit in with the very different role undertaken by MIG overseas. The table giving a brief international comparison of residential mortgage markets illustrates some of the differences.

Brief International Comparison of Residential Mortgage Market

Typical Characteristics	Country					
	UK	USA	Australia	Canada	Holland	Belgium
Mortgage Type						
Amortizing/Endowment	85% Endowment	Amortizing	Amortizing	Amortizing	50% Endowment	Amortizing
Interest:Fixed/Variable	Variable	Fixed/Variable	Variable	Fixed (25 years)	Fixed (25 years)	Fixed
Term	25 years	15 or 30 years	25 years	1/3/5 years	5/10/15/20 years	20/25 years
Interest Rate Charged directly linked to funding source?	No	Yes	No	No	No	No
Tax Incentives						
Interest Relief	first £30,000	Yes	No	No	No	No
Capital Gains Exemption	primary residence	No	Yes	primary residence	No	No
Underwriting Standards	Non-standard	Standard	Non-standard	Non-standard		standard
Forbearance of Lender	common	uncommon	common	uncommon		
Federal Insurer	No	Yes	Yes	Yes	Yes – on Town Mortgages, but limited value	No
Loan Repaid	On moving					
Comments			"Lifetime" mortgages move with borrower		MIG business in form of "Top-Up Mortgages" Charged on annual basis.	OCCH provide all loans to 70% LTV level. i.e State controlled. Loans given to 125% of house value! MIG rates apply to total loan.

There is also an increasing economic interdependency between different countries, particularly within the EEC, which will mitigate the success of international diversification.

d)   Reinsurance

In theory, stop loss reinsurance would be the most suitable form of protection against the accumulation risk. Unfortunately for insurers, this cover is generally not available, or, if it is, only at a very high price.

2)   ARE THERE COMPARABLE PRODUCTS OVERSEAS?

The table on International Comparisons gives some background information on the markets (under "Comments"). It is important to recognise the differences in cover provided under the general banner of MIG-type insurance. In particular the different treatment of interest arrears, estate agency and legal fees in apportioning claims should be considered carefully when comparing different MIG contracts. For example, in the USA MIG cover is given under the title of Primary Mortgage Insurance (PMI). This cover excludes the estate agency fees, and apportions the other costs and interest arrears according to the original cover provided (see example in Appendix 3).

In the UK, mortgages are advanced to individuals using the property as security. An alternative which is practised in Denmark is for the mortgage to be attached to the property. When the property is sold the mortgage passes on to the new owner. In Australia, "lifetime" mortgages are now being advanced which attach to the individual in the sense that the mortgage moves with the individual whenever he/she moves.

These examples serve to illustrate the very different housing market backgrounds applying in different countries.

3)   IS THERE AN INTERNATIONAL OR EEC FACTOR?

The international aspect has already been touched on in discussing means of diversification. Of particular concern to the UK MIG market is the increasing involvement of overseas insurers and the banking community at large in the financing of mortgage business. There have been three main spurs to this over the past eight years:

i)   Ending of the monopoly of mortgage provision by building societies in 1982.

ii)   Start of alternative funding arrangements to the traditional "retail" method. This began in the UK in 1987 with wholesale funding and mortgage pool securitization issues.

iii) Increasing cross-border trading within the EEC in the run up to 1992 is leading to greater interest in the UK insurance market being shown by foreign insurers (notably from France).

V. MORTGAGE POOL INSURANCES & SECURITIZATION

. MPI: What is it?
. Securitization: background & structure
. Are the capital requirements sensible?
. How should the risks on the secondary mortgage market be covered?
. Is MPI insurance or banking?

It should be appreciated from the outset that the Mortgage-Backed Securities (MBS) market is BIG, and GROWING RAPIDLY (see Appendix 4, "Miscellaneous Background Market Statistics", and the details of activity in 1989, as described in Appendix 5). The use of securitization is a means of transferring large blocks of potential future cash flow from one party (the originator) to another (the investor).It is currently the main way in which MBS are created. Insurance, in the form of Mortgage Pool Indemnity (MPI), is sometimes used to make the investment more attractive.

The MBS market provides one of basically three ways of financing mortgage business. The other ways are firstly the traditional method of raising money from the public via deposits and short-term savings, and lending this out in the form of mortgages. This may be classified as retail funding. Secondly the lending institutions may raise funds from the money markets, and this is now widely practised by Building Societies to help smooth their mortgage lending. (Up to 40% of their liabilities can be made up of this type of wholesale funding.)

MPI: What is it?

A Mortgage Pool Indemnity (MPI) applies to a pool of mortgages grouped for insurance purposes. It may be arranged in conjunction with a securitization - which will be discussed in the next section - but this is not necessarily the case.

If a mortgage lender has insufficient funds of its own available for lending, it may seek to borrow in the wholesale money market to finance further mortgage lending. This will be viable provided a sufficient margin between lending and borrowing rates of interest can be achieved. The rate of interest payable on borrowings will depend on the credit rating of the associated pool of mortgages, and so the lender will seek to enhance the credit rating of the pool in order to reduce its interest charges. This is achieved by arranging a MPI with an insurer which itself has an excellent credit rating, and is known as "rate enhancement".

The object of the MPI is to improve the security of the mortgage pool by covering potential losses arising as a result of defaults by borrowers. It thus provides a form of global protection for the pool, and operates after such MIG covers as are in force on individual mortgages. Where the pool includes loans in excess of the normal advance, these will be covered by MIG in the usual way, and in the event of default, these covers will reduce the loss to the pool which would otherwise arise.

The losses to be covered by the MPI will be of two types:

i) Losses following default on cases where the loan was below the normal advance and so no MIG cover was purchased.

ii)   Normal losses on cases where MIG cover was in force but where a normal loss was also sustained, i.e. the sale proceeds were insufficient to cover the normal advance plus the outstanding interest on it.

This assumes of course that there will be no problems with the security of MIG insurers.

Securitization: Background & Structure

In general, credit securitization is the carefully structured process whereby loans and other renewable forms of credit are packaged, underwritten and sold in the form of securities.

Compared with more traditional methods of raising debt by the issue of bonds etc, credit securitization has the following advantages:-

1.   It isolates the loans from the originator's balance sheet.   The originator's capital is not tied up.

2.   Credit securitization typically splits credit risk into three or more tranches and places it with the institutions that are in the best position to absorb it.

The first tranche is the "expected" or "normal" rate of portfolio credit loss. This is borne by originator who has direct contact with the borrowers.

The second tranche covers losses above the originator's limit, and is in effect the catastrophic losses.   Typically a layer of 7 to 8 times expected losses is written if there are no assets backing the loans.   This layer is borne by the credit enhancer (eg mortgage pool insurer) who diversifies the risk by taking a number of separate pools.   The risk of loss is covered by a guarantee fee or premium.   There is clearly a strong analogy with reinsurance of property and casualty business.

The third tranche is the higher risks.   These are borne by the investors purchasing the securities.

In the UK when the loans are backed by property, the second tranche may cover all losses, and the higher risks are not borne by investors. If there were no property backing the debt, then a layering of risks should be used.

3.   Credit securitization segments interest rate and mismatching risk so that it can be tailored and placed among the most appropriate investors.

The originator absorbs no interest risk.   This is sold on to the investors. Mismatch is absorbed through interest rate swaps.   Prepayments are absorbed through guaranteed investment contracts.

The cost of capital is therefore significantly reduced.

4.   With credit securitization, regulators can require capital to be deployed in a way that covers risk more effectively.   A substantially higher volume of debt can be raised by this approach.

5.   Credit securitization permits the orderly reduction of low skilled, excess lending capacity.   The weak companies who write low quality risk are theoretically underwritten out of the market.

6.   Credit securitization could lead to a far more stable and less costly financial system.

A transaction in the credit securitization market may be termed a structured finance arrangement, and will have the following features:-

1) Cash flow from underlying assets is packaged to attract target investors.

2) Tax and accounting needs of both borrowers and investors are satisfied.

3) Credit criteria applied to the asset pool will generate an efficient use of funds.

4) Bankruptcy or insolvency of the originator will not interfere with the timing of proceeds from the assets in making final repayments.

The following aspects need particular consideration when setting up a structured finance arrangement:-

1) The credit rating of the asset-backed issue, which is separated from that of the originator. Typically the originator sells assets to a special purpose vehicle (SPV) to protect the investors from the bankruptcy of the originator.
   (a) Transfer must be a <u>true</u> sale and not a pledge.
   (b) SPV must file documents to confirm receipt.
   (c) SPV must be structured in such a way that it cannot engage in activity which would cause it to become bankrupt. There are restrictions on the purchase of assets and issue of debt.
   The type of SPV depends on location and law.

2) The legal form selected for the issue. It may be a trust.

3) Tax considerations.

4) Security Law considerations.

5) Accounting treatment of asset-backed issue by the originator. It must be off balance sheet.

In the US examples of types of credit which have been packed as structured finance arrangements are as follows:-

1) Mortgages.

2) Vehicle Loans.

3) Credit Card Loans.

4) Lease receivable.

5) Commercial mortgages.

6) Non-conforming residential mortgages.

7) Receivable-backed commercial paper programmes.

Securitization Issue Details in the UK

This section will consider securitization of residential mortgages only.

In the jargon potential investors are usually offered "FRNs linked to 3 month sterling LIBOR", i.e Floating Rate Notes (FRNs) linked to London Inter Bank Offered Rate (LIBOR). The rates are floating because mortgages in the UK are usually variable rate loans.

The interest rate is typically 32.5 bps / 50bps above LIBOR, meaning that the interest rate on the notes is 32.5 basis points above LIBOR (1 basis point = 0.01%) during the first seven years of the issue, rising to 50 bps above LIBOR thereafter (if it remains outstanding after 7 years). Recent issues have been made at much lower margins above LIBOR, reflecting their attractiveness from the investor's point of view.

Insurance may be used to provide security on the principal. For the investment to secure a AAA rating from the credit rating agency Standard & Poor the insurer must be of similar credit rating.

Brief details of two MBS issues are shown in Appendix 6. These illustrate two different ways of providing credit enhancement, namely by insurance (NHL First Funding Corp) and by subordinated notes (NHL Second Funding Corp).

The mortgage rate needs to be at least 75bps above LIBOR. This is needed to provide servicing of the notes (typically about 0.25% of the outstanding mortgage debt), pay the investors and the insurers, and also cover the deductible imposed on the mortgage pool by the insurer.

The attractions of MBS investment may be summarised as follows:

a)   Enhanced by excellent credit ratings (mainly AAA). The perceived security of these issues is very high;

b)   Declining size of the UK Gilt Market;

c)   Capital Asset Requirements. This form of investment is very attractive to banks following the paper published by the Bank of England in 1988 on the implementation of Capital Adequacy Requirements (commenced February 1989). MBS holdings only attract a 50% weight (cf 100% weight for Corporate Debt) for the calculation of the 8% minimum capital adequacy standard, thereby increasing the return on capital achieved by holding MBS in preference to Corporate Debt.

   e.g holding of £10m of Corporate Debt at 15.2%, funded at 15%

capital required at 8%	800,000
return on capital	17.5%
if instead hold £20m of MBS at same	
rates capital required at 8% on	
weighted assets	800,000
return on capital	20.0%

   However it should also be noted that some banks may be obliged to offload some of their mortgage book , say using securitization, in order to increase their free capital ratio up to the 8% level.

d)   Tax position. At one time their status as "Non-Corporate Bonds" allowed them to benefit from capital gains indexation as they were "non-qualifying" under the 1984 Finance Act. However subsequent to 1989 Budget this loophole has been closed off.

e)   High yields are currently available on these issues.

f)   The Junk Bond collapse makes the alternative corporate bond market very unattractive, especially in the US.

Potential Insurance Market

The insurance is normally on some 5-10% of the total mortgage pool, the size depending on the degree of credit enhancement required to boost the issue to a satisfactory credit rating status. A lower quality mortgage pool will require a higher level of insurance protection. The insurance premium is typically of the order of 0.35%-0.7% of the total pool value. Thus, to give some indication of the insurance market size, the total premium on the £3b of notes issued in 1988 in the UK, if they had all been insured, would have generated around £ 16 million.

There is the possibility of a potential explosion of the market. First, the banks and building societies in the UK are looking to become more capital efficient, by transferring mortgages off their balance sheets. Secondly, the US problem with their Savings & Loans debacle has necessitated a massive packaging and resale of the mortgage portfolios. It is reckoned that there is $100 billion of assets to liquidate over the next three years, and this could well result in cover being required from the insurance markets to enhance MBS issues.

Is MPI Insurance?

MBS credit enhancement can be achieved using either the banking or the insurance route. It is questionable whether the enhancement (in the form of a financial protection on the pool) counts as insurance, as it barely meets all the following criteria, which have been suggested as necessary for insurability (reference "Limits of Insurability of Risks" by Baruch Berliner).

> randomness of the loss occurrence
> maximum probable loss
> average loss amount per occurrence
> average period of time between two loss occurrences
> insurance premium
> moral hazard
> public policy
> legal restriction
> cover limit

MPI suffers from losses that are not really random, but are linked to the economic environment. Whilst the members of this working party do not believe this makes the class uninsurable, it is as well to be aware of the divergent opinions held on this issue.

Banking versus Insurance : Capital requirements

It is interesting to compare the relative attractiveness to a bank and an insurer of offering the protection. The insurer has a minimum solvency requirement of, say, 18% of premium, whereas the bank has capital requirements of 8% (4% if asset-backed) of the asset value. [Incidentally, Building Societies have a minimum asset ratio of 1.2%.] The bank would receive whatever interest was offered on the subordinate loans each year it held the asset. The insurer would receive a single premium to cover essentially the same risk.

Types of Credit Enhancement

a) Pool Insured Transactions. The value depends on

    1)   adequacy of the level of support
    2)   quality of the insurer
    3)   timeliness of claim payments
    4)   defenses available to the insurer for non-payment of claims

b) Senior/Subordinated (or "A/B", "Senior/Junior") Transactions. Alternative to a). The subordinated FRNs provide the credit protection for the senior FRNs. Whilst this may not be as liquid as third party credit enhancements it will usually provide more comprehensive coverage. Also likely to be less susceptible to potential downgrade as it is more resilient and versatile.

c) Commercial Paper Transactions. Moody's believe this could start to be utilised in the future to provide mortgage funding.

Factors Affecting the Insurance Premium

There are many factors involved in assessing the required insurance premium. Many of these will also need to be considered by potential investors to any securitization issue. Appendix 7 shows the factors used by the credit rating agencies, Moodys and Standard & Poors, for their assessment. Any deviation from the benchmark set for a "prime" mortgage pool will require an appropriate adjustment to the insurance premium.

The following list is purely illustrative of kinds of adjustment that might apply

    -   Whether further mortgage advances & substitution are permitted

    -   Is there a "sweep up" facility after say 10 years to limit life of issue?

    -   Prepayment Rate: ie the speed at which mortgages are paid off. Experience on MPIs to date (1987-8) suggests a prepayment rate of 13%-23% p.a

The above factors will affect the expected period of exposure. A loading to the rate will be made for any significant extension of the anticipated lifetime of the pool.

    -   Underwriting Practices
        a)   loan to income ratio (better to look at income gearing)
        b)   status of borrower

    -   Mortgage products sold
        A loading will apply if the products are perceived as riskier such as deferred interest mortgages, or if unusually high income gearings are permitted.

    -   LTV profile

    -   Mortgage indemnity for high LTVs
        A discount might apply if an unusually high proportion of the pool is covered by MIG. This is because MIG covers the costs of repossession and sale in addition to the top slice of loan and interest.

    -   Deductible of the Pool
        Typically 0.5% of the total mortgage value. Higher deductibles would warrant a discount.

Miscellaneous Catastrophe Potential.   Could arise as consequence of non-economic factors e.g
a)   environmental health scares (unsafe building material say)
b)   new rail route blighting property within immediate vicinity.

The insurer would load the rate for unusually heavy concentrations of risk e.g. by location, or due to high value properties.

VI. COMMERCIAL LOSS RISKS

Commercial Loss Risks take a number of forms. There are two distinct groups:

1) Those that relate to the performance of contractual obligations in the construction of property, that is, if the contractor should fail in his obligations to build the construction, then the insurer meets the difference between the actual cost of completion of the construction and the initial expected costs.

2) Those that relate to the guarantee of the performance of a lessor in a completed property.

The first group is not included in this note. Suffice it to say that such guarantees are mainly "insured" by banks, and insurance operations who have been involved in such insurances often have tales to tell. The risk can be a political risk, and the insurer could find itself the owner of partially completed projects (eg a Lloyds syndicate owned a substantial number of partially completed construction projects in Venezuela following a coup),

The second category of risks is more akin to the MIG products, and forms a clear step in the process of development of products providing credit rating enhancement.

To explore how this market developed we need to give a few examples from the real world.

1. AIRCRAFT LEASING

The leasing of an aircraft involved transactions between a number of parties.

1) The aircraft manufacturer sold the aircraft to the leasing company.

2) To finance the purchase, the leasing company derived funds from outside third parties at a low rate of interest.

3) The leasing company leased the aircraft over a period of years to an airline.

The airline had a number of alternatives:

a) It could purchase the aircraft outright.

b) It could borrow money itself from the bank to finance the purchase.

c) It could lease the aircraft.

The option chosen depended on two factors, namely the ability of the airline to raise capital at the required interest rate, and tax breaks. Invariably the greater stability and credit rating of leasing agencies, plus the tax breaks, meant the leasing route was chosen.

At the end of the leasing period, however, the leasing company was left with an aircraft which might be of some value. The airline might have an option to purchase at a nominal amount, and so on. The whole operation therefore depended on:

a) The ability of the leasing company to find a new airline to lease the aircraft in the event of default by the initial airline.

b)   The value of the aircraft at the end of the leasing period.

If one could find someone to insure such risks, then the whole transaction was not one of aircraft leasing, but of compound interest with known margins.

This lead to Residual Value Insurance (RVI) whereby the value of the aircraft at any point in time was guaranteed. This covered the risk of default, because the leasing company had the right to sell the aircraft in the event of default (or receive compensation based on the current residual value if the value of the aircraft fell below that amount).

Typical residual values started at 10% of initial purchase price after 10-15 years. The financing of such business has meant this residual value is now higher, but it should be noted that a 10 year old 747 is now worth more than the initial purchase price!

2.   PROPERTY INSURANCE

This follows a similar pattern. A company wishes to raise finance in respect of a building it currently owns. This is available providing:

a)   The rents raised from tenants (less other costs) exceed the interest payable on the loan.

b)   The value of the property at the end of the period exceeds the amount of the loan, and, in the event of default, can be taken in lieu of a repayment.

Insurers can:
i)   Guarantee the rental income (this is clearly related to the tenancy).
ii)   Guarantee the residual value (again this is related to the availability of tenants).

Banks tend to take the risk up to 60%-70% of the property value, and need guarantees above this amount.

Sometimes, properties are pooled to raise money, and, in addition to the actual properties, a lien is taken on the balance sheet of the company so that the total properties against which the lien is held exceed those involved in the financing.

Areas to consider in commercial loan insurance are:

1)   The quality and number of tenants.

2)   The need to ensure other insurances are being maintained, or that the default is not triggered by a non-covered event.

3)   The need to ensure the property is maintained to the highest standard.

4)   The balance sheet of the company.

5)   The spread of properties in a pooling arrangement.

Other underwriting considerations are also important, such as:

i)   The local economy.

ii)   The difference between the rent and the interest. What happens if the largest tenant leaves?

iii) The length of the leases. Are they to be renewed during the period?

iv)   The quality of the building, with respect to new technology.

v)   Whether the use of the property can be transferred.

An interesting development that has arisen recently is the extent to which brokers think that such a guarantee can be given.

a)   Initially the residual value for aircraft leasing was 10%. It is now rising upwards - but it is thought not to have exceeded 70%.

b)   The loan to value ratio for commercial properties was initially 50%. Loan to value ratios of 80% or higher are now considered.

c)   Mortgages.

      The advent of variable mortgages has meants that a LTV of 100% may be exceeded! For example, a pool of properties was to be insured so that essentially at the end of a period of 20 years their value was to have increased in line with inflation during the period.

LENDING CRITERIA

When requested by a lender to provide a quotation for their MIG insurance requirements, the insurer will require a copy of the lender's detailed lending criteria. Within such criteria reference will typically be made to the following:

-   Type and nature of properties which the lender is prepared to accept as security (i.e. construction, age, usage, tenancy and geographical location).

-   Maximum and minimum size of loans (including loan to valuation ratio restrictions).

-   Income multiple requirements ("standard" would be 3 x prime applicant's income plus 1½ x second applicant's income or 2½ x joint applicants' income).

-   Details of what may be included as income (overtime, bonuses or other additional payments) and the manner in which these may be used to establish the maximum loan available.

-   Applicant status requirements. These may include the following:-

    Employer's reference/previous employer's reference
    Previous lender's reference
    Landlord's reference
    Voters' roll check
    Credit search check
    Age requirements
    Nature of employment requirements
    Production of audited accounts (self-employed applicants)

-   Limits beyond which MIG insurance is required (normal advance limits).

-   Appointment of valuers.

-   Appointment of solicitors.

-   Acceptable repayment methods (repayment, endowment, pension backed etc.)

-   Minimum and maximum term of mortgage.

-   Availability of remortgages and further advances.

The insurer will need to be satisfied that the criteria are prudent and that any limits which it wishes to place on its writing of MIG insurance will not be exceeded.

MORTGAGE PRODUCT PROFILES

A lender may offer a variety of mortgage products; for each product, status requirements, income multiples, loan to value ratios, Maximum Advance and Normal Advance limits are likely to vary. It is essential therefore that the insurer has full details of all mortgage products offered for which MIG cover is sought, if details have not already been incorporated within the Lending Criteria.

The term "plain vanilla" is often used for a standard repayment, endowment or pension backed mortgage under which the lender requires "Full Status" enquiries to be completed. "Full Status" enquiries will generally incorporate all of the following status checks:

- Previous lender's or, if no previous lender, landlord's reference.

- Employer's reference, including confirmation of salary and position.

- If applicant is self-employed, production of 3 years' accounts from a qualified accountant.

- A credit search (from UAPT or CCN agency).

- A voters' roll check.

Sometimes under specially agreed schemes a lender is prepared to offer to forgo some of the "Full Status" checks in exchange for a high level of equity input from the applicant; such products are often referred to as "Semi-status", "Non Status", "Express", "Fast Track", or "High Quality" mortgages. Frequency, because of the high level of equity input by the borrower (i.e. loans restricted to 60 or 70% of valuations), MIG insurance will not be sought by the lender. However, driven by the relentless search to have the competitive edge in the market place, requests from lenders for MIG insurance in respect of such products are now becoming more common. Such requests need to be treated with caution.

In recent years a variety of "Low Start" products have been introduced by lenders. All such products work on the principle of deferring some element of mortgage repayment in the early part of the mortgage, deferred amounts being added to the principal sum at some later date. Whilst the subsequent cost of the mortgage will increase, the repayments in the early part of the mortgage will be lower. In theory therefore the debt burden upon the borrower is reduced, although often this advantage is to a certain extent eroded by the lender making available increased income multiples under such products. All such schemes require careful consideration before agreeing to write MIG cover.

New mortgage products are constantly being developed by lenders; more recent examples are mortgages which utilise Unit Trust Funds or Personal Equity Plans (PEP's) as repayment vehicles as opposed to more conventional methods such as an endowment policy.

Each new product will require careful consideration in order that the insurer can be satisfied of the viability of the proposed product and the impact the product profile is likely to have on any MIG insurance arranged in connection with it.

Specially agreed terms and rating are likely to be applied to non "plain vanilla" mortgages.

PREMIUM REFUNDS

Generally no return of premiums for cancellation of cover, i.e. early redemption of a mortgage benefiting from MIG cover, will be entertained. There will however be a number of existing insurance connections where in the past negotiations have been completed agreeing a scale of refunds or premium which may be allowed in the event of early redemption. It will be necessary therefore to refer to the Mortgage Indemnity Acceptance Authority Agreement or relevant correspondence to establish the agreed position for any specific lender. Nevertheless, the current general philosophy for new insured connections is that, unless a mortgage is redeemed within the first six months from the original date of mortgage and in addition the borrower specifically requests a refund from the lender, no rebate shall be given.

The following points demonstrate that whilst the MIG cover extends for the life of any mortgage (normally 25 years) the MIG policy is most at risk within the first 2/3 years of a mortgage and therefore any refund of premium agreed after such a period is to a large extent unjustified.

- In the early years of a mortgage the monthly payments represent a significant debt burden upon a borrower in terms of total percentage of income. In subsequent years, for the majority of borrowers, such debt burden will become lighter as a result of increases in salary (cost of living increases and/or promotion). A borrower is therefore far more likely to default within the early years of a mortgage.

- History indicates that in the long term property values increase. Such increases will be to the benefit of MIG insurers in the event of foreclosure.

- In the later years of a mortgage, the surrender value of any life contract effected as a repayment vehicle is likely to be significant and this may be available to relieve the oustanding debt.

SPECIMEN CLAIM CALCULATIONS

Calculation A

In this case the MIG premium was £39.20, having been calculated at the rate of £2.80% on an amount of £1400.

The normal loss was nil, so no loss was suffered by the lender.

The claim amount was £2805.40, or just over twice the amount on which the premium was calculated. The costs associated with the re-possession and sale amounted to £1942.66, or 69.2% of the claim amount.

Calculation B

In this case the MIG premium was £51.48, having been calculated at the rate of £3.30% on an amount of £1560.

The normal loss was £2367.09, or 35.5% of the total deficiency.

The claim amount was £4294.88, of which the costs associated with the re-possession and sale amounted to £2249.21, or 52.4%.

In this case it appears that the property value had fallen by about £2000.

STATEMENT OF CLAIM

Actual Advance as stated in Guarantee Policy .... £ 15000.25

Guarantee Premium (if debited) .... £ 39.20

Plus interest on actual advance calculated from the commencement of
the mortgage up to the date of completion .... £ 5574.94

Plus Outgoings:-

Litigation	£	489.60
Inspection fees	£	92.00
Repairs	£	125.58
Administration fees	£	156.00
Rates	£	–
Ground rent/Service charges/Feu duty .	£	–
Housebreaking Insurance	£	50.00
Insurance premium	£	119.49
Legal costs of sale	£	520.77
Selling commission	£	267.37
Advertising costs	£	121.85
Inventory fee	£	–
Factor charges	£	–
Other items	£	–

£ 1942.66

£ 1942.66

Less HII claim .... £ 1942.66

£ –

Total £ 22557.05

Less Repayments
(All subscription and Principal Repayments from commencement of
the Account but excluding amounts relating to the Combined Life
Advance – ordinary subscriptions and voluntary repayments to be
apportioned if necessary.
N.B. – Exclude fines of Redemption Fees due or debited and not
paid for in cash)
£ 4251.40

Property sold for £18305.65
Less Special Surrender Value £15500.25
Deficiency .... £ –
£ 2805.40

Deficiency .... £ 2805.40

Deduct Normal Loss (if any) .... £ Nil

Amount claimed for Settlement .... £ 2805.40

Normal Advance
(Actual advance (as shown opposite) less amount of Guarantee Policy) .... £ 19,600.25

Plus Proportionate Interest
(Calculated :-

Interest on actual advance X normal advance
Actual Advance

) .... £ . 5054.62

£ 1942.66

Total £ 18654.87

Less Proportionate Repayments
(Calculated :-

Repayments on actual advance X normal advance
Actual Advance

) ....

Property sold for .... £ 14800.27
£ 15500.25

Normal Loss (if any) .... £ Nil

CALCULATION A

STATEMENT OF CLAIM

Actual Advance as stated in Guarantee Policy .... £ 7569.07

Guarantee Premium (if debited) .... £ 51.48

Normal Advance
(Actual advance (as shown opposite) less amount of Guarantee Policy) .... £ 6014.07

Plus interest on actual advance calculated from the commencement of
the mortgage up to the date of completion .... £ 4918.84

Plus Proportionate Interest
(Calculated :-

$$\text{Interest on actual advance X normal advance} \over \text{Actual Advance}$$

.... £ 3908.30

Plus Outgoings:-

Litigation	£	186.00
Inspection fees	£	92.00
Repairs	£	180.50
Administration fees	£	171.00
Rates	£	-
Ground rent/Service charges/Feu duty .	£	-
Housebreaking Insurance	£	25.00
Insurance premium	£	305.00
Legal costs of sale	£	178.25
Selling commission	£	115.00
Advertising costs	£	799.81
Inventory fee	£	-
Factor charges	£	-
Other items	£	299.00

£ 2351.56
£ 102.35

£ 2249.21

£ 2249.21

Total £ 14748.60

Total £ 9922.37

Less HBI claim ....

Less Repayments
(All subscription and Principal Repayments from commencement of
the Account but excluding amounts relating to the Combined Life
Advance - ordinary subscriptions and voluntary repayments to be
apportioned if necessary.
N B - Exclude fines of Redemption Fees due or debited and not
paid for in cash) .... £ 2586.38

Less Proportionate Repayments
(Calculated :-

$$\text{Repayments on actual advance X normal advance} \over \text{Actual Advance}$$

.... £ 2055.03

Property sold for .... £ 12162.22
                                 £ 5500.25
                                 £ 7867.34
                                 £ 5500.25

Less Special Surrender Value .... £ -

Deficiency .... £ 6661.97

Normal Loss (if any) .... £ 6661.97
                                     £ 2367.09

Deficiency .... £ 6661.97

Deduct Normal Loss (if any) .... £ 2367.09

Amount claimed for Settlement .... £ 4294.88

Normal Loss (if any) .... £ 2367.09

CALCULATION B

House Price Fall	Total Loss	MIG Loss	PMI Loss
-25%	4,250	4,250	4,250
-15%	13,750	13,750	13,750
-5%	23,250	23,250	23,250
5%	32,750	32,750	24,600
15%	42,250	37,250	24,600
25%	51,750	36,750	24,600

Comparison of MIG & PMI Insurance
L=95%,K=75%,E=5%,Sale,I=20%,O=£9,000

Original House Value = £100,000

Loss to Insurer (Thousands)

House Price Fall — Total Loss — MIG — PMI

Appendix 3 : Comparison of MIG & PMI Insurance
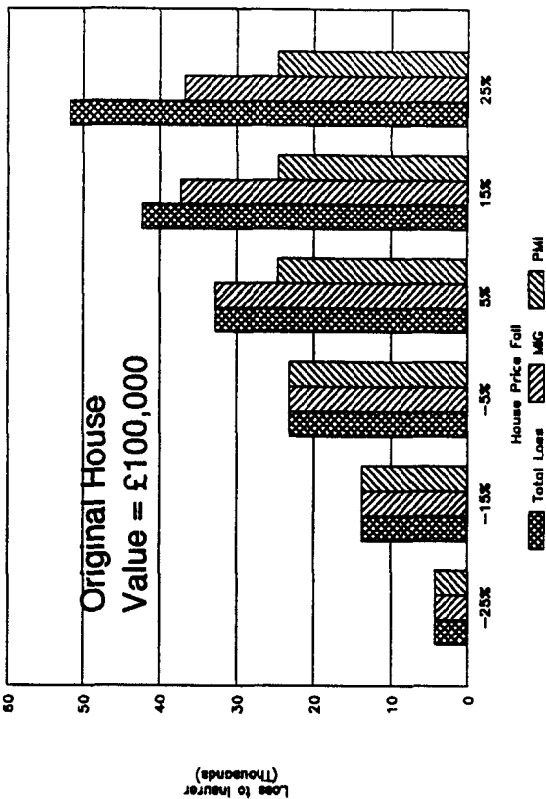
initial property value		100,000
loan to value		95%
insured down to		75%
loan amount		95,000
interest arrears	20%	19,000
estate agency fees	5%	4,000
other costs		9,000
total		127,000
house price fall		20%
current property value		80,000
amounts payable		127,000
originators loss exposure		(47,000)
Split of Loss with MIG Insurance:		
MIG Insurer		37,000
Originator		10,000
Split of Loss with PMI Insurance:		
PMI Insurer		24,600
Originator		22,400

Current Market Players - Special Purpose Mortgage Companies

1. The Mortgage Corporation (TMC)
   a) owned by Salomon (American investment bank)
   b) started April 1986

2. Household Mortgage Corporation (HMC)
   a) 16 financial institutions as shareholders
   b) started July 1985
   c) obtains business through 10 life companies

3. National Home Loans Corporation (NHLC)
   a) stock market listed September 1985
   b) obtains business through panel of life companies

4. Mortgage Funding Corporation (MFC)
   a) owned by merchant bank Kleinwort Benson
   b) started June 1985
   c) purely a funding vehicle (i.e relies entirely on other institutions to originate the mortgages)
   d) securitizes mortgages for 7 mortgage originators

Miscellaneous Background Market Statistics

The first public issue of MBS (Mortgage-Backed Securities) in the UK was in 1987.

UK

Gross Advances by Building Societies in 1988	£49.4 billion
Building Society Share of 1988 Residential Mortgages	58%
Gross public issues of MBS in 1988	£3.2 billion
Total residential mortgage loan balance at June 1989	£237 billion

USA

Outstanding MBS at the end of 1989	$900 billion

There were at least four secondary mortgage market issues during the first quarter. On 27 February 1989 SRF 1 PLC issued a £150 million floating rate note, AAA rated, backed by loans originated by Allied Dunbar Mortgages Ltd and the Household Mortgage Corporation. The return on the notes was Libor plus 0.2% (0.5% after 1999).

On 2 March 1989, HMC 102 issued £100 million worth of mortgage backed securities secured by loans originated by Household Mortgage Corporation. The securities were AAA rated and carried a fixed rate of 11% although HMC 102 swapped this into variable flows.

On 19 June 1989 The Mortgage Corporation announced a new programme for the issuance of mortgage backed securities which allowed up to £3 billion to be issued in tranches (eight initially) of loans originated by the Corporation. The securities were AAA rated and brought to the market by Salomon. Later in the month the first tranche of £250 million was issued at Libor plus 0.18%.

On 23 June 1989 BZW brought £175 million worth of mortgage backed securities to the market on behalf of Gracechurch Mortgage Finance PLC. The loans were originated by Barclays Bank, rated AAA and carried a coupon of Libor plus 0.2% (0.5% after 1999).

There were two publicly announced secondary mortgage market issues during the fourth quarter. The first of these, launched by The Mortgage Corporation on 16 November, was an issue of £250 million arranged by Salomon Brothers through the TMC "PIMBS" programme. The issue is the first from TMC to incorporate "fast pay/slow pay" tranches. Based on an analysis of assumed pre-payment levels within the underlying mortgage pool. TMC is offering £100 million of fast pay notes with an expected average life of under two years, and £150 million of slow pay notes. Early mortgage repayments are dedicated to the fast pay notes until they are fully repaid, and thereafter to the slow pay notes. The issue was priced at a margin of 18 basis points over three months Libor on the fast pay notes, and 25 basis points over three months Libor on the slow pay notes

The second securitized mortgage issue in November came from Temple Court Mortgages No.1, a special purpose vehicle for Legal & General, the finance and insurance company, which released a mortgage backed issue of £175 million. The issue, managed by S G Warburg, was originally expected to raise £150 million. Demand however exceeded expectations and the issue was increased by £25 million.

There were four publicly announced secondary mortgage market issues during the third quarter. In July the Household Mortgage Corporation, through HMC Mortgage Notes 4. issued £150 million of mortgage backed securities at an initial margin over LIBOR of 18 basis points. The issue, which was lead managed by CSFB, was AAA rated. The major part of the issue was protected by £9 million worth of "B" notes.

On 30 August, National Home Loans announced the offering of £250 million worth of sterling denominated floating rate notes issued by Collateralised Mortgage Securities (Number 2) plc, a special purpose mortgage vehicle. The structure of the transaction involved the issue of £250 million of "A" or senior class notes, lead managed by S G Warburg, and an amount of "B" or subordinated notes, lead managed by Goldman Sachs. The "A" notes were rated AAA by Standard and Poor's. The coupon on the "A" notes was set at 18 basis points per annum above the three month London interbank offered rate.

On 6 September, First Mortgage Securities' special purpose vehicle, Mortgage Securities Number 2, made a £150 million mortgage backed floating rate note issue. J P Morgan was the lead manager. The notes carried a yield of 18 basis points over three months LIBOR for the first ten years.

On 13 September Salomon Brothers launched a £250 million floating rate note issue for its Mortgage Corporation subsidiary. The issue (TMC PIMBS First Financing plc No 2) was set at 18 basis points over LIBOR.

Extracts from recent editions of "Housing Finance", published by the Council of Mortgage Lenders.

NHL First Funding Corp. plc

Rated 'AAA'

Transaction summary

Sale date: March 3, 1987
Securities offered: £50 million mortgage-backed floating rate notes due 2013
Structure type: Mortgage-backed cash flow bonds.
Collateral: A pool of variable-rate mortgages on residential properties located in England and Wales.

Dependent issues: Sun Alliance & London Insurance plc ('AAA' claims-paying ability), and Financial Security Assurance Inc. ('AAA' claims-paying ability)
Administrator/originator: National Home Loans Corp. plc.
Trustee: Chase Manhattan Bank N.A.
Lead underwriter: Salomon Brothers International Ltd.

Rationale: An 'AAA' rating is assigned to NHL First Funding Corp. plc's £50 million mortgage-backed floating rate notes due 2013. The rating is based on the underlying collateral's quality, the financing structure's legal soundness, protection against credit losses and liquidity shortfalls, and the administrator's ability to service the loans. A mortgage indemnity insurance policy ultimately provided by Sun Alliance covers those mortgages with loan-to-value ratios above 75%. Additionally, Sun Alliance provides a mortgage pool indemnity policy which covers losses resulting from defaulted mortgages. A surety bond, written by Financial Security Assurance Inc., guarantees interest payments on the notes.

Structure: Interest on the notes will be payable quarterly in arrears on the last business day in March, June, September, and December. The notes will bear interest at an annual rate of 0.20% above the London Interbank Offered Rate. The notes will be redeemed on any interest payment date, from mortgage prepayments not used to make further advances on existing loans. The notes may also be redeemed in their entirety when the ag-

gregate principal amount outstanding falls to £10 million. On any interest payment date, the issuer may opt to redeem all of the notes upon certain changes in the tax laws. If the issuer does not redeem the notes in this instance, the investor will receive the net interest payment. Unless otherwise redeemed, the notes will be redeemed in September 2013 (at note maturity).

Collateral: The mortgage portfolio consists of 1,000 residential mortgage loans, with an aggregate principal balance of £50 million. The loans are for residential freehold and leasehold properties, including detached, semidetached, and terraced housing in England and Wales. The mortgages range from £15,000 to £250,000. The mortgages have maturities of 10 to 25 years, monthly interest payments, and scheduled principal repayment at maturity. The last mortgage will mature Sept. 30, 2011, two years prior to note maturity. Each mortgage is covered by an endowment policy, as well as the other insurance policies mentioned above.

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Heidi Joy Levin (212) 208-1891

NHL Second Funding Corp. plc

Rated 'AAA'

Transaction summary

Sale date: Oct. 8, 1987.
Securities offered: £100 million mortgage-backed series A notes due 2014.
Structure type: Senior/subordinated mortgage-backed bonds.
Collateral: A pool of variable-rate endowment residential mortgages on properties located in England and Wales.

Dependent issues: Sun Alliance & London Insurance plc ('AAA' claims-paying ability) and National Westminster Bank plc ('A-1+' short term).
Administrator/originator: National Home Loans Corp. plc.
Trustee: Chase Manhattan Bank N.A.
Lead underwriter: Morgan Guaranty Ltd.

Rationale: An 'AAA' rating is assigned to NHL Second Funding Corp. plc's £100 million mortgage-backed series A notes due 2014. The rating is based on the underlying collateral's credit quality, overcollateralization of assets, and liquidity reserve funds. The rating also addresses the financing structure's legal soundness, as well as the administrator's ability to service the loans. The cash flow from the mortgages, together with the reserve funds, will service debt on a full and timely basis. Credit loss protection is provided by £11 million subordinated B notes issued in concurrence with the rated series A notes. Additional credit loss coverage is provided by a mortgage guarantee indemnity insurance policy provided by Sun Alliance. The variable mortgage rate is set to ensure that note payments, fees, and expenses are met. The transaction accounts are held with National Westminster Bank.

Structure: Interest on the notes will be payable quarterly in arrears on the last business day in January, April, July, and October (interest payment dates). Until the interest payment date in

October 1994, the notes will bear interest at a rate of 0.275% above the London Interbank Offered Rate (LIBOR). Thereafter, the rate will be 0.5% above LIBOR. Series A notes will be redeemed on the interest payment dates if the issuer receives mortgage prepayments. No series B notes will be redeemed until all series A notes are repaid. The issuer may redeem the notes in their entirety as of the interest payment date in October 1994 or when the notes' outstanding principal balance falls to £10 million. The notes may also be redeemed at the issuer's option if a withholding tax is imposed. If the issuer does not redeem the notes, the investor will receive interest payments net of the tax.

Collateral: The notes are secured by a pool of 2,600 variable-rate endowment mortgages over freehold and leasehold residential properties in England and Wales. Over 70% of the mortgages' aggregate principal balance represents properties concentrated in the southeast of England and the Greater London area. The mortgages approximate £111 million. The mortgages' maturities range from five to 25 years, with the latest maturity in 2012 (two years prior to note maturity). About 83% of the pool consists of mortgages with maturities of at least 20 years. Interest will be paid monthly. There are no scheduled principal payments prior to maturity. However, principal may be prepaid at any time, at the mortgagor's option. The mortgage interest rate is reset as often as monthly by the administrator. Mortgage loan balances range from £15,000 to £250,000, with an average balance of £42,125. Mortgages with a loan-to-value ratio above 75% are insured by a mortgage guarantee indemnity insurance policy provided by Sun Alliance.

1. mortgage types

endowment,repayment,interest-only,and pension-linked

2. security

first charge on residential property located in England or Wales

3. property characteristics

detatched and semidetached

purpose-built and converted flats

bungalows,maisonettes,and terraced housing

freeholds and leaseholds (30 years remaining life beyond mortgage term)

vacant possession

deed or letter of consent from nonborrower adult residents

4. LTV ratios

up to 80% LTV without mortgage indemnity insurance, up to 95% LTV with insurance

5. Loan size

£15,000-£150,000

6. income limits

2.5 times main salary plus 1.0 times secondary salary or equivalent

7. credit checks

united association for protection of trade (UAPT) and income verification

8. regional dispersion

maximum 0.5% pool from any primary postal code designation

9. pool size

minimum 300 loans

10. values

royal institute of chartered surveyors (RICS) approved or equivalent by outside panels

11. homeowners' insurance

index linked to annual index and coverage of subsidence

12. limit on endowment and pension-linked policies from (credit) unrated companies

no more than 25% of the policies from any one unrated provider; maturities of the mortgages and policies
are to precede the bonds by at least two years

13. term insurance

100% level term with policy assignable to lender

Nonconforming pools require an adjustment to be made to the credit loss protection calculations.

The following basic underwriting criteria would be sufficient to give the pool "prime" status (namely AAA):

1. the loans must be secured on traditionally built owner-occupied properties located in England and Wales

2. mortgage amount of between £15,000 and £250,000

3. the status of the borrower must be adequately checked

4. loans must be interest only and secured by an endowment policy (pension policies may be acceptable)

This is related to the distinctive features of the UK mortgage market as they relate to mortgage pool credit risk.

Credit Quality of the Underlying Mortgages

Consider quality of the underlying mortgage collateral and the protective elements used to insulate investors from mortgage default losses. For highly rated issues the credit support must be sufficient to provide full protection under extreme economic conditions. For "benchmark credit support level" require

a) Non-amortising, interest-only mortgage loans
b) Loan size of £15,000 to £30,000
c) Secured by 1st charges on single-family, detached properties
d) Freehold properties
e) Owner-occupied, primary residence
f) Well dispersed throughout industrially diversified regions
g) No abnormally high property values
Values of financed homes consistent with the range of property values of the area in which the homes are located
h) Underwritten to industry standards
By a company with a proven track record of low arrears and default losses
i) Carrying mortgage indemnity insurance
Down to 75% for all loans in excess of 80% LTV.

This "benchmark" was developed after consideration of the UK circumstances with regard to
a) Unemployment Benefits
Unemployment highly correlated with default rates despite support provided by UB. Under attack by Conservative Government
b) Net Equity (ie 100-LTV%) and house price changes.
Serious arrears may be brought about by unemployment, marital problems, unforseen expenses or other circumstances affecting cash flow. However the decision to default rather than sell up will usually only occur if there is the likelihood of negative equity at the time of the sale. The outlook for continued house price rises is diminished by
1) proportion of owner-occupiers stabilising
2) possibility of MIRAS being eventually removed
3) speculative bubble bursting
c) Mortgage indemnity insurance
More effective than US version (PMI) as all reasonable expenses incurred in the possession and sale proceedings are covered.
d) Possession and Sale Costs
This will be affected by the length of time needed to gain possession and effect sale. The costs include
1) past-due mortgage interest payments
2) estate agent fees
3) solicitor fees
4) court fees
5) property insurance
6) general rates
7) maintenance costs
e) Time to Possession and Sale
Can take 2 or more years following initial default. Affected by
1) time to get to court (these are already overburdoned and in the event of a severe economic downturn will get more so)
2) attitude of courts which has tended to be very sympathetic
3) lenders exercising forbearance
f) Interest-only mortgages
As these don't amortise the loan the exposure is relatively greater. 82% of new loans are of this type.
g) MIRAS
Provides some insulation to the lender as payments continue temporarily after initial default by borrower. However future for MIRAS is dim – in any case less effective as basic rate tax diminishes.

This "benchmark" should be adjusted for the following factors

a) endowment insurance policies if assigned to lender

This provides a contribution towards the loan redemption in the event of default. However this is minimal in the first couple of years. "With-Profit" policies offer better protection to lender than "unit-linked" as premiums are generally higher. Credit quality of the underlying endowment insurance company relatively unimportant as a result of the Policyholders Protection Act 1975.

b) pension-linked mortgages are not creditworthy

This is because they cannot legally be assigned - therefore the pension provider is not obliged to make payment direct to the lender.

c) capital repayment mortgages

These have not yet been securitised. Problems are caused if the mortgage repayment period is extended, following a rescheduling, as the security to the note investors is endangered if it extends beyond the FRN period.

d) Property Type

Flats and maisonettes, particularly freehold, exhibit greatest price volatility.

e) Geographical Concentration Risk

The risk depends on the diversity of the local economy. Moody's will monitor regional and postal code concentration.

f) Abnormally high Property Values

In relation to the immediate vicinity as there will then be a tendency to a longer than average selling time and greater susceptibility to house price volatility.

g) Further Advances tend to reduce credit quality

It was usual for these mortgages to be removed from the securitised pool. However this shortens life of the issue from the investors' viewpoint, which may be unpopular.

h) Loan Seasoning

Monitor repayment history and house price changes to look for signs of good/bad servicing record of mortgagors.

i) Loan Purpose

Remortgaging is likely to increase default propensity. Low income ratios, low LTV and conservative valuations by a qualified valuer will all help reduce risk.

j) Method of Setting Mortgage Interest Rates

Risk increases if rates are fixed relative to LIBOR with no discretion left to loan administrator. Further increased if SPMCs are thinly capitalised allowing them little freedom in times of high interest rates to keep rates competitive (see 4d).

k) Quality of the indemnity insurance company

The indemnity insurance provides a high level of credit risk protection: the overall credit risk therefore depends crucially on the quality of the insurer.

This has regard to the payment to noteholders not being impaired by third party credit risks; namely insolvency or illiquidity.

a) Issuer Related Risks

1) Liquidity Risk

Look at potential for mismatch between inflow from mortgage repayments, scheduled interest payments and income from investment of the issuer's cash accounts in short-term instruments and outflow of investor principal and interest and the issuer's ongoing expenses (from administration, trustee and accounting).

2) Third Party Insolvency Risk

Ensure adequate protection to issuer in the event of insolvency of say the administrator. In particular ensure mortgage collateral is insulated.

3) Equitable vs. Legal Assignments

Mortgages are transferred from the originator to the issuer. Mortgages consist of 3 constituents: mortgage debt; legal mortgage on property; and the mortgage of the endowment policy. The risks are much greater if only equitably assigned as the interests of the issuer are then not apparent to the mortgagor, and the originator may fraudulantly or mistakenly transfer the mortgage to a third party as no record in the Registrar of Titles would exist. This can then result in delays and loss to the issuer. If the transfer is by equitable assignment the following considerations apply:

> a> Notice Legal
>
> Interests of issuer and trustee need to be notified to all interested parties to ensure the collateral of the mortgage is not treated as part of the estate of the originator.
>
> b> Priority of Rights
>
> Legal takes precedence over equitable assignments
>
> c> Borrowers Right of Set Off
>
> Mortgagor may offset with originator unless made aware of the transfer.
>
> d> Direction of Mortgage Payments
>
> Payments made to originator can only be redirected to issuer if legally assigned.

b) Administrator Related Risks

Administrator - usually the originator - handles normal servicing functions including setting interest rates, managing MIRAS and mortgage arrears, handling borrower enquiries in return for an administration fee. Look at

> 1) Management
> 2) Arrears and Collection Procedures
> 3) Investor Reporting
> 4) Past portfolio Losses and Arrears
> 5) Cash Reserves
> 6) Existence of Corporate Guarantees or Performance Bonds

Check that the following are satisfactory dealt with:

> 1) Transfer of Administration Responsibilities
> 2) Repurchase Obligations
>
> Oblige the Administrator to repurchase mortgage loans that don't conform to representations and warranties outlined in the mortgage sale agreement as insurers providing credit enhancement will not cover them.
>
> 3) Interest Rate Subsidies
>
> Usually provided by Administrator for marketing reasons. May jeopardise security of Administrator.

Basis Risk

This arises as a result of

a) Quarterly Note rate & Monthly Mortgage Repayment Discrepancy

b) Mortgage Prepayment Necessitating Short-Term Reinvestment

c) Increased LIBOR Spread Required After Normally 7 Years

d) Expenses of the Issuer(subject to inflation) must be Serviced

Puts added pressure on Administrator particularly as more mortgages become prepayed thereby reducing the amount of the mortgage interest

To some extent the risk is diminished by giving the Administrator more freedom to set competitive rates by providing a shortfall contingency fund.

MORTGAGE INDEMNITY BUSINESS

Reserves for Company A and Company B

1. This note is a technical response to the types of calculations that might be used in assessing the reserves required for MIG business. Full calculation worksheets are attached. The calculations are entirely mechanical, and any actuarial input – including rejection of the numbers – should be considered.

2. Important points to consider in the methodology are as follows:

    (1)   MIG insurance has a "maximum" indemnity, and hence inflation adjustment on the long tail will overstate the position.

    (2)   There is a question over what really does inflation mean. In the long term house prices are correlated to inflation, but in the short term they are not. There is a lag factor.

    (3)   Claims do not occur until the house market picks up.

    (4)   Paid claims are the only reliable statistic.

3. The first method I illustrate is the "Earned Premium" approach, plus the introduction of the new Equalisation Reserve. It should be noted that no definition of "Technical Surplus" in U.K. Legislation. I understand that this definition arose out of the EEC, and no one is sure what is included! For the purpose of this note I have assumed that it means Earned Premium less Incurred Claim, although clearly Brokerage, Commission, Expenses, Investment Income and so on could all form part of the exercise. Secondly, I have assumed Incurred Claims = Paid Claims.

4. The calculation appears to favour Method 3 and Method 4. This puts money from the good years away to subsidise the bad years. It therefore helps indentify the bad years. It is, however, based on Incurred Loss Ratios which still appear to depend on the definition of Earned Premium. Alternative assumptions will give different answers.

5. Although there is a need for an Equalisation Reserve on a non–specific basis, one should question the need when a prudent scientific basis is used. One may suggest that the Reserves are reduced by the Equalisation reserve before adding it back!

6. I turn now to the standard methods. The Chain Ladder Method gives the following results:

Inflation	10%	5%	0%
	£m	£m	£m
Company A	21.382	20.524	19.635
Company B	25.320	24.799	24.154

I have assumed here that inflation is throughout the whole period. It is difficult to justify any inflation index, and, accordingly, the above reserves can only be viewed as an initial estimate.

I have also analysed the data using the Separation Method. This picks out some implied inflation values for prior years – which are usually nonsense amounts. Future inflation needs to be specified.

Inflation	10%	5%	0%
	£m	£m	£m
Company A	17.556	15.147	13.081
Company B	18.659	16.317	14.301

6. I thought it worthwhile to do, at least in part, a regression analysis on the data. Regression analysis is a powerful tool in analysing data, although it also has its drawbacks. Basically the chain ladder follows the rule:

$$Dev(n) = a \times Dev(n+1)$$

Under regression rules we have:

$$Dev(n) = a \times Dev(n+1) + b$$

The estimation for a and b is least square. This method is used, for example, in the London Market on Loss Ratios. One particular method is the Benjamin–Eagles Loss Ratios, although the Bornheuter Ferguson approach also fits the model type.

Consider the following problem:

The statistical model suggests an Ultimate Loss Ratio of 100%, and a model Loss Ratio of 20% after the first year. Actual data gives a loss ratio of 16%. There are two estimates, namely:

$$80\% = 16 \times {}^{100}/20 \qquad \text{– linked ratio}$$
$$\text{or} \quad 96\% = 100 - 20 + 16 \qquad \text{– a Bornheuter Ferguson type approach}$$

The methodology places a credibility on which of these approaches is used. This is similar to the B–F method which uses:

Actual Reported Loss + Expected Unreported Losses

Expected Unreported Losses = Estimated Ultimate Premium
x Initial Expected Loss Ratio
x (100 – reported percentage)%

It should be noted that as $n \longrightarrow \infty$, $a \longrightarrow 1$ and $b \longrightarrow 0$

I have used the approach on the Paid Loss Ratios. The calculations give reserves of £16.429 million for Company A and £14.298 million for Company B. Company B Loss Ratios for 1989 are, perhaps, a little optimistic.

7. As an alternative exercise I looked at methods such as inflation average cost per claim. The problem with most average costs is the need to estimate both the inflation average cost and the number of claims. Regression analysis indicated the overall instability of the number and amount of the paid claims when viewed in isolation.

8. I know of other actuaries trying out alternative methods. The main considerations for this type of business are:

   (i) Does it fit the earned premium approach. This method has been tried and tested and only found wanting in extraordinary years. The link ratio (and most other actuarial methods) which averages out losses also suffers from the same approach.

   (2) The professional requirement of GN12. In writing this note I have not put down all my assumptions, and I don't know how credible the business data really is.

   (3) The need for the system to be predictive, and to monitor the predictions in much the same way as analysis of surplus. Hindsight models may be useful with this approach.

D E A Sanders

COMPANY A EQUALIZATION RESERVE CALCULATIONS

	Earned Premium % @ 1989 (%)	Earned Premium @ 1989 (£)	Paid to Date (£)	Incurred Claims (£)	Technical Surplus (£)
1972	100	500,136	29,632	29,632	470,504
1973	100	390,488	87,817	87,817	302,671
1974	100	251,318	85,994	85,994	165,324
1975	100	461,665	136,767	136,767	324,898
1976	100	823,205	127,365	127,365	695,840
1977	100	816,920	55,631	55,631	761,289
1978	100	1,196,559	93,293	93,293	1,103,266
1979	100	876,172	124,280	124,280	751,892
1980	100	713,653	372,917	372,917	340,736
1981	97	1,237,400	948,327	948,327	289,073
1982	92	1,670,246	2,334,744	2,334,744	(664,498)
1983	85	1,772,669	2,003,240	2,003,240	(230,571)
1984	75	1,888,187	2,923,308	2,923,308	(1,035,122)
1985	60	1,979,844	2,558,874	2,558,874	(579,030)
1986	40	1,779,859	1,888,134	1,888,134	(108,275)
1987	20	1,372,030	607,528	607,528	764,502
1988	5	396,923	71,228	71,228	325,695
1989	0	0	37,639	37,639	(37,639)
TOTAL		TOTAL MAX 11,907,693	14,486,718	14,486,718	3,640,556

Incurred Claims
= Paid Claims
+ o/s c/fwd
- o/s b/fwd

Technical Surplus
= Earned Prem
- Inc Claims

METHOD 1

	Potential Contribution (£)	Actual Contribution (£)
1972	60,016	60,016
1973	46,859	46,859
1974	30,158	30,158
1975	55,400	55,400
1976	98,785	98,785
1977	98,030	98,030
1978	143,587	143,587
1979	105,141	105,141
1980	85,638	85,638
1981	153,080	153,080
1982	664,498	664,498
1983	230,571	230,571
1984	1,035,122	1,035,122
1985	579,030	579,030
1986	108,275	108,275
1987	573,377	573,377
1988	244,271	244,271
1989	37,639	37,639
	TOTAL MAX 11,907,693	TOTAL 4,349,477

METHOD 2

	Potential Contribution (£)	Actual Contribution (£)
1972	352,878	332,924
1973	227,003	227,003
1974	123,993	123,993
1975	243,674	243,674
1976	521,880	521,880
1977	570,967	570,967
1978	827,450	827,450
1979	563,919	563,919
1980	255,552	255,552
1981	216,805	216,805
1982	664,498	664,498
1983	230,571	230,571
1984	1,035,122	1,035,122
1985	579,030	579,030
1986	108,275	108,275
1987	573,377	573,377
1988	244,271	244,271
1989	37,639	37,639
	TOTAL MAX 7,356,948	TOTAL 7,356,948

METHOD 3

CLAIM RATIO (Paid Claims/Earned Premiums)	Required Equalisation Reserve	Initial Transfer	E-A Adjustments	Final Equalisation Reserve
1972 0.059	1,493,515	52.273	267.832	320.105
1973 0.225	1,166,082	40.813	144,432	185,245
1974 0.342	750,490	26.267	63,481	89,749
1975 0.296	1,378,632	48.252	137,816	186,068
1976 0.155	2,458,269	86.039	362,249	448,289
1977 0.068	2,439,501	85,383	430,245	515,628
1978 0.078	3,573,186	125,062	618,379	743,441
1979 0.142	2,616,440	91,575	396,837	488,413
1980 0.523	2,131,123	74,589	51,539	126,129
1981 0.766	3,695,146	129,330	(212,364)	0
1982 1.398	4,987,719	174,570	(1,341,339)	0
1983 1.130	5,293,576	185,275	(948,917)	0
1984 1.548	5,638,536	197,349	(1,800,279)	0
1985 1.292	5,912,245	206,929	(1,381,330)	0
1986 1.061	5,315,046	186,027	(829,535)	0
1987 0.443	4,097,181	143,401	208,509	351,910
1988 0.179	1,185,299	41,485	164,848	206,334
1989 1.000	0	0	(37,639)	0
	TOTAL 54,131,988	TOTAL 1,894,620		TOTAL 3,661,308
AVG 0.595				
S.D 0.498				

METHOD 4

	Final Equalisation Reserve
1972	320.105
1973	185.245
1974	89.749
1975	186.068
1976	448.289
1977	515.628
1978	743,441
1979	488,413
1980	126,129
1981	0
1982	0
1983	0
1984	0
1985	0
1986	0
1987	351,910
1988	206,334
1989	0
	TOTAL 3,661,308

UNEARNED PREMIUM RESERVE + EQUALISATION RESERVE

	UNEARNED PREMIUM £	METHOD 1 £	METHOD 2 £	METHOD 3 £	METHOD 4 £
1972	0	60,016	332,924	320,105	320,105
1973	0	46,859	227,003	185,245	185,245
1974	0	30,158	123,993	89,749	89,749
1975	0	55,400	243,674	186,068	186,068
1976	0	98,785	521,880	448,289	448,289
1977	0	98,030	570,967	515,628	515,628
1978	0	143,587	827,450	743,441	743,441
1979	0	105,141	563,919	488,413	488,413
1980	0	85,638	255,552	126,129	126,129
1981	38,270	191,351	255,075	38,270	38,270
1982	145,239	809,737	809,737	145,239	145,239
1983	312,824	543,395	543,395	312,824	312,824
1984	629,396	1,664,517	1,664,517	629,396	629,396
1985	1,319,896	1,898,926	1,898,926	1,319,896	1,319,896
1986	2,669,788	2,778,063	2,778,063	2,669,788	2,669,788
1987	5,488,121	6,061,497	6,061,497	5,840,031	5,840,031
1988	7,541,539	7,785,810	7,785,810	7,747,873	7,747,873
1989	4,903,298	4,940,937	4,940,937	4,903,298	4,903,298
	23,048,370	27,397,847	30,405,318	26,709,678	26,709,678

PROJECTED PAID LOSS RATIOS

	1	2	3	4	5	6	7	8	9	10	11	12	13
1972	0.00%	0.01%	0.32%	2.12%	3.15%	3.48%	3.94%	4.37%	5.65%	5.65%	5.92%	5.92%	5.92%
1973	0.00%	0.74%	8.09%	14.35%	16.88%	19.30%	20.60%	21.35%	22.49%	22.49%	22.49%	22.49%	22.49%
1974	0.43%	2.09%	10.08%	20.83%	26.71%	29.53%	30.64%	32.25%	32.74%	33.26%	34.22%	34.22%	34.22%
1975	0.00%	1.41%	9.51%	18.77%	26.48%	27.70%	28.50%	29.05%	29.05%	29.62%	29.62%	29.62%	29.62%
1976	0.00%	0.43%	4.81%	9.13%	12.39%	13.92%	14.62%	15.25%	15.27%	15.47%	15.47%	15.47%	15.47%
1977	0.00%	0.03%	2.13%	3.17%	4.48%	4.80%	5.01%	5.09%	5.35%	5.96%	6.81%	6.81%	6.81%
1978	0.00%	0.14%	0.50%	1.22%	2.25%	2.96%	4.38%	4.74%	5.08%	6.53%	7.80%	7.80%	7.80%
1979	0.15%	0.27%	0.91%	3.36%	7.42%	9.36%	9.96%	11.78%	12.78%	13.36%	14.18%	14.18%	14.18%
1980	0.00%	0.00%	5.86%	26.05%	35.48%	43.83%	45.72%	48.95%	51.73%	52.25%	52.28%	52.28%	52.28%
1981	0.14%	0.94%	15.44%	30.10%	43.56%	51.49%	63.26%	72.19%	74.34%	74.64%	74.36%	74.36%	74.36%
1982	0.10%	1.89%	14.88%	34.98%	68.01%	99.74%	117.13%	128.60%	132.41%	132.49%	131.42%	131.42%	131.42%
1983	0.10%	0.85%	8.61%	36.61%	64.79%	86.68%	96.06%	105.66%	108.83%	109.00%	108.25%	108.25%	108.25%
1984	0.00%	1.42%	26.46%	66.01%	96.30%	116.12%	133.06%	146.59%	150.89%	150.91%	149.58%	149.58%	149.58%
1985	0.06%	5.10%	27.81%	57.92%	77.55%	99.28%	113.59%	125.05%	128.76%	128.86%	127.83%	127.83%	127.83%
1986	0.39%	3.55%	21.73%	42.43%	63.12%	80.49%	91.87%	101.03%	104.08%	104.26%	103.58%	103.58%	103.58%
1987	1.19%	4.01%	8.86%	21.03%	31.49%	39.30%	44.24%	48.34%	49.94%	50.32%	50.38%	50.38%	50.38%
1988	0.53%	0.89%	8.19%	19.62%	29.40%	36.57%	41.09%	44.85%	46.35%	46.75%	46.86%	46.86%	46.86%
1989	0.77%	2.91%	16.40%	37.03%	55.14%	70.10%	79.85%	87.73%	90.42%	90.65%	90.15%	90.15%	90.15%
ALPHA		2.585801	4.063840	2.119960	1.478200	1.302291	1.156213	1.106239	1.027478	0.996344	0.986218	1	1
BETA		0.009288	0.045618	0.022604	0.003981	-0.01711	-0.01195	-0.00605	0.002734	0.005679	0.007502	0	0
CORRELATION		0.528910	0.720496	0.947146	0.979645	0.991636	0.997612	0.999404	0.999520	0.999617	0.998972	1	1

PAID LOSS RATIO TIMES PREMIUM

	1	2	3	4	5	6	7	8	9	10	11	12	13	Outstanding
1972	0	35	1615	10583	15740	17385	19725	21845	28234	28234	29632	29632	29632	
1973	0	2904	31609	56016	65930	75366	80444	83366	87817	87817	87817	87817	87817	
1974	1077	5240	25339	52357	67125	74213	77009	81040	82289	83598	85994	85994	85994	
1975	0	6492	43912	86663	122241	127882	131563	134134	134134	136767	136767	136767	136767	
1976	0	3570	39628	75167	101963	114610	120335	125577	125732	127365	127365	127365	127365	
1977	0	218	17360	25917	36595	39215	40900	41613	43740	48673	55631	55631	55631	0
1978	0	1676	6001	14584	26881	35409	52388	56660	60747	78167	93293	93293	93293	0
1979	1303	2368	7967	29483	64981	82014	87286	103183	111959	117015	124280	124280	124280	0
1980	0	0	41803	185888	253179	312805	326254	349339	369155	372917	373132	373132	373132	215
1981	1756	12042	196964	383990	555641	656900	806989	920847	948327	952106	948555	948555	948555	228
1982	1814	34387	270182	634991	1234678	1810820	2126543	2334744	2403865	2405390	2385861	2385861	2385861	51117
1983	2101	17816	179474	763474	1351141	1807759	2003239	2203428	2269679	2273228	2257546	2257546	2257546	254307
1984	0	35786	666093	1661927	2424391	2923308	3349869	3690506	3798801	3799216	3765745	3765745	3765745	842437
1985	2140	168383	917729	1911112	2558874	3275908	3748200	4126417	4248829	4252041	4218198	4218198	4218198	1659324
1986	17341	158110	966876	1888134	2808756	3581642	4087945	4495290	4630984	4639330	4608776	4608776	4608776	2720642
1987	81444	274769	607528	1443005	2160362	2695977	3035110	3315998	3425879	3452322	3456210	3456210	3456210	2848682
1988	42525	71228	653651	1566175	2346905	2919679	3280328	3580463	3700683	3732501	3740956	3740956	3740956	3669728
1989	37639	142870	804280	1815878	2703753	3437131	3915437	4301706	4433320	4444966	4420494	4420494	4420494	4382855

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INFLATION CHAIN LADDER

Current Value of Past Claims

Past Inflation													
Year	Infl.												
1972	5.05	1.10	0	161	6600	34056	17803	5163	6676	5499	15065	0	2724
1973	4.59	1.10	0	12131	109007	84260	31114	26922	13171	6890	9541	0	0
1974	4.18	1.10	4499	15809	69387	84794	42135	18384	6593	8641	2434	2319	3859
1975	3.80	1.10	0	22412	117440	121974	92280	13301	7891	5010	250	4240	0
1976	3.45	1.10	0	11204	102878	92179	63184	27110	11156	9287	3114	2391	0
1977	3.14	1.10	0	622	44462	20177	22889	5106	2985	1148	5440	6566	8419
1978	2.85	1.10	0	4347	10198	18398	23963	15108	27345	6255	10619	21078	16639
1979	2.59	1.10	3380	2511	12002	41929	62887	27432	7719	21159	21798	5562	7265
1980	2.36	1.10	0	0	81462	255255	108373	87298	17901	27933	27480	3762	
1981	2.14	1.10	3764	20045	327601	301207	251314	134776	181608	125244			
1982	1.95	1.10	3535	57705	379750	534117	798183	697132	347295	208201			
1983	1.77	1.10	3722	25309	236685	777304	711077	502280	195480				
1984	1.61	1.10	0	52394	838939	1204959	838710	498917					
1985	1.46	1.10	3133	221269	906709	1092721	647762						
1986	1.33	1.10	23081	170330	889643	921258							
1987	1.21	1.10	98547	212658	332759								
1988	1.10	1.10	46778	28703									
1989	1.00	1.00	37639										

Chain Ladder on Current Value of Past Claims

Year										
1972	0	161	6761	40817	58620	63783	70459	75958	91023	93747
1973	0	12131	121138	205398	236512	263434	276605	283495	293036	293036
1974	4499	20308	89695	174489	216624	235008	241601	250242	252676	254995
1975	0	22412	139852	261826	354106	367407	375298	380308	380308	384548
1976	0	11204	114082	206261	269444	296554	307711	316997	317247	319638
1977	0	622	45084	65261	88150	93256	96241	97389	100503	107069
1978	0	4347	14545	32944	56907	72015	99360	105614	111054	132132
1979	3380	5891	17893	59821	122708	150140	157859	179018	189637	195198
1980	0	0	81462	336718	445090	532289	550289	578222	600020	603782
1981	3764	23809	351409	652616	903931	1038706	1220314	1345558	1373038	1400033
1982	3535	61240	440990	975107	1773290	2470422	2817718	3025919	3106106	3167175
1983	3722	29031	265716	1043020	1754097	2256177	2451857	2619669	2689091	2741960
1984	0	52394	891333	2096292	2935002	3433919	3795652	4055436	4162906	4244753
1985	3133	224403	1131111	2223633	2871595	3513237	3883325	4149110	4259063	4342800
1986	23081	193411	1083054	2004312	2892657	3539006	3911808	4179543	4290302	4374653
1987	98547	311205	643964	1394105	2011996	2461566	2720670	2907093	2984132	3042803
1988	46778	75481	422047	913682	1318641	1613284	1783229	1905278	1955769	1994221
1989	37639	207140	1158220	2507409	3618735	4427322	4693701	5226639	5367199	5472723
	5503346	5591471								5592500

Development factors:
5.591471 2.164881 1.443216 1.223444 1.105340 1.068442 1.026500 1.019660 1.021886

Year	Future	Inflation	Outstanding
1972	1.10	1.10	
1973	1.10	1.21	
1974	1.10	1.33	
1975	1.10	1.46	
1976	1.10	1.61	
1977	1.10	1.77	
1978	1.10	1.95	
1979	1.10	2.14	
1980	1.10	2.36	14536
1981	1.10	2.59	66771
1982	1.10	2.85	254361
1983	1.10	3.14	426825
1984	1.10	3.45	1124738
1985	1.10	3.80	1971596
1986	1.10	4.18	3161842
1987	1.10	4.59	3244307
1988	1.10	5.05	2720136
1989	1.10	5.56	8397783
			21382896

Outstanding development triangle:

							88206	14536
						184593	84000	37076
					397905	314339	143043	92262
				705807	447806	353760	160981	87862
			977179	782082	496200	391990	178378	149619
		825156	747648	598378	379646	299915	136479	168983
	381223	594878	539001	431388	273698	216217	98391	186579
186452	1150806	1795771	1627092	1302238	826218	652700	297016	142753
							248819	102915
								310672

Intermediate column (29695 / 73893 / 70370 / 119831 / 134059 / 149433 / 114332 / 82425 / 248819) and (14536 / 66771 / 254361 / 426825 / 1124738 / 1971596 / 3161842 / 3244307 / 2720136 / 8397783).

SEPARATION

Average Payment Per Claim

Year											
1972	0	35	395	690	737	329	1170	707	1278	0	1398
1973	0	968	776	842	708	1180	1693	974	1484	0	0
1974	1077	694	837	1422	869	1181	2796	2016	625	655	2396
1975	0	721	850	950	1017	1410	1841	1286	155	544	0
1976	0	714	736	808	1165	1054	1145	1048	1064	1233	3479
1977	0	218	779	475	1068	2620	843	713	1362	5807	3025
1978	0	419	721	1717	1230	1706	1544	1068	2194	2528	3633
1979	1303	533	1120	1537	1775	1419	1054	3179	2202	1881	
1980	0		1608	2183	2103	2056	1494	2565	3053		
1981	1756	1714	2642	2750	2562	2411	3661	3795			
1982	1814	2172	2649	2354	3044	4175	3996	3856			
1983	1051	1964	2343	3244	3841	4005	4073				
1984	0	2386	3136	3830	4056	3991					
1985	2140	2558	3620	4319	4152						
1986	4335	3519	4595	4305							
1987	3878	4028	4322								
1988	3544	3588									
1989	5377										

	0.102428	0.096281	0.112896	0.110773	0.104743	0.096596	0.084243	0.090233	0.062528	0.053257	0.086017
Diag sum	42229.928	37068.29	3128328	2340189	1409464	1086639	9821782	6672998	28758	5325.8	1303
D/gen	42229.928	40556.87	3634524	2931843	2103871	1745399	1863281	1579858	9228974	2679.795	12721.11
Col sum	3632.5	4409	7449111	1484450.4	1694892	1869431	2055760	2213745	2306003.5	2246076	2519778
		82786.80	1191320	1484450.4	1869489.2	1868943.1	2055760	2213745	2306003.5	2460076	2460044
C/gen	0.0860171	0.053257	0.062528	0.090233	0.084243	0.096596	0.104743	0.110773	0.112896	0.096281	0.102428
	0.0860171	0.139274	0.201802	0.292036	0.376280	0.472877	0.577620	0.688394	0.801290	0.897571	1
	0.9139828	0.860725	0.798197	0.707963	0.623719	0.527122	0.422379	0.311605	0.198709	0.102428	0
	1	0.913982	0.860725	0.798197	0.707963	0.623719	0.527122	0.422379	0.311605	0.198709	0.102428

D/gen	C/gen infn	0.102428	0.096281	0.112896	0.110773	0.104743	0.096596	0.084243	0.090233	0.062528	0.053257	0.086017
12721.11		1303	258	1042	1750	1952	1686	1772	2646	2273	2160	3633
2679.795	0.2106573	274	889	1784	2064	1828	2032	2470	3280	2536	2249	3996
9228.974	3.4439101	945	1521	1933	2104	2204	2832	3062	3660	2641	2474	4395
15798.58	1.7118461	1618	1794	1970	2331	3071	3511	3417	3811	2905	2721	4835
18632.81	1.1793975	1909	1680	2375	3248	3807	3918	3558	4192	3195	2993	5318
17453.99	0.9367342	1788	2026	3310	4026	4248	4079	3913	4611	3515	3293	5850
21038.71	1.2053814	2155	2823	4103	4493	4423	4487	4305	5072	3866	3622	6435
29318.43	1.3935463	3003	3499	4579	4678	4866	4936	4735	5579	4253	3984	7079
36345.24	1.2396722	3723	3905	4768	5146	5352	5430	5209	6137	4678	4383	7787
40556.87	1.1158785	4154	4066	5244	5660	5887	5972	5730	6751	5146	4821	8565
42229.92	1.0412519	4326	4473	5769	6226	6476	6570	6303	7426	5660	5303	9422

										Outstanding
									11577	11577
								16410	23834	40244
						69751	40643	59029		169423
					161128	64547	37611	54625		317910
				301801	267442	107136	62427	90667		829472
			613200	334781	296667	118844	69249	100575		1533315
		837495	636523	347515	307951	123364	71882	104400		2505782
	914146	715371	498115	271950	240989	96539	56252	81699		2798411
446175	663025	566342	394346	215296	190765	76428	44533	64679		2661608
167923	1093128	1624410	1387537	966147	527475	467424	187248	109107	158464	6688663
										17556606

ProjD/gen

46452.92
51098.21
56208.03
61828.83
68011.72
74812.89
82294.18
90523.60
99575.96
109533.5

COMPANY B EQUALIZATION RESERVE CALCULATION

Incurred Claims
= Paid Claims
+ o/s c/fwd
- o/s b/fwd

Technical Surplus
= Earned Prem
- Inc Claims

	Earned Premium % @ 1989	Earned Premium @ 1989 £	Paid to Date £	Incurred Claims £	Technical Surplus £
1972					
1973					
1974					
1975	100	1,615,000	170,388	170,388	1,444,612
1976	100	1,877,000	157,081	157,081	1,719,919
1977	100	2,076,000	97,462	97,462	1,978,538
1978	100	1,695,000	119,391	119,391	1,575,609
1979	100	1,770,000	296,349	296,349	1,473,651
1980	100	2,798,000	988,236	988,236	1,809,764
1981	100	4,169,000	1,950,105	1,950,105	2,218,895
1982	100	5,913,000	4,115,760	4,115,760	1,797,240
1983	100	6,950,000	5,342,585	5,342,585	1,607,415
1984	95	7,466,050	6,853,904	6,853,904	612,146
1985	90	11,724,300	5,648,563	5,648,563	6,075,737
1986	76	13,204,240	5,866,482	5,866,482	7,337,758
1987	41	9,186,460	1,954,797	1,954,797	7,231,663
1988	8	1,515,920	384,441	384,441	1,131,479
1989	1	49,033	13,121	13,121	35,912
TOTAL		72,009,003	33,958,665	33,958,665	38,050,338

METHOD 1

	Potential Contribution £	Actual Contribution £	Potential Contribution £	Actual Contribution £
1972				
1973				
1974				
1975	193,800	193,800	1,083,459	0
1976	225,240	225,240	1,289,939	0
1977	249,120	249,120	1,483,904	0
1978	203,400	203,400	1,181,707	0
1979	212,400	212,400	1,105,238	0
1980	335,760	335,760	1,357,323	0
1981	500,280	500,280	1,664,171	1,172,679
1982	709,560	709,560	1,347,930	1,347,930
1983	834,000	834,000	1,205,561	1,205,561
1984	459,110	459,110	459,110	459,110
1985	1,563,240	1,563,240	4,556,803	4,556,803
1986	2,084,880	2,084,880	5,503,319	5,503,319
1987	2,688,720	2,688,720	5,423,747	5,423,747
1988	848,609	848,609	848,609	848,609
1989	26,934	26,934	26,934	26,934
	TOTAL MAX 33,609,000	TOTAL 11,135,053	TOTAL 20,544,692	TOTAL 20,544,692

METHOD 3   METHOD 4

	CLAIM RATIO (Paid Claims/Earned Premiums) £	Required Equalisation Reserve £	Initial Transfer £	E-A Adjustments £	Required Equalisation Reserve £	Final Equalisation Reserve
1973						
1974						
1975	0.106	2,534,599	88,711	404,315	493,026	493,026
1976	0.084	2,945,785	103,102	510,856	613,958	613,958
1977	0.047	3,258,098	114,033	641,289	755,323	755,323
1978	0.070	2,660,152	93,105	483,780	576,886	576,886
1979	0.167	2,777,858	97,225	333,511	430,736	430,736
1980	0.353	4,391,213	153,692	7,441	161,134	161,134
1981	0.468	6,542,876	229,001	(466,553)	0	0
1982	0.696	9,279,929	324,798	(2,011,600)	0	0
1983	0.769	10,907,409	381,759	(2,869,405)	0	0
1984	0.918	11,717,304	410,106	(4,197,086)	0	0
1985	0.482	18,400,250	644,009	(1,476,432)	0	0
1986	0.444	20,722,884	725,301	(1,167,710)	0	0
1987	0.213	14,417,335	504,607	1,314,235	1,818,842	1,818,842
1988	0.254	2,379,102	83,269	155,004	238,273	238,273
1989	0.268	76,953	2,693	4,328	7,021	7,021
		TOTAL 113,011,748	TOTAL 3,955,411		TOTAL 5,095,198	TOTAL 5,095,198
AVG.	0.356					
S.D.	0.262					

UNEARNED PREMIUM RESERVE + EQUALISATION RESERVE

	UNEARNED PREMIUM £	METHOD 1 £	METHOD 2 £	METHOD 3 £	METHOD 4 £
1972					
1973					
1974					
1975	0	193,800	0	493,026	493,026
1976	0	225,240	0	613,958	613,958
1977	0	249,120	0	755,323	755,323
1978	0	203,400	0	576,886	576,886
1979	0	212,400	0	430,736	430,736
1980	0	335,760	0	161,134	161,134
1981	0	500,280	1,172,679	0	0
1982	0	709,560	1,347,930	0	0
1983	0	834,000	1,205,561	0	0
1984	392,950	852,060	852,060	392,950	392,950
1985	1,302,700	2,865,940	5,859,503	1,302,700	1,302,700
1986	4,169,760	6,254,640	9,673,079	4,169,760	4,169,760
1987	13,219,540	15,908,260	18,643,287	15,038,382	15,038,382
1988	17,433,080	18,281,689	18,281,689	17,671,353	17,671,353
1989	4,854,265	4,881,199	4,881,199	4,861,286	4,861,286
	41,372,295	52,507,348	61,916,987	46,467,493	46,467,493

PROJECTED PAID LOSS RATIOS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1972														
1973														
1974														
1975	-0.02%	0.49%	3.28%	7.93%	9.01%	9.60%	9.73%	9.73%	10.11%	10.31%	10.48%	10.48%	10.48%	10.56%
1976	0.00%	0.51%	4.16%	6.23%	7.42%	7.64%	7.96%	7.96%	7.96%	7.96%	8.02%	8.25%	8.37%	8.37%
1977	0.00%	0.30%	0.72%	1.05%	1.45%	1.58%	2.14%	2.24%	2.50%	3.24%	3.94%	4.61%	4.69%	4.54%
1978	-0.08%	0.14%	0.76%	1.38%	3.26%	4.00%	4.79%	5.34%	5.72%	6.10%	6.89%	7.04%	7.12%	7.07%
1979	-0.02%	-0.02%	1.09%	5.16%	9.18%	10.22%	12.20%	13.11%	15.01%	16.75%	16.75%	16.08%	16.05%	16.36%
1980	0.00%	6.99%	12.45%	20.27%	25.53%	29.65%	31.33%	32.69%	34.27%	35.32%	34.15%	31.75%	31.54%	32.49%
1981	1.39%	3.07%	11.43%	24.65%	32.63%	39.51%	43.64%	45.74%	46.78%	48.33%	46.40%	42.80%	42.45%	43.85%
1982	0.41%	2.40%	16.65%	36.24%	50.09%	62.30%	68.47%	69.61%	71.67%	73.85%	70.46%	64.47%	63.86%	66.14%
1983	0.47%	3.95%	21.91%	46.09%	63.97%	74.23%	76.87%	78.87%	81.16%	83.58%	79.63%	72.73%	72.03%	74.64%
1984	0.27%	6.74%	36.90%	63.61%	82.20%	87.21%	92.76%	95.12%	97.80%	100.64%	95.71%	87.22%	86.34%	89.54%
1985	0.31%	5.86%	22.42%	38.30%	43.36%	49.25%	52.60%	54.06%	55.74%	57.52%	55.07%	50.61%	50.16%	51.88%
1986	0.52%	5.48%	24.24%	33.77%	44.00%	49.96%	53.36%	54.83%	56.54%	58.33%	55.83%	51.30%	50.85%	52.59%
1987	0.28%	3.88%	8.72%	16.50%	21.66%	24.97%	26.93%	27.79%	28.85%	29.95%	29.08%	27.19%	27.03%	27.79%
1988	0.13%	1.50%	7.15%	13.83%	18.21%	21.11%	22.84%	23.62%	24.57%	25.56%	24.95%	23.47%	23.35%	23.96%
1989	0.27%	2.96%	12.31%	22.56%	29.51%	33.75%	36.21%	37.29%	38.58%	39.92%	38.48%	35.66%	35.39%	36.50%
ALPHA		2.124515	3.543784	1.690228	1.293450	1.118808	1.057768	1.022649	1.024076	1.025275	0.942481	0.901069	0.988044	1.041038
BETA		0.023906	0.018271	0.017491	0.003254	0.007358	0.005121	0.002591	0.003862	0.003669	0.008580	0.009854	0.001622	-0.00343
CORRELATION		0.317533	0.831479	0.976218	0.994729	0.995897	0.998994	0.999752	0.999326	0.998807	0.998830	0.999083	0.999840	1

PAID LOSS RATIO TIMES PREMIUM

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Outstanding
1972															
1973															
1974															
1975	-312	7901	53029	128021	145582	155009	157062	157062	163278	166451	169172	169172	169172	170568	
1976	0	9642	78096	116891	139180	143427	149327	149327	149327	149327	150593	154763	157081	157081	-3130
1977	0	6143	14990	21758	30106	32777	44511	46586	51842	67186	81824	95709	97462	94332	456
1978	-1332	2345	12800	23347	55281	67795	81275	90524	96879	103326	116862	119381	120705	119837	-6838
1979	-323	-371	19219	91381	162516	180922	215880	232077	265617	296439	296439	284554	284024	289601	-79260
1980	0	195524	348319	567200	714420	829566	876692	914783	958739	988236	955402	888455	882374	908976	-122087
1981	58046	127970	476599	1027692	1360489	1647310	1819179	1906852	1950105	2014695	1934584	1784277	1769710	1828018	-204879
1982	24492	141767	984288	2142656	2961978	3683940	4048898	4115760	4237694	4366504	4166086	3812200	3776219	3910881	-155143
1983	32848	274682	1522637	3203427	4445927	5158781	5342585	5481601	5640425	5808496	5534035	5055036	5005879	5187442	183255
1984	21439	529828	2900301	4999019	6460112	6853904	7290093	7475575	7685918	7909025	7521545	6854879	6785678	7037159	1109681
1985	40397	763394	2920745	4989572	5648563	6415516	6852850	7041820	7261683	7493034	7173823	6592483	6534807	6758244	3270261
1986	90748	951994	4210640	5866482	7644550	8680630	9271079	9526084	9822552	10134583	9700733	8912241	8833885	9136743	4272525
1987	62096	868480	1954797	3695972	4853479	5594984	6032954	6227657	6464148	6709761	6516076	6092229	6055755	6227322	4256552
1988	24983	284441	1354218	2620388	3451014	4000457	4328607	4475750	4656707	4843949	4727921	4446911	4424497	4540993	1776759
1989	13121	145098	603786	1106304	1446908	1654892	1775606	1828528	1891493	1957297	1866780	1748445	1735498	1789800	
															14298152

Current Value of Past Claims

Year	Past Inflation		d1	d2	d3	d4	d5	d6	d7	d8	d9	d10	d11	d12	d13	d14
1972		1.10														
1973		1.10														
1974		1.10														
1975	3.80	1.10	-1185	28354	141631	213961	45549	21804	4401	0	11012	5110	3984	0	0	1536
1976	3.45	1.10	0	30261	195307	100624	52556	9104	11497	0	0	0	1685	5046	2550	0
1977	3.14	1.10	0	17527	22947	15959	17895	5205	20787	3342	7695	20423	17712	15274	1753	
1978	2.85	1.10	-3772	9537	24652	22608	62230	22169	21710	13541	8459	7801	14890	2519		
1979	2.59	1.10	-838	-113	41993	140623	126020	29643	51182	21558	40475	33904	0			
1980	2.36	1.10	0	419123	297754	387761	237099	168585	62725	46090	48352	29497				
1981	2.14	1.10	12427	136262	617618	887541	487248	381759	207961	96440	43253					
1982	1.95	1.10	47728	207760	1356888	1695967	1090518	873574	401454	66862						
1983	1.77	1.10	58192	389476	1827131	2237131	1503425	784139	183804							
1984	1.61	1.10	34528	744332	3155100	2539449	1607202	393792								
1985	1.46	1.10	59145	962309	2610395	2275710	658991									
1986	1.33	1.10	120786	1042108	3584511	1655842										
1987	1.21	1.10	75136	887022	1066317											
1988	1.10	1.10	27481	359458												
1989	1.00	1.00	13121													

Chain Ladder on Current Value of Past Claims

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1975	27169	168800	382761	428309	450113	454514	454514	465526	470636	474620	474620	474620	474620	476156
1976	30261	225568	326192	378749	387852	399350	399350	399350	399350	401035	406081	408630	409630	409630
1977	17527	40474	56432	74327	79532	100319	103661	111356	131779	149491	164765	165518	166807	166807
1978	5765	30418	53026	115256	137426	159135	172677	181135	188896	203826	206345	207194	207554	207554
1979	-951	41042	181665	307685	337328	388510	410069	450543	484447	484447	493450	495481	496342	496342
1980	419123	716877	1104638	1341738	1510323	1573048	1619138	1667489	1696986	1735756	1768011	1775288	1778375	1778375
1981	260689	878306	1765847	2253095	2634854	2842816	2939256	2982509	3070594	3140744	3199109	3212276	3217861	3217861
1982	255498	1612376	3308343	4398860	5272434	5673088	5740750	5890650	6064623	6203175	6318450	6344455	6355485	6355485
1983	447668	2274799	4511931	6015356	6799495	6983299	7132606	7318848	7535002	7707146	7850370	7882679	7896384	7896384
1984	778860	3933960	6473408	8080611	8474403	8939054	9130176	9368578	9645268	9865624	10048958	10090317	10107859	10107859
1985	1021454	3631849	5907559	6566550	7321553	7722994	7888115	8094086	8331135	8523514	8661908	8717639	8732796	8732796
1986	1162893	4747404	6403246	7969685	8886017	9373237	9573642	9823623	10113752	10344811	10537051	10580418	10598813	10598813
1987	962159	2048476	3410984	4245420	4733546	4993086	5099841	5233005	5387556	5510840	5613045	5636147	5645946	5645946
1988	386939	1461432	2433479	3028785	3377027	3562189	3638350	3733353	3931424	3991424	4020483	4020964	4027955	4027955
1989	139901	528392	879843	1095081	1220991	1287937	1315474	1349823	1389689	1421437	1447852	1453811	1456339	1456339
	10.66236	3.776902	1.665132	1.244632	1.114977	1.054830	1.021380	1.026111	1.029533	1.022845	1.018583	1.004115	1.001738	

Future Inflation / Future Claims / Outstanding

Year	Future Inflation		f1	f2	f3	f4	f5	f6	f7	f8	f9	f10	f11	f12		Outstanding
1975	1.10	1.10														318
1976	1.10	1.21													318	1370
1977	1.10	1.33													436	13507
1978	1.10	1.46	18702												1147	95880
1979	1.10	1.61	47023	75365											8994	287731
1980	1.10	1.77	59919	189495	82348										19541	790006
1981	1.10	1.95	102257	241466	207054	94001									26706	1243935
1982	1.10	2.14	76595	412062	263842	236352	73630								37605	2262662
1983	1.10	2.36	80596	308665	450268	301176	185133	50661							35738	2980841
1984	1.10	2.59	57238	324788	337268	513981	235909	134925	118601						47712	5702646
1985	1.10	2.85	41881	230662	354885	384991	402598	171930	298206	202778					27957	4840314
1986	1.10	3.14	19277	168774	252037	405102	301561	293412	379993	509860	315130				21940	4960459
1987	1.10	3.45	9685	77664	184413	287700	317313	219777	648490	649696	792353	467781			8726	2120255
1988	1.10	3.80	2457	39010	84882	210508	225354	231257	485743	1108762	1009667	1176176	470075			
1989	1.10	4.18	934	9903	42646	96893	164889	164237	511117	830504	1723083	1498759	1181942	139458		
																25319924

SEPARATION

Average Payment Per Claim

Year														
1972	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0	0	0	1396
1975	-312	548	684	926	798	841	1027	692	6216	1058	2721	2085	773	0
1976	0	507	691	746	929	1416	1967	1542	1314	2577	1266	2777	1753	
1977	0	473	590	615	835	1336	1676	2025	1271	2149	3660	2519		
1978	-661	735	1046	703	1996	963	1685	2539	2573	3425	4512			
1979	-323	-16	1152	1569	1872	1534	2689	2828	3140	3277	0			
1980	0	16294	2093	1990	2538	2742	2356	3715	3932					
1981	14512	1840	2340	2826	2580	3084	3243							
1982	2227	1988	2277	2910	3213	3721	3802							
1983	2996	2468	2869	3409	4034	4455	4595							
1984	1949	2872	3781	4437	4482	4985								
1985	2886	3443	4238	4811	5314									
1986	3781	4243	5281	6393										
1987	3268	5639	5571											
1988	1249	6419												
1989	3280													

Diag sum	51753.554	51753.93	40190.58	30186.36	22403.05	15968.67	13814.38	13026.51	34911.11	2573.481	1748.257	502.9930	507.4736	0
D/gen	51753.554	47173.93	41243.54	32746.75	25832.75	19718.45	18325.02	18675.51	57104.79	4820.887	3917.634	1430.545	2008.378	0
Col sum	51753.554	0	2525666	7381	9437.5	11408.44	12229.88	13339.90	22012.88	22423.78	27792.89	3040.40	3192.928	3515350
						98927.48	140171.0	172917.7	187505.0	218469.0	236794.0	255469.5	312574.3	3173995.2	3213128	3227443.4	3247517	3247517.7
C/gen	0	0.025530	0.054577	0.057400	0.055979	0.056335	0.086166	0.077532	0.087565	0.094644	0.098930	0.144430	0.108247	
		0.025530	0.078187	0.132765	0.190166	0.246146	0.302481	0.386648	0.466181	0.553746	0.648390	0.747321	0.891752	1
	0.974469	0.921812	0.867234	0.809933	0.753853	0.697518	0.611351	0.533818	0.446253	0.351609	0.252678	0.108247	1.1E-16
	1	0.974469	0.921812	0.867234	0.809933	0.753853	0.697518	0.611351	0.533818	0.446253	0.351609	0.252678	0.108247

D/gen	C/gen infl'n	0.108247	0.144430	0.098930	0.094644	0.087565	0.077532	0.086166	0.056335	0.055979	0.057400	0.054577	0.052657	0.025530
0		0	290	142	371	422	4427	1609	1032	1104	1483	1787	2172	1204
2008.378	0.7122888	217	207	388	456	5000	1448	1579	1111	1446	1880	2251	2484	1321
1430.545	2.7385593	155	566	477	5405	1635	1421	1699	1455	1833	2367	2575	2725	1453
3917.634	1.2305607	424	696	5649	1768	1605	1529	2226	1845	2309	2708	2825	2998	1599
4820.887	11.845286	522	8248	1848	1734	1727	2003	2822	2323	2641	2971	3107	3297	1759
5704.79	0.3270394	6181	2697	1813	1866	2262	2539	3554	2658	2897	3268	3418	3627	1935
18675.51	0.9812324	2022	2647	1951	2445	2867	3198	4065	2916	3187	3595	3760	3990	2128
18325.02	1.0760399	1984	2848	2556	3099	3612	3658	4459	3207	3506	3954	4136	4389	2341
19718.45	1.0760399	2134	3731	3240	3903	4131	4013	4905	3528	3856	4349	4549	4828	2575
25832.75	1.3100800	2796	4730	4080	4465	4532	4414	5396	3881	4242	4784	5004	5311	2832
32746.75	1.2676443	3545	5957	4667	4898	4985	4855	5935	4269	4666	5263	5504	5842	3116
41243.54	1.2594699	4465	6813	5120	5388	5484	5341	6529	4696	5132	5789	6055	6426	3427
47173.93	1.1437893	5106	7475	5632	5927	6032	5875	7182	5165	5646	6368	6660	7068	3770
51753.55	1.0970794	5602	8222	6195	6519	6635	6462	7900	5682	6210	7005	7326	7775	4147
56929														
62622														
68884														
75772														
83350														
91685														
100853														
110938														
122032														
134235						1339345	640531	465544	133164	126512	66330	13787	6791	
147659			1258286	788779	750940	507856	433187	169509	157591	149528	31073	16669	2135	
162425		1246116	1152480	722453	442251	299091	184916	157728	200604	186261	70049	37615	5247	
178667		714710	661005	414363	232324	157119	108902	118042	186662	237100	87257	84795	11826	

| | | 292937 | 714710 | 661005 | 414363 | 232324 | 157119 | 99745 | 128879 | 220621 | 258649 | 111073 | 105626 | 26660 |
| | | | | | | | | 67703 | 118042 | 152326 | 220621 | 103353 | 134455 | 33209 |

	Outstanding
	0
	1041
	8926
	35722
	146845
	457543
	703108
	1360560
	1906527
	3574501
	3363414
	4326708
	2774522
	18659417

COMPANY A EQUALIZATION RESERVE CALCULATIONS

Financial Year	Written Premium £	Unearned Premium £	Annual Earned Premium £	Incurred Claims £	Technical Surplus £
1972	500,136	0	0	0	0
1973	390,488	0	25,007	35	24,972
1974	251,318	0	94,545	5,561	88,984
1975	461,665	0	171,166	41,836	129,330
1976	823,205	0	238,906	56,155	182,751
1977	816,920	0	313,792	79,567	234,225
1978	1,196,559	0	415,510	105,571	309,939
1979	876,172	0	551,096	104,221	446,875
1980	713,653	0	698,040	58,729	639,311
1981	1,275,670	38,270	791,572	45,136	746,436
1982	1,815,485	145,239	846,833	33,215	813,618
1983	2,085,493	312,824	949,513	92,183	857,330
1984	2,517,582	629,395	1,137,738	422,055	715,683
1985	3,299,740	1,319,896	1,400,900	530,892	870,008
1986	4,449,647	2,669,788	1,731,203	809,963	921,240
1987	6,860,151	5,488,121	2,167,609	2,152,561	15,048
1988	7,938,462	7,541,539	2,819,556	3,328,278	(508,722)
1989	4,903,298	4,903,298	3,774,287	3,711,534	62,753
TOTAL		23,048,370			

Incurred Claims
= Paid Claims
+ o/s c/fwd
- o/s b/fwd

Technical Surplus
=Earned Prem
-Inc Claims

METHOD 1 / METHOD 2

	METHOD 1 Potential Contribution £	Actual £	Maximum Reserve £	Accumulation £	METHOD 2 Potential Contribution £	Actual £	Maximum Reserve £	Accumulation £
1972	0	0	750,204	0	0	0	670,182	0
1973	18,729	18,729	750,204	18,729	18,729	18,729	596,718	18,729
1974	30,158	30,158	750,204	48,887	66,738	66,738	510,067	85,467
1975	55,400	55,400	750,204	104,287	96,998	96,998	537,208	182,464
1976	98,785	98,785	1,234,808	203,071	137,063	137,063	650,386	319,527
1977	98,030	98,030	1,234,808	301,102	175,668	175,668	735,284	495,196
1978	143,587	143,587	1,794,839	444,689	232,454	232,454	951,311	727,650
1979	105,141	105,141	1,794,839	549,830	335,156	335,156	1,118,772	1,062,807
1980	85,638	85,638	1,794,839	635,468	479,483	479,483	1,186,304	1,542,290
1981	153,080	153,080	1,913,505	788,548	559,827	559,827	1,307,565	2,102,117
1982	217,858	217,858	2,723,228	1,006,406	610,214	610,214	1,575,180	2,712,331
1983	250,259	250,259	3,128,240	1,256,666	642,997	642,997	1,813,415	3,355,328
1984	302,110	302,110	3,776,373	1,558,775	536,762	536,762	2,253,313	3,892,090
1985	395,969	395,969	4,949,610	1,954,744	652,506	652,506	2,946,384	4,544,597
1986	533,958	533,958	6,674,471	2,488,702	690,930	690,930	3,797,010	5,235,527
1987	11,286	11,286	10,290,227	2,499,988	11,286	11,286	5,148,980	5,246,813
1988	(508,722)	(508,722)	11,907,693	1,991,266	(508,722)	(508,722)	6,717,576	4,738,091
1989	47,065	47,065	11,907,693	2,038,331	47,065	47,065	7,356,948	4,785,156

TOTAL 4,785,156

TOTAL MAX 7,356,948

METHOD 3 / METHOD 4

	CLAIM RATIO	METHOD 3 Maximum Equalisation Reserve	Initial Transfer	E-A Adjustments	Required Equalisation Reserve	Initial Transfer	Actual Transfer	Minimum Equalisation Reserve	METHOD 4 Final Equalisation Reserve
1972	1.000	0	0	0	0	0	0	0	0
1973	0.001	56,083	1,963	9,535	11,498	9,535	9,535	28,041	9,535
1974	0.059	212,035	7,421	30,621	49,540	30,621	30,621	106,018	40,156
1975	0.244	383,874	13,436	23,669	86,645	23,669	23,669	191,937	63,825
1976	0.235	535,793	18,753	35,274	140,671	35,274	35,274	267,897	99,098
1977	0.254	703,739	24,631	40,520	205,822	40,520	40,520	351,870	139,619
1978	0.254	931,863	32,615	53,444	291,881	53,444	53,444	465,932	193,062
1979	0.189	1,235,941	43,258	106,682	441,821	106,682	106,682	617,970	299,744
1980	0.084	1,565,492	54,792	208,409	705,022	208,409	208,409	782,746	508,153
1981	0.057	1,775,256	62,134	257,796	1,024,952	257,796	257,796	887,628	765,950
1982	0.039	1,899,190	66,472	290,866	1,382,290	290,866	290,866	949,595	1,056,815
1983	0.097	2,129,469	74,531	271,193	1,728,014	271,193	271,193	1,064,734	1,328,008
1984	0.371	2,551,602	89,306	13,354	1,830,674	13,354	13,354	1,275,801	1,341,362
1985	0.379	3,141,794	109,963	5,229	1,945,866	5,229	5,229	1,570,897	1,346,591
1986	0.468	3,882,563	135,890	(147,436)	1,934,319	(147,436)	(147,436)	1,941,282	1,199,155
1987	0.993	4,861,289	170,145	(1,323,023)	781,441	(1,323,023)	(1,199,155)	2,430,645	0
1988	1.180	6,323,408	221,319	(2,249,242)	0	(2,249,242)	0	3,161,704	0
1989	0.983	8,464,579	296,260	(2,267,125)	0	(2,267,125)	0	4,232,290	0

AVG. 0.383

S.D. 0.374