# Moral Hazard and Guarantee Arrangements: A Case Study of Lloyd's

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**Abstract**

State guarantees to insurance policy-holders remove the need for counterparty credit risk assessment and create a moral hazard that may result in excessive risk-exposure and underpricing in the insurance industry. The arrangements at Lloyd's guaranteeing payment on policies written by individual Lloyd's syndicates can be expected to have similar effects. An analysis of the behaviour of Lloyd's in the 1970s and 1980s provides a case study that demonstrates some of the practical consequences of this moral hazard: insurers with insufficient capital resources, excessive exposure to high-volatility catastrophe reinsurance business, and underpricing of risks.

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# MORAL HAZARD AND GUARANTEE ARRANGEMENTS: A CASE STUDY OF LLOYD'S

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## 1 Introduction

In the insurance literature discussions of moral hazard have focused traditionally on its effects on policy-holders' behaviour: the fact that policy-holders could recover the cost of losses reduced the incentive to minimise any losses or to incur costs (financial or psychic) in order to cut the probability of loss. More recently, however, attention has turned to the moral hazard inherent in government guarantees, following on the similar analysis applied to deposit-taking institutions. In this case the focus is on the bank, thrift institution or insurance company concerned, rather than on the depositor or policy-holder, and the moral hazard is an *indirect* consequence of the absence of counter-party credit risk, which enables the institution to alter its behaviour. Specifically, because the depositor or policy-holder does not have to take account of the financial strength (or covenant) of the financial institution concerned, that institution will have an incentive to pursue more profitable, but riskier, policies than would otherwise be the case. Therefore, unless the government guarantee is associated with more effective peer group pressure or tighter regulation, the presence of guarantees should be associated with a tendency to greater risk exposure. In the case of insurance this might take the form of a riskier structure for investment portfolios, a lower solvency margin, greater risk exposure in the business written, or lower premiums for a given risk. In the US the S&L debacle provided incontrovertible evidence of the effects of moral hazard on deposit-taking institutions, while in the insurance field the diversity of government guarantees between States has enabled investigators to identify differences in risk exposure that are associated with differing guarantee arrangements.[2]

In the UK there have not, to my knowledge, been studies of the effects of policy-holder protection on insurance company behaviour, and it is unlikely that any effects could be discerned: policy-holder protection was introduced in the aftermath of insurance company failures, there has been a tightening of regulatory arrangements, and the costs of any failures are borne by competitors, who therefore have an interest in ensuring that the regulators are sufficiently well-informed to prevent undue risk exposure. In Lloyd's, however, the UK does have a market that is affected by comparable arrangements, in that policy-holders who place business with any Lloyd's syndicate have the implicit guarantee of the Lloyd's policy. As a result, the individual syndicates are not subject to the discipline of counterparty credit risk assessment, and the potential for moral hazard to affect behaviour exists.[3] The experience of Lloyd's in

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[1] I am indebted to Lee Redding for perceptive comments at a Department of Economics seminar.
[2] See Brewer and others (1997) for evidence from life insurance and Lee and others (1995 pp. 8-9.]) for evidence from property-liability insurance.
[3] This problem of moral hazard was identified in the Walker Report (1992) on Lloyd's syndicate participations and the LMX spiral, particularly p.17, paragraph 3.10.

the period from 1970 to 1990 provides a case study of the effect of guarantees in the absence of adequate regulation.

While theoretical analysis tends to stress the effect of this moral hazard on shareholder behaviour, because it is the shareholder who receives the rewards from providing risk-bearing capital, in practice it is the executive management, whose interests are unlikely to be fully aligned with those of shareholders, who take the relevant decisions. In particular, when job-security and remuneration depend on short-term performance, the reward to risk ratio for managers may be higher than for shareholders, and lead them to pursue more aggressive policies than would be in the interests of the shareholders themselves. The focus of this study is therefore on the behaviour of the *Working* Names, i.e. management, at Lloyd's, who were responsible for raising capital and deploying it on insurance business.

Section 2 below sets out the structure of Lloyd's so far as is necessary for this paper, Sections 3 to 5 deal in turn with three distinct aspects of the effects of moral hazard on behaviour at Lloyd's, while section 6 demonstrates the consequences for premium rates, retentions, and the distribution of losses. Conclusions are summarised in the final section.

## 2 The Structure of Lloyd's[4]

The Lloyd's market has a unique structure. The capital-support is provided by *Names*, who are divided into two broad categories: *Working Names*, who have some business involvement with the market and who may exercise control over the deployment of capital or underwriting; and *External Names*, who provide the bulk of the capital-support, but who have no executive function in the market. Like shareholders in insurance companies, external Names bear the underwriting risks and receive the profits (after all expenses), though unlike shareholders their liability to meet underwriting losses is, at least in principle, unlimited.

As a condition of admission to Lloyd's, external Names must provide evidence of some minimum level of personal wealth. The amount of business (measured by premium income) that a Name may underwrite - the Name's *capacity* - is linked to the level of "means" shown, and the Name's *Lloyd's deposit*, i.e. funds held at or readily available to Lloyd's - is determined by his capacity.

Every Name's capacity is allocated to a range of *syndicates*, run by *Managing Agents*. These managing agents, through the underwriters they employ, arrange the insurance business written by the syndicate. Each syndicate specialises in particular kinds of business, e.g. motor, marine, catastrophe reinsurance. The syndicate underwriters are the key working Names, who have day-to-day responsibility for the risk-exposure and profitability of their syndicate's business. Part of the remuneration of both managing agents and their underwriters takes the form of profit-commission.

[4] This description applies to Lloyd's in the 1970s and 1980s, and is intended to give only a broad outline of the key aspects relevant to the issues discussed in this article.

The responsibility for recruiting and managing Names' relationships with Lloyd's is in the hands of *Members' Agents*, and in practice it is normally the members' agents who decide on and arrange the syndicate-participations of their Names, thus effectively controlling their overall risk-exposure. Part of the members' agent's remuneration also takes the form of profit-commission.

Most of the funds at Lloyd's are held by managing agents in premium trust funds, and claims arising from policies written are normally met out of these funds, with the back-up of Names' deposits and other funds at Lloyd's and, if necessary, calls for further funds from Names' personal wealth. In the event of a managing agent's premium trust fund being exhausted, and of any Name having insufficient funds at Lloyd's and failing to pay a call, the syndicate has recourse to the Lloyd's *Central Fund* to ensure that claims are paid.[5] All Names contribute annually to this fund, and it may also be augmented by levies; contributions and levies depend on Names' capacity at Lloyd's, but not on the kind of business they write or their risk-exposure. Since Names are liable individually only for their own shares of any syndicate losses, it is the Central Fund and its associated arrangements[6] that provide the guarantee that claims on Lloyd's policies will be paid in full.[7]

Within this structure there are a number of ways in which moral hazard emanating from the mutual guarantee might have influenced behaviour. First, since policy-holders did not need to be concerned with the financial strength of the individual Names, it could have affected the behaviour of the authorities at Lloyd's, who were responsible for setting the criteria for admission of Names, and of the members' agents who recruited them. Secondly, it could have affected the Names' participations on syndicates specialising in high-risk business: when there was no counterparty credit risk assessment of individual Lloyd's syndicates, factors that might otherwise have prevented members' agents from placing Names without sufficient financial strength on high-risk syndicates, or from applying too high a proportion of Names' participations to them, were weakened. Thirdly, it could have affected the behaviour of managing agents and their underwriters, because syndicates could accept exposures that were excessive in relation to the capital-support provided by some or all of their Names, or write business at premium levels that other insurers regarded as uneconomic, without undermining their customers' confidence that any claims would be paid.

Any or all of these consequences of moral hazard might, of course, have been expected to damage the Lloyd's market or undermine customers' confidence in the Lloyd's policy in the long run. They could, in principle, have been prevented through regulation of the Lloyd's market. My contention, however, is that the self-regulatory

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[5] The Central Fund is also used to replenish premium trust funds for shortfalls resulting from any Name failing to pay a call, even if the syndicate as a whole has had sufficient funds to pay claims in full.

[6] If the Central Fund is exhausted the funds belonging to the Corporation of Lloyd's can also be made available.

[7] See Bob Hewes(1991), Head of Regulatory Services at Lloyd's, who wrote "The Central Fund and the assets of the Corporation of Lloyd's exist as the <u>ultimate</u> safeguard and protection for the Lloyd's policyholder, in the event of members failing to meet their underwriting obligations."

regime at Lloyd's in the two decades under review did not in practice provide sufficient protection against moral hazard and its consequences.[8]

## 3 Lloyd's Names' wealth

The first proposition is that Lloyd's admitted a large number of external Names whose wealth was insufficient to warrant the underwriting of insurance business at Lloyd's[9]. This occurred because it was perceived to be in the financial interest of the working Names as a whole, and/or of the members' agents in particular.

In order to maintain its position in insurance markets Lloyd's has to attract enough Names to provide the capacity it requires. At the end of the 1960s this was seen to be a problem. Following losses on business written in 1965 and 1966 membership of Lloyd's had been stagnant,[10] "there were complaints about difficulties in placing risks at Lloyd's because of lack of capacity",[11] and "if capacity was seen to be inadequate, a point might come .... when there was a massive loss of business."[12] A Lloyd's Working Party, with Lord Cromer[13] as an independent chairman and including other independent members, was set up, part of whose task was "to recommend measures designed to keep business at Lloyd's and where practicable increase it."[14] The behaviour of Lloyd's in setting minimum criteria for admission of external Names subsequently (and the opening up of the market to corporate Names more recently) was consistent with recurring business pressures to maintain or augment capacity.

Members' agents also had an incentive to attract new members to Lloyd's - their profits depended on the numbers of members for whom they acted, and the capacity provided by them. In the mid-1980s members' agents were particularly active in recruiting new Names, on occasion paying commissions to intermediaries who introduced Names to them[15].

Table 1 shows the number of Names, and the minimum means required of new external Names commencing business, in each year from 1970 to 1990. At the time of the Cromer Working Party the minimum level of means for external Names was set at £75,000. The Working Party considered that in future the minimum means should be £50,000: "The ability to produce a capital sum is needed and the figure of £50,000 is relatively modest.....In reducing the means test to £50,000, we have gone as far as is desirable." Proposals to the Working Party that a lower figure should be set were

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[8] Whether, given the priorities of powerful interest groups at Lloyd's, self-regulation could realistically have been expected to do so, is a question for some future historian to consider.
[9] More specifically, that a significant number of Names would not have been regarded as sufficiently credit-worthy by the insurance brokers and others who place high-risk business at Lloyd's if the covenant of the individual Names had not been supported by the Lloyd's guarantee.
[10] Cromer (1969), p 13, para. 48
[11] Ibid. , p7, para. 28.
[12] Ibid., p8, para. 29.
[13] A former Governor of the Bank of England.
[14] Ibid., p8, para. 29.
[15] While many of the new Names were in fact wealthy, a significant number were not. The moral hazard applies only to the recruitment of the latter group.

rejected, and Lloyd's was recommended to keep the minimum under review in the light of inflation.[16]

**Table 1: Lloyd's Members and Means**

| YEAR | MEMBERS* | MINIMUM MEANS (£000) | MINIMUM MEANS (£000) |
|---|---|---|---|
| | | (CURRENT PRICES) | (1990 PRICES) |
| | | | |
| 1970 | 6001 | 75 | 501.2 |
| 1971 | 6020 | 50 | 298.4 |
| 1972 | 6299 | 50 | 278.6 |
| 1973 | 7140 | 50 | 255.2 |
| 1974 | 7589 | 75 | 329.8 |
| 1975 | 7710 | 75 | 265.5 |
| 1976 | 8565 | 37.5 | 113.9 |
| 1977 | 10662 | 37.5 | 98.3 |
| 1978 | 14134 | 37.5 | 90.8 |
| 1979 | 17279 | 37.5 | 80.1 |
| 1980 | 18552 | 50 | 90.5 |
| 1981 | 19137 | 50 | 80.9 |
| 1982 | 20145 | 50 | 74.5 |
| 1983 | 21601 | 50 | 71.2 |
| 1984 | 23436 | 100 | 135.6 |
| 1985 | 26019 | 100 | 129.2 |
| 1986 | 28242 | 100 | 121.8 |
| 1987 | 30936 | 100 | 117.8 |
| 1988 | 32433 | 100 | 113.1 |
| 1989 | 31329 | 100 | 107.8 |
| 1990 | 28770 | 250 | 250 |

* *Active* members from 1985

The Working Party's recommendation of a minimum of £50,000 at the end of 1969 was equivalent to almost £350,000 in 1990 prices, and this £50,000 limit was implemented for Names commencing business in 1971. The minimum was increased to £75,000 for Names commencing in 1974, broadly compensating for the decline in the value of money in the intervening period. The reduction in the minimum to £50,000 after 1970 led to a significant increase in the number of Names, but the rate of growth tailed off after the real value of the minimum was restored. Lloyd's response was not to maintain the minimum real value, as recommended by Cromer, but to introduce a new category of "Mini-Names", who had to show wealth at only half the normal level (and whose underwriting limits were correspondingly lower)[17], i.e. with a real value in 1976 of less than 40% of the minimum suggested by the Cromer Working Party. This appears to have led to an upward surge in membership, starting in 1976 and continuing

[16] Ibid., p 19, paras. 74 and 76.
[17] The Rowland Task Force Report (1992) states that the Cromer Working Party recommended this step. (P.22, Exhibit 2). In fact Cromer recommended a lower limit only for *Working* Names. (Cromer (1969), p.19, para. 74.)

until 1979 when the minimum, which had fallen in real terms to only a little over a quarter of the Cromer figure, was increased to £50,000 (full Names, £100,000). Membership continued to rise, though more slowly, but with inflation continuing the real value of the minimum means requirement had fallen to less than a quarter of the Cromer figure by 1983.

In 1983 the Mini-Names category for new Names was abolished, so that the effective minimum reverted to £100,000 - in real terms still less than half the Cromer figure. But this was accompanied by a very significant easing of the assets that were eligible in calculating a prospective Name's means. Until then the value attached to a Name's owner-occupied house had been excluded or discounted significantly, and bank guarantees secured on such housing had not been acceptable. From 1983 on, bank guarantees secured on owner-occupied houses were accepted. This meant that people whose sole significant asset was the house in which they lived could satisfy the asset criterion for membership of Lloyd's. The growth of membership accelerated, with rapid growth continuing until 1988 - by which time the real value of minimum shown means (for *full* Names) had fallen to the 1976 level for *Mini*-Names - after which mounting losses at Lloyd's[18] discouraged potential new Members. By 1990 it was becoming evident that significant numbers of Lloyd's Names either could not or would not pay their debts, and the minimum was raised substantially, to £250,000.

There are no statistics measuring the *actual* levels of Lloyd's Names wealth[19]. However, data for 1986 record that 13% of external Names at that time had *shown* means of less than the minimum for new Names, and that a further 42% showed means in the range £100,000 - £150,000 that included the minimum (£100,000) at the time.[20] In 1988 the managing director of one of Lloyd's largest agencies drew attention to the financial weakness of some Names[21]: "There are probably quite a number of Names who either have few liquid assets beyond their stated means or have provided their deposit with a Bank Guarantee supported by their house. Also many Names, it is thought, have passed much of their wealth to their spouses or trusts for their children."

Later a Lloyd's Task Force stated that "With hindsight, it is apparent that....it was a serious mistake to permit some individuals to join who did not have the appropriate resources to pay losses;"[22] and the Chairman of Lloyd's told a parliamentary committee that "Names came into membership overstretching themselves, being encouraged by their banks and other advisers to do so, and by agents who brought

[18] Due to both long-tail liabilities and catastrophe insurance.
[19] This is one reason why the counterparties who purchase insurance policies from Lloyd's syndicates have to rely on the resources available to Lloyd's as a whole and on the mechanisms for pooling those resources.
[20] Neill (1987), Appendix 6.
[21] Anthony G. Carver, Managing Director of Wellington Underwriting Agencies Ltd., at a conference on The Future Lloyd's, 20/21 June 1988. An example of a Name with slender means was a Mr Sword-Daniels, a dentist with a total annual income of less than £35,000 in 1986, whose only substantial asset was a half share in the equity of his house, which was charged to the bank as security for a bank guarantee of £100,000, to establish the required minimum of readily realisable assets. [Gatehouse (1994), pp. 8-9.]
[22] Rowland (1992), p. 22, para. 1.12.

them in, who never should have been members of the market."[23] Finally, in 1996, in the context of proposals for Lloyd's "Reconstruction and Renewal" the Names' Committee estimated that some *6000* Names - some 20% of all Names at the time - "may be unable to pay their 'finality' bills in full without further assistance."[24]
The facts are that from the mid-1970s to 1990 Lloyd's chose to ignore the criteria for admission standards recommended by the Cromer Working Party, that Lloyd's admitted members with means that were only a fraction of those required previously or subsequently, that this was encouraged by some members' agents and that the means of a substantial proportion of Names proved in the event to be inadequate. These facts are consistent with moral hazard affecting the recruitment and admission of Names at Lloyd's.

## 4 Lloyd's Names' exposure to catastrophe reinsurance

The second proposition is that, as a result of moral hazard, many Lloyd's Names were able to commit much too large a proportion of their underwriting capacity to high-risk catastrophe reinsurance business, and that this resulted in an increase in the capacity committed by Lloyd's as a whole to this kind of business.

Lloyd's Names' exposures to the risk of underwriting losses reflect the specialisations of the syndicates of which they are members and the size and spread of their syndicate participations. Few external Names have the expertise to determine these matters themselves and, as already noted, they normally rely instead on recommendations from their members' agents, who have a clear duty to make recommendations that accord with each Name's appetite for and capacity to bear risk.

Members' agents are remunerated by a combination of fees - based on each Name's total syndicate participations - and profit commission, which depends on the profits earned on the Name's syndicate participations.[25] Prior to 1990, any syndicate losses were *not* netted off against profits of other syndicates in the same year. Members' agents thus had a significant financial interest in the profitability of the syndicates on which they placed their Names, but, at least until 1990, suffered no immediate financial penalty as a result of syndicate losses.[26] Thus members' agents could expect to earn more from Names' participations in syndicates specialising in high volatility business, characterised by relatively high profits in most years partly offset by relatively rare, but probably significant, losses, than on syndicates with a more stable profit profile: in other words, they had a financial incentive that was liable to bias recommendations in favour of high risk syndicates.

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[23] Treasury and Civil Service Committee, (1994-95), p. 115.

[24] Reconstruction and Renewal, (February 1996), Appendix 1, p. 3]. These Names would be unable to pay in full even after part of their losses had been met from the Central Fund or other sources and the outstanding balance had been capped at a maximum of £100,000. Moreover the 6000 does not include Names who had already settled their debts as far as possible and who had been unable to pay them in full.

[25] The 1989/90 accounts of 10 large members agencies showed that revenue was divided more or less equally between fees and profit commission in that year. [Rowland (1992) p.122, Exhibit 63.]

[26] The overall profitability of the syndicates on which members' agents placed Names was, of course, a factor influencing their ability to attract new Names.

In the years between 1965 and 1987 the world-wide reinsurance industry was relatively undisturbed by major catastrophes, thus generally leaving catastrophe reinsurers with a 22 year span of profitable results. Moreover there was a shortage of world-wide capacity for catastrophe reinsurance in the mid-1980s, giving rise to a hardening of premium rates.[27] This led in turn to an influx of capacity, both in the company market and, significantly in the context of this paper, at Lloyd's. At the same time, there was excess capacity in some other types of insurance, limiting the demand for new capacity in these areas.

The issue is whether the shortage of capacity and apparent profitability of catastrophe reinsurance in the mid-1980s led members' agents to bias their recommendations in favour of syndicates specialising in this business, without giving due weight to their Names' financial resources and appetites for risk. Names could not generally be expected to appreciate the magnitude of the risks to which these syndicates were exposed, and the high credit standing of Lloyd's as a whole meant that even Names who could not reasonably bear the risks were in a position to participate in the business.

The starting point is the question of *how much* exposure to catastrophe reinsurance would be reasonable in the context of any Name's portfolio of syndicate participations and of that Name's means and appetite for risk. Clearly, since the returns on catastrophe reinsurance have little correlation with the returns from other kinds of insurance, a case can be made for including *some* exposure in order to improve the prospective return to risk ratio for the Name. However, for Names with limited means, that exposure may well be less than the minimum size of for a syndicate participation. Moreover, syndicates emphasising other categories of insurance may well also have *some* exposure to catastrophes, so that Names without participations on specialist catastrophe reinsurance syndicates are liable in practice to be exposed to some catastrophe losses.

Good practice at Lloyd's provides some answers, and in determining good practice the English Courts have relied on the advice of expert witnesses. One such witness[28] classified syndicates into three categories - standard, medium and high risk - with the high risk category being those for which the loss potential[29] was greater than 30% of their annual premium income limit and could be as high as 100%.[30] In practice the high-risk category comprised specialist catastrophe excess of loss reinsurers, including some that wrote a considerable proportion of high-level retrocession business. Since, under Lloyd's rules, Names could (and generally did) have syndicate participations permitting underwriting of premiums up to 2.5 times their shown means, the potential for loss as a percentage of their shown means was 2.5 times the percentage share of

[27] See Fryer (1986) p. 14: "The shortage of capacity at the present time has done wonders for the resolve of reinsurance underwriters".
[28] Mr Robin Wilshaw. Information about the classification of syndicates and appropriate levels of participation in them by Names can be found in Clementson (1996) Day 14, pp. 46-47 and 70-74/
[29] The loss potential can be interpreted as what might reasonably be expected in a bad year - higher levels of loss could not, of course, be altogether excluded.
[30] See Gatehouse (1994), p 10 and 17.

such syndicates in their portfolios. The medium-risk syndicates, which were likely to form the bulk of any portfolio, had potential loss ratios in the range 10% to 30% of their annual premium income limits, and might include some catastrophe reinsurance or even a small amount of catastrophe retrocession business. Unless specifically instructed by a Name to do so, good practice dictated that members' agents should not recommend participations on the high-risk category of syndicates exceeding 10% of any Name's total participations, with a lower 5% limit applicable to Names with only limited shown means or who were new to Lloyd's.[31]

Statistical analysis of Names' exposure to high risk-syndicates showed that almost half of all external Names in 1988 had 10% or more of their portfolios allocated to these syndicates, and that for over 10% of Names the figure was 25% or more. For Names who joined Lloyd's in 1988 the proportion with 25% or more was about 18%.[32] In some cases members' agents who recommended to Names exposures much higher than the limits set out by this expert have been found by the Courts to be negligent, e.g. in the case of Mr Sword-Daniels, referred to above, who had participations on high-risk syndicates in excess of 40% of his total participations,[33] and whose "limited assets" were consequently "foreseeably at risk."[34] While an isolated case of this sort would hardly constitute evidence of the effects of moral hazard, detailed analysis of Names' exposure has shown that Mr Sword-Daniels was by no means an isolated case, and that Names generally - advised by many different members' agents - increased their exposure to high-risk syndicates to an unwarranted degree in the mid-1980s. For example, in 1988 about two thirds of all the members' agents at Lloyd's had new Names with 5% or more of their capacity allocated to high-risk syndicates and one third had new Names with over 10% of their capacity allocated in this way.[35] On the basis of such detailed statistical analysis a judge concluded that the figures "constitute prima facie evidence of widespread negligent portfolio selection advice on the part of Members' Agents."[36]

In the event, many of these Names were unable to meet their obligations. It has been suggested that the members' agents who advised them " did not comprehend what they were doing."[37], but this is scarcely credible as an explanation: the level of exposure by Lloyd's as a whole to catastrophe reinsurance was public knowledge - brokers and others had access to the figures for syndicate capacity and members' agents were actively involved in the market - and it is beyond belief that such a high proportion of members' agents were ignorant of the associated risks. However, incompetence or negligence on this scale is consistent with the hypothesis that the moral hazard resulting from the Lloyd's guarantee made it possible for many members' agents to give biased advice when it was in their financial interest to do so.

In the absence of the guarantee Lloyd's capacity to write high-risk catastrophe reinsurance would have been much lower: at least half of the aggregate capacity of

[31] Clementson (1996), Day 14, pp. 70-74.
[32] Clementson (1996) Day 10, pp. 60-63 and Day 14, pp. 75-78.
[33] ibid. p.11.
[34] ibid. p.15
[35] Clementson (1996), Day 10 pp.64-66, Day 14 pp. 84-88
[36] Cresswell (1996), p. 13.
[37] Clementson (1996), Day 14, p. 78

these syndicates was provided by Names whose allocations exceeded the appropriate 5% or 10% prudential limits in their portfolios.[38]

## 5 Managing Agents and Underwriters

The third proposition is that the Lloyd's guarantee enabled syndicate underwriters to take on more exposure to risk, to write business at lower premium rates, and to write kinds of insurance that they would not otherwise have been able to write.

In considering this proposition it would be unreasonable to compare Lloyd's syndicates with independent insurance companies of the same size. Catastrophe reinsurance is a category of business in which the financial strength of the reinsurer is a key consideration,[39] and this means that small independent insurance companies are unable to compete for catastrophe reinsurance and retrocession business on equal terms with financially strong majors.[40] It follows that the best counterfactual for a Lloyd's syndicate writing significant amounts of catastrophe reinsurance business is a specialist catastrophe reinsurance division (or subsidiary) of a large, high quality insurance company: Lloyd's syndicates are supported by the financial strength of Lloyd's as a whole, while the division of an insurance company is supported by that company's entire capital resources. For the purpose of comparison I shall therefore use as the counterfactual a hypothetical, large, well-managed insurance company.[41] The issue is whether *management controls* within major companies provide a level of protection against moral hazard that was not matched by the *regulatory arrangements* within Lloyd's.

How do the incentives and constraints that influence the behaviour of managing agents and underwriters at Lloyd's differ from those that influence their counterparts in major insurance companies? The position of the directors of a firm of managing agents vis-à-vis the external Names who provide the bulk of the capital is comparable to that of company directors vis-à-vis their shareholders[42]; and the position of the syndicate underwriter - in particular the *active* (senior) underwriter - who is responsible for the business that the syndicate writes and the extent to which its gross exposure is protected by reinsurance, is comparable to that of his counterpart in a division of an insurance company. In both Lloyd's and insurance companies these relationships are subject to well-known principal-agent problems. However, the problems at Lloyd's differ in degree and/or kind from those which occur in joint-stock insurance companies.

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[38] Clementson (1996) Day 10, pp. 68-69

[39] See Kiln (1981): "The quality of reinsurers and their financial stability on catastrophe reinsurance is of paramount importance....and the higher the layer of protection the more important is the quality of reinsurers.".

[40] Companies with a poor covenant win business only by quoting correspondingly low premium rates - and some such companies failed as a result of the catastrophes of the late 1980s.

[41] Not all major insurance companies will have all the features I attribute to this hypothetical company; few surviving companies will be without any of them!

[42] Though the external Names' only sanction is to withdraw their capital.

The first difference is control of exposure to risk. At Lloyd's the regulators did not seek to exert any direct control on syndicates' exposure to risk: the amount of business a syndicate could write was limited only by premium income, not by the exposure involved, and the funds that Names had to place at the disposal of Lloyd's were similarly unrelated to the nature of the business underwritten. Thus the control of exposure lay entirely in the hands of the managing agents and their underwriters. In contrast, the central management of an insurance company is concerned to control exposure as well as premiums written. In the absence of central controls Lloyd's syndicates were *permitted* to take on more exposure when premium levels were low than when they were high - it was left to the managing agents and underwriters to decide how much business to write - whereas in a company the deterioration in the risk/reward ratio implied by lower premiums would be expected to curtail the amount of business written by a catastrophe insurance division.

The second difference is the extent to which underwriters were required to have relevant expertise in order to write particular categories of business. Lloyd's syndicates had to designate their main categories of business and employ underwriters who were acceptable to Lloyd's for those categories; however, they were also permitted to write limited amounts of other business, including catastrophe reinsurance, without having any specialist expertise. Thus marine underwriters, with little or no experience in non-marine catastrophe reinsurance or in excess of loss retrocession business, were able to enter these markets. In contrast, well-managed companies do not generally permit one specialist division to write business for which the underwriters are wholly unqualified and which is the specialism of another division.

A third difference is the structure of incentives for directors and underwriters. At Lloyd's the incentives to accept high levels of exposure to risk were very strong. The managing agents' remuneration consisted of both fees and profit commission, the latter being calculated on annual profits, with no deduction for losses and, until 1994, with no carry-forward of losses previously incurred by the same syndicate. Typically the managing agents received 5% of total syndicate profits as profit commission, and this comprised the greater part of their revenue.[43] The principals of the managing agents were also members of the syndicates concerned, and were therefore liable to share as individuals in any losses. Nevertheless, their risk/reward ratio was much more favourable than that of the external Names who participated in their syndicates.

The active underwriter's remuneration was even more highly geared to the syndicate's profits (also with no offset for losses). A typical active underwriter would expect to receive about 1.75% of the syndicate profits in addition to his basic salary. Again, the underwriter would have a participation on the syndicate, so would have some exposure to risk, but with a typical participation of 0.2% of the syndicate's capacity, the risk/reward ratio for the underwriter would be almost *ten* times as favourable as for an external Name.

In an effort to align managerial and shareholder interests, companies frequently link their remuneration structures to divisional or overall company profits. Directors and

[43] The 1989/90 accounts of 10 large managing agents showed that for that year 63% of their revenue was derived from profit commission. [Rowland (1992), p. 122, Exhibit 63.]

underwriters, at Lloyd's and elsewhere, have to consider the consequences for their reputations and career prospects if things go wrong, and it can be argued that additional profit incentives are required to compensate for a bias towards excessive caution. However, the incentives at Lloyd's appear to go far beyond what is required to align interests, and, particularly in the case of highly volatile catastrophe reinsurance business, well-managed companies would not be expected to gear the remuneration of divisional managers and underwriters so highly to current profits. Moreover, experience in other financial industries has demonstrated that a possible loss of reputation cannot be relied on to prevent excessive risk-taking.

It may be objected that the *unlimited liability* of Lloyd's Names constitutes a special factor, which does not apply to their company counterparts, and which would be expected to constrain the risk-appetite of managing agents and underwriters, and which therefore justifies additional profit incentives. There are a number of counter-arguments. First, the purpose of gearing remuneration to profits is to align the interests of management and Names, and (unlike shareholders in insurance companies) external Names too have unlimited liability. Secondly, the effectiveness of syndicate membership as a deterrent to excessive risk-taking will depend on the agent or underwriter's own appetite for risk: professional involvement in catastrophe reinsurance is unlikely to be attractive to highly risk-averse people. Thirdly, the management's willingness to take risks will also depend on the consequences of losses for their overall financial positions. Some managing agents limited the scale of any possible losses[44], and some others were in the same position as wealthy external Names who could readily absorb any likely level of losses.

The evidence suggests that a significant proportion of the professional catastrophe reinsurers at Lloyd's did in fact respond to the incentives to seek premium income and hence potential profits, having insufficient regard to the level of risk. Whilst about half of the high-risk catastrophe reinsurers at Lloyd's avoided cumulative losses in excess of 50% of their premium limits[45] (or even made profits) in the period 1988-91, the other half incurred cumulative losses greater than 50% and a quarter had losses exceeding 100% of their premium limits in a single year.

Losses on such a scale cannot realistically be attributed to either bad luck[46] or ignorance, and many, if not most, of the specialist catastrophe reinsurance underwriters in London must have been aware of the risks being run. At a reinsurance conference in 1988, *prior* to the Piper Alpha oil rig disaster, Outhwaite (1988)[47] drew attention to the unsound nature of the business being conducted in the LMX (London Market

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[44] At a seminar in 1994 Mr C.K. Murray, Managing Director of R J Kiln, one of the largest Managing Agents at Lloyd's and a Deputy Chairman of Lloyd's commented that "certain underwriters, by a combination of high salaries, low percentages in their own syndicates, stop losses and a variety of other stratagems, have been able to make a fortune while their Names have lost." See also the remarks of Mr Anthony G. Carver quoted on p. 6 above.

[45] External Names' funds at Lloyd's were a minimum of 30% and their shown means a minimum of 40% of their total syndicate participations. For a syndicate to lose 50% of its premium limit is therefore equivalent to a division or subsidiary of a major insurance company losing over 100% of the capital allocated to it.

[46] Mr Wilshaw confirmed that the losses were "totally foreseeable". [Clementson (1996), Day 14, p. 104]

[47] Quoted at length in Phillips (1994) pp. 59-62.

Excess of Loss) market. He included a hypothetical example of the total loss of an oil rig valued at $2 million, of which $1.2 million net was provided by the London Market, and estimated that in that case the level of intended retentions in London would not have exceeded $100 million. The remaining “cover” would have been obtained through spiral reinsurance and retrocession[48] in the London Market, and in the event of a total loss would end up as unanticipated losses for the reinsurers concerned. This analysis was public knowledge, at least to the professional reinsurers working in the London Market.

But the problem lay not only with the specialist catastrophe reinsurance syndicates. The combination of excess capacity in the marine market at Lloyd’s and the attraction of apparently high profitability in catastrophe reinsurance led many marine underwriters to dabble in catastrophe reinsurance business. This added to Lloyd’s capacity for reinsurance business and helped to drive premium levels down, particularly for the higher layers of cover.[49]

## 6 Premiums and Retentions

The fourth proposition is that conditions at Lloyd’s had a significant effect on the world-wide catastrophe reinsurance market, that the increase in capacity at Lloyd’s drove down premium rates, particularly for the higher layers of cover, and that as a result Lloyd’s bore a disproportionate share of the losses resulting from catastrophes at the end of the 1980s.

A US insurance industry study [AIRAC (1986)] of the incidence of losses that would have been experienced if the Eastern Seaboard had been struck by two hypothetical hurricanes in 1984, with insured losses of $7 billion each, estimated that Lloyd’s would bear just over 15% of the total losses.[50] Since some 35% would have been borne by the primary insurers, Lloyd’s share of the reinsurance and retrocession losses amounted to almost 25%. With a market share of this size any substantial expansion or contraction of capacity at Lloyd’s could be expected to have an influence on world-wide premium rates.

The major increase in Lloyd’s capacity and appetite for catastrophe reinsurance occurred after 1984, though it is likely that even then some of the capacity was provided by Names who should not have admitted to Lloyd’s at all and some by Names whose exposure to catastrophe reinsurance was too high. However, between 1984 and 1988 Lloyd’s Names grew by nearly 40% (Table 1); by 1988, as shown in section 4 above, at least half of the capacity of the specialist catastrophe reinsurance syndicates should not have been provided by the Names concerned; many syndicates at Lloyd’s were accepting risks greater than was warranted by the capacity of their syndicates; and Lloyd’s appetite for catastrophe reinsurance was being further augmented by non-specialist syndicates. Capacity elsewhere did not, of course, stand still - there were developments in Bermuda and there was an influx of “fringe” companies into the London market. Nevertheless. starting from a market share of

[48] For the working and effects of reinsurance spirals, see Bain (1999).
[49] Clementson (1996), Day 14, pp. 31,38; Outhwaite (1988), pp. 61-62.
[50] AIRAC (1996), Table 4.

25%, and with its capacity augmented by a factor of well over two due to the various manifestations of moral hazard, competitive conditions at Lloyd's could be expected to drive down world-wide catastrophe reinsurance premium rates.

This is exactly what occurred. Premium rates were driven down and retentions were reduced,[51] and this applied with greatest force to the higher layers of cover: "high-level catastrophe rates are absurdly low, and are based solely on comparison and precedent and bear no relation whatsoever to the risk being run"[52] The result was an irrational pricing structure, leading to opportunities for profitable arbitrage and for other insurers to limit their catastrophe reinsurance retentions.

Opportunities for profitable arbitrage exist when underwriters are able to provide a low layer of cover and purchase an equivalent higher layer of cover at a lower premium without increasing their net retentions.[53] It is risk-free only if the protection purchased can be guaranteed - otherwise the arbitrageur could be obliged to pay out on the lower layer of cover without in fact being able to recover the cost. However, if the higher layer was provided by a Lloyd's syndicate that guarantee was a good as Lloyd's itself. Inter-syndicate reinsurance at Lloyd's rose from £250 million in 1982 to £1399 million in 1990, or from 11.2% to 32.6% of Lloyd's total net premium income;[54] and reinsurance placed elsewhere was "often insured on a similar basis back in London."[55]

At the prevailing premium levels other insurers lost interest. Dr Frey of Swiss Re has stated that "We did not fight so hard for new business, or sometimes even we did not fight for any business at all;"[56] and according to Outhwaite " the amounts (of catastrophe retrocession) placed overseas are insignificant."[57]
The end-result was that, by comparison with the 15% share estimated in 1984, Lloyd's bore an abnormally large proportion of the catastrophe losses at the end of the 1980s. For example, in the case of the Piper Alpha oil rig disaster, while 40% of the risk before reinsurance was placed outside the London Market, "a substantial proportion of the non-London placement was subsequently reinsured back into London as insurers protected their higher exposures," so that in the end only 20% of the losses were retained outside London[58] and Lloyd's share of the total losses was estimated as 55%. Comparable figures for Lloyd's losses due to other catastrophes - the 1987 and 1990 North European storms and Hurricane Hugo - were 31%, 36% and 36% respectively.[59]

## 7 Conclusions

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[51] Clementson (1996), Day 14 pp. 29.30. 37-38.
[52] Outhwaite (1988) pp. 61-2. The problems at Lloyd's were attributed by Outhwaite to marine insurers (who did not understand the catastrophe reinsurance market) but were also found amongst "innocent" or "naive" underwriters in "fringe" companies in the London market. [Clementson (1996), Day 16, p. 88].
[53] For further discussion of the reasons for irrational pricing see Bain (1999).
[54] Statistics Relating to Lloyd's (1994), Table 3.1.
[55] Outhwaite (1988), p.60.
[56] Clementson (1996), Day 16, p. 88
[57] Outhwaite (1988), p. 60.
[58] Mercantile and General Reinsurance (1988).
[59] Walker (1992), p. 9, para. 2.1

The arrangements within Lloyd's to guarantee payments to policy-holders can be expected to have effects comparable to those of state guarantees for insurance companies. The experience of Lloyd's thus provides a case study illustrating the effects of guarantees in practice.

The moral hazard inherent in guarantee arrangements influenced behaviour at Lloyd's in the following ways:

- Individuals, who did not have sufficient capital to support the business they wrote, were encouraged and/or enabled to become external Names at Lloyd's.
- Many external Names committed much more capital to high-volatility catastrophe reinsurance business than their resources warranted: this was reflected in an increase in the capacity of Lloyd's as a whole to supply catastrophe reinsurance cover.
- Underwriters of catastrophe reinsurance syndicates were able to accept exposures that were excessive in relation to the capacity of their syndicates, and underwriters without specialist catastrophe reinsurance expertise were able to write catastrophe reinsurance business.
- This led to an underpricing of risk at Lloyd's, with a consequential concentration of exposure to catastrophe losses.

These consequences accord exactly with theoretical predictions of the effects of guarantees: namely, excessive exposure to, and underpricing of, risk.

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