

# Marine Insurance in Britain and America, 1720-1844: A Comparative Institutional Analysis

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## Abstract

This paper examines how the marine insurance industry evolved in Britain and America during its critical formative period, focusing on the information asymmetries and agency problems which were inherent to the technology of overseas trade at the time, and on the path-dependent manner in which the institutions which addressed these problems evolved. We argue that the market was characterized by multiple equilibria because of a potential adverse selection problem. Exogenous shocks and endogenous institutional development combined to bring about a bifurcation of institutional structure, the effects of which persist to the present day.

## INTRODUCTION

Marine insurance played a vital role in facilitating the expansion of trade during the eighteenth and early nineteenth centuries, but the industry developed in different ways in different countries. By the mid nineteenth century, the British marine insurance market was dominated by Lloyd's of London, a marketplace where private individuals risked their personal fortunes by insuring vessels and cargoes with unlimited liability. In contrast, in the United States, private underwriting had virtually

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disappeared, and marine insurance was predominantly carried out by joint-stock corporations. To account for the success of private underwriting in Britain and its demise in the United States, we will focus on the information asymmetries and agency problems which were inherent to the technology of overseas trade at the time, how institutions arose to address these problems, and how exogenous and endogenous changes in the political, legal and economic environment affected the evolution of these institutions over time.

Broadly, the argument is as follows. In Britain, the Bubble Act of 1720 temporarily limited the development of marine insurance corporations, thereby enabling Lloyd's coffee house to develop as a center where individual private underwriting could flourish. Lloyd's became a hub for information about ships and their crews, political and economic developments, and the many other factors affecting the risk of a voyage, and also for information about the reputations of market participants.

Over time, Lloyd's role gradually evolved in the shadow of the Bubble Act as a variety of informal and later formal organizations, laws, specialized roles, and mechanisms for sharing information became adapted to a market dominated by private underwriting. In particular, the extended period of heightened risk resulting from the Revolutionary and Napoleonic wars (1793-1815) led to boom years in marine insurance, and a period of accelerated institutional development at Lloyd's. By the time the Bubble Act was repealed in 1824, exposing Lloyd's underwriters to competition from an influx of new joint-stock corporations, Lloyd's had gained an institutional sophistication which enabled it to survive the competition, and it remains an important marketplace for marine insurance today.

In contrast, although private underwriting had been developing rapidly in the American colonies, it never reached the level of complexity of Lloyd's. Instead, Independence freed the US marine insurance market from the Bubble Act's restrictions before the start of the Revolutionary wars, and private underwriting was rapidly extinguished as marine insurance corporations developed during the wars.

We argue that the market was characterized by multiple equilibria. In Britain, the existence of well-developed institutions for private underwriting ultimately meant that corporations had inferior access to the information needed to assess risks, and as a result, faced an adverse selection

problem which hindered their expansion. This was not the case in the US, where private underwriting was less well developed. Furthermore, the timing of exogenous changes including American independence and the Revolutionary and Napoleonic wars, together with the endogenous development of Lloyd's and its legal environment, drove the process of equilibrium selection and gave rise to a path-dependent bifurcation of institutional structure between Britain and the rest of the world.

The paper proceeds as follows. We begin by outlining the relevant technological constraints facing marine insurance in the eighteenth century. The next two sections describe how the market developed in Britain and America, respectively: how Lloyd's emerged as the dominant force in the British market, and how joint-stock corporations came to dominate the industry in America. Finally, we develop a context-specific game-theoretic model to show how an adverse selection problem can account for many aspects of the observed behavior and institutional development.

### TRANSACTION CHARACTERISTICS

In a marine insurance contract, an insurer (“underwriter”) assumes some of the maritime risks on a vessel or cargo, or both, in exchange for a premium. The risks covered may include a variety of risks at sea or in port, for a particular voyage or for a period of time. Marine insurance originated in the Italian City states in the middle ages, and by the start of the eighteenth century it had become a familiar practice, and because of the hazardous nature of maritime commerce, a crucial input for trade. However, insurers had to contend with numerous sources of uncertainty, and complex informational asymmetries which created agency problems for both the insurer and the insured. We can separate these into three main categories.

First, the probability of a ship or its cargo being lost or damaged (and therefore, the appropriate premium) depended on numerous risk factors including the route, the season, the age and seaworthiness of the ship, and the quality of its crew and armament, as well as, in wartime, the danger of capture by enemy naval vessels and privateers, and the possibility of seizure in a foreign port. Some of these factors could be taken into account by the underwriter when determining the premium. Often, however, merchants had better information than underwriters about various

aspects of the risk. Thus, one underwriter complained that “with the keenest penetration and judgement, it will rarely happen that [the underwriter] is on an *equal* footing, as he ought to be, with the insured” (Weskett 1781: 297).<sup>1</sup>

Second, there were many opportunities for moral hazard on the part of the insured. These ranged from excessive risk-taking, such as sending unseaworthy ships to sea, or attempting to carry goods into a blockaded port, to outright frauds, such as deliberately sinking an insured ship, misrepresenting the value of the goods, insuring the same goods multiple times, or seeking to insure a ship already known to have been lost.<sup>2</sup>

Thirdly, the financial stability of the underwriters was a major concern for those buying insurance. Private underwriters might become bankrupt, die, emigrate or abscond before a claim could be made, and their financial stability was frequently uncertain, especially in wartime. And even if the underwriters were solvent, the uncertainties associated with maritime voyages and the difficulty of proving claims meant that they frequently had opportunities to contest claims or delay payment. As a result, merchants were willing to pay higher premia to those underwriters they perceived as non-litigious and financially secure.

In the context of these informational asymmetries and agency problems, information was critical. Underwriters needed access to prompt and accurate intelligence on the movements and condition of particular ships, the “character” of the merchant being insured and the captain of the vessel, and on political developments at home and abroad, as well as the experience to weigh

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<sup>1</sup>Merchants often tried to convince underwriters of the quality of the vessel and crew. The problem, of course, was to convey this information credibly. For example, in 1749, New York merchant Gerard Beekman, requesting his London agents to get insurance for a slaving voyage, wrote: “I am Concerned in a fine Brigantine prim[e] Sailors Sailed 2 Days ago for the Coast of Africa with a fair wind the Captain Extreemly well acquainted have bin several Voiages there. hes a Sober honist and Industerous man the vessel mounts 6 Carrage guns 4 pounder . . . am in hopes of the Vessell is so good and well found etc. that it may Save me one or two per Cent on the Premium . . . I hope youl git done at the Cheapest rate and Lett the underwritters be good” (Gerard Beekman to Shaw and Snell, 20 January 1749 [White 1956: 73])

<sup>2</sup>Fraud was common, and could be difficult to detect. In one instance, a shipowner took out several policies with different brokers in London, Hull, Glasgow, and Dundee to insure goods worth about £1,000 for £3,745. The ship was then deliberately sunk after some of the cargo had been secretly removed. The fraud was accidentally discovered, and the culprit narrowly escaped a death sentence (Jackson, 1971).

this information correctly in order to determine what premium to charge. In the words of one contemporary underwriter,

An insurer ought to be constantly casting about for the earliest, the best, and the most circumstantial intelligence: - he ought to have a quick perception of the circumstances of the risque, and be able to reason well and instantly thereupon, in order to guard against concealments and misrepresentations; ... it is far more material to him to regard the *quality* than the *quantity* of the risques which he undertakes.<sup>3</sup>

Information, however, travelled slowly in the eighteenth century; the latest news from foreign ports was frequently months old. Ships sometimes disappeared without a trace, and if a ship was lost or damaged, it was frequently costly, and sometimes impossible, to verify or disprove events which had occurred in distant ports or at sea. Yet, despite these difficulties, marine insurance provided crucial support for the expansion of trade throughout the eighteenth and nineteenth centuries. The market was able to function because institutions were created to enable merchants to share risk. What were the important characteristics of these institutions, and how did they arise?

### MARINE INSURANCE IN BRITAIN, 1720-1844

At the start of the eighteenth century, marine insurance in Britain was carried out entirely by private individuals. Many underwriters were merchants who wrote insurance on the side, but any wealthy individual willing to dabble could underwrite a policy. A merchant (or a broker acting on his behalf) wishing to purchase insurance drew up a policy and presented it to private underwriters for their signature. Risks were usually shared among several underwriters. The parties negotiated a premium, and the underwriter wrote on the policy the amount he was willing to insure.<sup>4</sup>

Although there was no single center for underwriting, merchants and underwriters generally tended to frequent several coffee houses around the Royal Exchange and near the Thames, where

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<sup>3</sup>Weskett (1781: 295); emphasis in original.

<sup>4</sup>On the early history of marine insurance, see Barbour (1929) and de Roover (1945). For British insurance generally, see Cockrell and Green (1994), Raynes (1964) and Martin (1876). On Lloyd's, see Gibb (1957) and Wright and Fayle (1928). Supple (1970) and John (1958) discuss the history of the chartered corporations. Weskett (1781) is the most comprehensive contemporary guide. The evidence given to the Select Committee on Marine Insurance (1810) is also invaluable.

they exchanged news and gossip, and transacted marine business including ship auctions and marine insurance.<sup>5</sup>

In 1717, during the stock market boom which culminated in the “South Sea Bubble”, several groups of merchants and speculators began petitioning to obtain charters for joint-stock marine insurance corporations. The promoters argued that the proposed corporations would provide cheaper and more secure insurance than the existing system of private underwriters. Their underwriting would be backed by a large capital fund, and in the event of a claim, it would be easier for a merchant to recover losses from a corporation than from many individual underwriters separately. Corporations also expanded the pool of available capital by enabling those without specialist knowledge of marine risks, or with relatively modest amounts of capital, to act as insurers by entrusting their underwriting decisions to experts. The proposed charters were opposed by merchants and private underwriters in London and Bristol, who claimed that the existing system was adequate, and that a monopoly would harm trade. Both sides in the debate, however, shared the expectation that if charters were granted, the proposed corporations would drive private underwriters out of the market.

The argument was settled when the two main groups of promoters offered the King £600,000 (to pay off the debt on the Civil List) in exchange for charters. Two joint stock corporations (the Royal Exchange Assurance and the London Assurance) were subsequently incorporated as part of what later became known as the “Bubble Act” of 1720. The Bubble Act made it illegal for joint-stock companies to operate without a corporate charter. In all industries *except* marine insurance, however, other kinds of unincorporated companies, including partnerships and trusts, were still allowed, and businessmen were later able to use these devices to create (highly imperfect) substitutes for the joint-stock business corporation (Harris, 2000). However, marine insurance received special treatment: *all* firms and partnerships, apart from the two corporations chartered by the Bubble Act, were barred from writing marine insurance (crucially, however, private underwriting by individuals was still allowed).

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<sup>5</sup>See “The Internet in a Cup”, *The Economist*, 20 December 2003 for a discussion of the role of the coffee houses as centers of business information in the eighteenth century.

The Bubble Act had a tremendous impact on the development of marine insurance in Britain until its repeal in 1824,<sup>6</sup> but the ultimate effect of the Act was neither foreseen nor intended in 1720. Contrary to expectations, private underwriting not only survived, but flourished. Except perhaps during their first few years of operation, the two chartered corporations probably never wrote more than 10% of all marine insurance business, and in 1810, it was estimated that together they accounted for less than 4% of total sums insured.<sup>7</sup>

Why, despite their advantages, did the two chartered corporations fail to dominate the British marine insurance market? In the remainder of this section, we describe how the market developed. Later, we will argue that the way in which the market developed - in particular, the way in which the private underwriters managed to overcome the information asymmetries and agency problems described above - meant that the two chartered corporations faced an adverse problem which hindered their expansion.

Edward Lloyd's coffee house opened for business in the mid-1680s, and by the turn of the century, had become a center for ships news and other activity connected with shipping (Dawson, 1934). Prior to 1720 it was only one of several venues in which marine insurance was carried out, but during the 1720s, it emerged as a focal meeting place for marine insurance. Merchants and brokers could get policies underwritten there quickly and conveniently because of the number of underwriters in attendance, while underwriters in turn were lured by the prospect of plentiful opportunities to underwrite. In this way, long before it gave rise to any formal association, Lloyd's coffee house became the center of the marine insurance market in London. By 1727, the London Assurance Corporation was regularly sending a clerk to Lloyd's to collect shipping news.<sup>8</sup> By the 1730s, the majority of British marine underwriting was being done at Lloyd's.<sup>9</sup>

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<sup>6</sup>The Bubble Act was repealed in 1825, but the clauses which governed marine insurance were repealed in 1824 (Harris 2000: 211).

<sup>7</sup>Select Committee on Marine Insurance (1810), evidence of Angerstein. One indirect measure of the proportion of underwriting done by the corporations comes from the revenue generated by Stamp Duty on marine insurance policies. Between 1805-1809, policies underwritten by private underwriters in London generated a total of £1,022,008 in revenue; policies underwritten by the corporations generated £43,848. (based on Martin 1876: 246)

<sup>8</sup>Guildhall Library, MS 8728, May 10 1727; 14 September 1737; 31 July 1751.

<sup>9</sup>Some private underwriting also occurred in regional ports (see, eg., Jackson (1971, 1972), and the Association of

In order to compete with the corporations, the private underwriters had to overcome the three kinds of informational problems discussed above: collecting and interpreting the information needed to determine the correct premium; overcoming moral hazard problems such as fraud on the part of the insured; and generating confidence in the good faith and financial security of the underwriter. Business practices at Lloyd's, which emerged and evolved gradually over an extended period of time, managed to partially overcome each of these difficulties. We will consider each in turn.

First, to meet his customer's needs for shipping news, Lloyd made a deliberate and systematic effort to gather and disseminate the most accurate and up-to-date information on ship movements, political developments, and any other relevant information. As early as 1693, the Hudson's Bay company had made a gift to Edward Lloyd in acknowledgement of "his intelligence of the companies ships" (McCusker 1997: 166). Some of the news came from the customers themselves; but Lloyd also employed runners who went along the docks picking up news of arrivals, departures, losses, and other relevant gossip, and relaying this information to the coffee-house. He began to build up a network of correspondents who were paid to send him shipping information from domestic and foreign ports, and cultivated a special relationship with the post office (which had its headquarters near the coffee-house): in exchange for an annual fee, letters addressed to Lloyd's were carried free of postage, sorted specially and held for collection by a Lloyd's messenger. The combined effect of these efforts was to give Lloyd's a "practical monopoly of complete and up-to-date shipping intelligence" (Wright and Fayle, 1928, p.75)

As the news was brought in, it was announced publicly from a pulpit built for the purpose. Lloyd had also begun publishing *Lloyd's News*, a news-sheet of shipping news, in 1696, and although the regular publication was short-lived, he continued to print sporadic newsheets detailing ships arrivals and departures, political developments and other news. In 1734, regular publication was Underwriters and Insurance Brokers in Glasgow, Glasgow City archives, TD 103/1/1). Regional underwriters mainly insured local vessels, because of their greater familiarity with the vessels and individuals involved. By insuring locally, merchants could avoid having to use agents, and recover claims more easily. On the other hand, regional markets were unable to handle large risks, and found it harder to spread risk effectively. In 1807, for example, Hull underwriters suffered unusually heavy losses as a result of the "Danish captures" (Jackson 1972: 152).



resumed as *Lloyd's List*, which has been published ever since. In the early 1760s, a committee of Lloyd's underwriters began employing surveyors to assess the condition of ships, and displaying this information in a register of ships which became *Lloyd's Register*.

Having gathered the information, the next problem was knowing how to interpret it to determine premia. Because this required weighing numerous factors, it was ultimately a matter of individual judgement requiring experience and familiarity with the routes, vessels, people and circumstances involved. Lloyd's attracted a wide variety of underwriters, many of whom were active or retired merchants, and whose experience and specialist knowledge regarding particular kinds of risks enabled them to make these kind of judgments. This was particularly important in evaluating cross risks (voyages between two foreign ports). As one broker explained:

If I have a cross risk to make, if it is from America, I go to a box where there are Americans to give me information; and so it is from the Baltic or any other part . . . they are the people who can begin the policy for me better than the others, and I can by that means get it done. It is of no use applying to a Baltic merchant [to underwrite] on an American risk; he does not do it, simply because he knows nothing about it . . . There are so many people frequenting the coffee-house, that, even if an underwriter does not himself understand a question, he soon procures information, and makes me master of the subject at the same time.<sup>10</sup>

Once a policy had been begun by a respectable "lead" underwriter with the appropriate expertise, other underwriters, despite lacking specific knowledge of the risk, were often willing to "follow the lead" and underwrite at the same premium.

Second, there was the problem of moral hazard on the part of the insured: deliberate sinking of a heavily insured ship, for example. Contemporary accounts suggest that the trust generated through repeated interaction between merchants and brokers, and between brokers and underwriters, helped to reduce (though not eliminate) this kind of fraud. Reputable brokers frequently refused business from merchants and shipowners who they did not know, and had regular accounts with particular underwriters to whom they offered first refusal of their business. They could therefore get policies written more quickly, and at a lower premium, than brokers who were not well known

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<sup>10</sup>Select Committee on Marine Insurance (1810), evidence of Angerstein.

and established.<sup>11</sup>

Reputation also affected the settlement of accounts following a claim. Both the timing and route of voyages in wind-driven vessels were inevitably unpredictable, and because information travelled slowly, it was often advantageous to allow a captain or supercargo some discretion over where to sell a cargo, and over the return cargo and route. This meant that marine insurance contracts were necessarily incomplete.<sup>12</sup> Furthermore, assembling witnesses and documentary proof to support a claim in court could be a slow and costly process. Underwriters therefore had frequent opportunities to contest claims or delay payment.

Nonetheless, Lloyd's underwriters were generally regarded as very generous in settling claims in cases where there had been an unanticipated change in the voyage, or a mistake which might have rendered the policy technically invalid.<sup>13</sup> Their motivation for this generosity was straightforward: by maintaining a reputation for honest and open dealing with brokers and merchants whom they trusted, they could expect to be offered future business and higher premiums. One of them stated, however, that "the private underwriters will settle the loss for a man of character, where they will not for a man whom they suspect",<sup>14</sup> and brokers also preferred to confine their business whenever possible to men of "character", who were prudent in their underwriting and not litigious in case of loss. Thus, all participants - merchants, brokers and underwriters - had an incentive to refrain from opportunistic behavior and maintain a reputation for prudence, fair dealing and respectability.

Finally, there was the problem of the underwriter's security. The corporations were widely

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<sup>11</sup>Kingston (2005) provides a fuller discussion of the central role of brokers in this market.

<sup>12</sup>For example, in 1759, Glasgow merchant James Lawson procured insurance in London on the unarmed vessel *Bettsey* from Glasgow to Maryland. Subsequently, complications arose because of a change of plan: rather than going north around Ireland as planned, the *Bettsey* sailed in company with a warship which Lawson feared might take the south channel, perhaps invalidating the policy (Glasgow City archives, TD 172/1, Lawson to Russell, 19 February 1759, 2 April 1759).

<sup>13</sup>In the case of the *Bettsey* (see the previous footnote), for example, the underwriters not only accepted the alteration on the policy but voluntarily provided a 2% abatement of the premium for sailing in convoy (Glasgow City Archives, TD 172/1, 4 May 1759, 1 October 1759). In 1755, the London-based German merchant Nicolas Magens observed that "It is notorious to all the Mercantile World that as the English Insurers pay more readily and generously than any others, most Insurances are done in England" (John 1958: 127).

<sup>14</sup>Select Committee on Marine Insurance (1810), evidence of Angerstein.

regarded as more financially secure than the private underwriters.<sup>15</sup> However, although private underwriters did sometimes fail, such failures were surprisingly rare, even during the Revolutionary and Napoleonic wars when several calamitous events produced large claims. Part of the explanation lay in the terms of credit granted to brokers in the collection of premia. Underwriters were bound to pay losses within a month of notification, but they generally granted brokers generous terms of credit, often over a year, to pay premia. In turn, the brokers often allowed credit to the merchants, so that in effect, the premium was often not actually paid until after the risk had been run. This meant that at any time the private underwriters had, in effect, two sources of capital: their own private fortune, with full unlimited liability; and a fund of premia owed to them by the brokers for policies they had already underwritten. Even if an underwriter became insolvent, there were generally sufficient outstanding premia due from the brokers to pay off any claims which might arise on outstanding policies.<sup>16</sup>

The underwriters' were willing to grant such lenient terms of credit because of the brokers' customary system of remuneration: brokers got 5% of the premium income, plus 12% of any net profits made by the underwriter on the account at the time accounts were settled. Therefore, it was in the underwriters interest to maintain a credit balance with the broker, so that if any losses should occur, in effect, 12% of the burden would fall on the broker.

Thus, by the late eighteenth century, business practices which emerged at Lloyd's had managed to partially overcome each of the three kinds of information and agency problems we described above, by collecting and making efficient use of shipping information, while (imperfectly) protecting underwriters against fraud, and merchants against insolvency and opportunism on the part of the underwriters. Remarkably, these practices emerged despite virtually no conscious collective efforts to design new rules or change old ones. Rather, Lloyd's was "a striking example of evolution as

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<sup>15</sup>In 1748, for example, one merchant explained his decision to insure with the London corporations as follows: "I wrote thee lately that divers insurers were become bankrupts, and that more we looked upon as doubtful . . . we think it unsafe at present to apply to any of the policy brokers, but to get our business done either at the Royal Exchange, or London Assurance Office, tho the premiums may sometimes be rather higher, yet the safety in our opinion will more than answer the difference" (Gillingham 1933: 19).

<sup>16</sup>Select Committee on Marine Insurance (1810), p.171-2.

distinct from creation. Conditions have been made, rules instituted not in preparations for new factors and developments, but to systematize a practice which had already been adopted to meet the requirements of commerce as they arose.” (Wright and Fayle 1928: 2). Yet the system worked so well that not only British, but also many foreign merchants and shipowners chose to insure at Lloyd’s. London became the most important center of marine insurance in Europe, and the vast majority of all business done in London was done at Lloyd’s.

The evolving legal environment during the mid-eighteenth century both reflected and reinforced the dominance of Lloyd’s. Until the mid eighteenth century, insurance cases had been decided for the most part in an unsystematic, ad-hoc way. However, Lord Mansfield, who was Chief Justice of the Court of King’s Bench from 1756-1788, took major steps towards rationalizing and setting out legal principles of insurance. The principles and precedents which Mansfield established were generally derived from mercantile practice and custom, such as the principle of “utmost good faith”, according to which any misrepresentation or concealment of facts by the insured, or deviations from the planned voyage without reasonable cause, would void a policy. Mansfield also simplified legal procedure, in particular, by eliminating the necessity for an insured party to bring legal actions against each underwriter separately in the event of a disputed claim (the “Consolidation Rule”). This strengthened private underwriting by removing one of the corporations major advantages (Oldham 1992).

The Revolutionary and Napoleonic wars (1793-1815) substantially disrupted trade<sup>17</sup> and increased the risks of international commerce. The risk of capture<sup>18</sup> increased the demand for marine insurance and drove up premia. On average, the high wartime premia more than compensated underwriters for the increased losses, and although some failed, many underwriters made a fortune.

The marine insurance market expanded rapidly as a result. The number of subscribers to the

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<sup>17</sup>See O’Rourke (2005) for a quantitative assessment of the economic impact of the wars.

<sup>18</sup>The total number of ships on the Register of the British Empire in 1792 was 16,329. During the first nine years of the war (to April 1802), a total of 3,919 British ships were captured by the enemy, of which 799 were recaptured. During the same period, approximately 3,700 more were lost by marine risks (Wright and Fayle 1928: 183, 451). Of course, British underwriters also insured many foreign (neutral) vessels. Insurance of enemy vessels, which had been common in earlier wars, was banned in 1793 (John 1958: 136).

society of Lloyd's grew from less than 200 in 1775 to more than 2,000 by 1801. The two chartered corporations also prospered as their premium income grew (Figure 1), but the market remained overwhelmingly concentrated at Lloyd's.

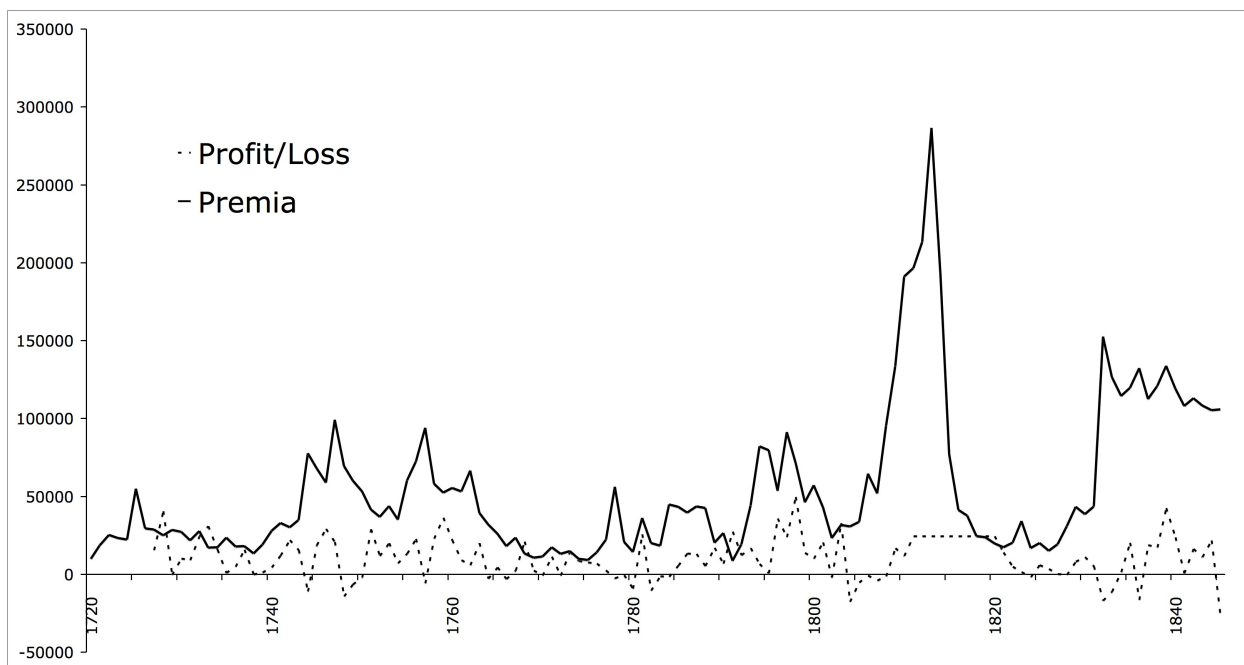


Figure 1: Profits and Premia (£) of the London Assurance Corporation, 1720-1844. Source: Guildhall Library, MS 8749A. (Note: profits are averaged over 1811-20).

This growth in business greatly accelerated the process of formal institutional development at Lloyd's. An ad-hoc committee had been meeting sporadically since 1769, but in 1796, it began to hold regular meetings and to issue an annual report. In 1800, in response to overcrowding, a new rule required new subscribers to be recommended in writing by at least six existing subscribers, and non-subscribers were excluded from the subscribers rooms.

In wartime, circumstances often changed rapidly, so prompt and accurate shipping, political and military news was more important than ever. At the start of the wars, Lloyd's news-gathering service was already more efficient than anything the government possessed. All the correspondence was handled by the coffee-house masters, but as the volume of correspondence grew, this arrangement became unsatisfactory, so in 1804 a secretary was appointed to manage it. The sec-

retary further developed and extended Lloyd's' intelligence-gathering apparatus, for example, by appointing new correspondents abroad and subscribing to foreign newspapers.

In 1811, a dispute arose over losses in the Baltic, and it became clear that the lack of clear regulations governing the operations of the committee and the use of information were the root cause of the problem. In response, a Trust Deed was drawn up which turned the committee from an ad-hoc into an established body with 12 elected members, gave it control of the subscription funds, and bound subscribers to obey its regulations. The committee was empowered to act on behalf of the underwriters as a group, taking over formal responsibility for the general supervision of the intelligence system, the election of subscribers and for appointing agents to provide intelligence and other services. In 1792, Lloyd's had 32 correspondents in 28 ports. By 1820, 269 agents had been appointed.<sup>19</sup>

Thus, in response to temporary needs caused by the increased demand for marine insurance during the Revolutionary and Napoleonic wars, Lloyd's had developed a formal structure, and had formalized and strengthened its mechanisms for information-gathering and self-regulation.<sup>20</sup>

In 1810, following a lengthy political battle, an attempt to repeal the relevant sections of the Bubble Act failed in parliament by a single vote.<sup>21</sup> A renewed effort to repeal the Act finally succeeded in 1824, paving the way for an influx of new joint-stock corporations. As in 1720, it was widely expected that this would mean the end of private underwriting.<sup>22</sup> By the 1820s, however, the boom years were over, premia were low, and the number of subscribers at Lloyd's was in decline. The average of total annual premia on marine policies at the London Assurance, for example, was over £216,000 between 1810-14, but less than one-tenth as much in 1820-24 (Figure 1).<sup>23</sup> The Royal Exchange fared even worse: premia plunged from £545,290 in 1814 to £14,562 in 1824,

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<sup>19</sup>Wright and Fayle (1928: 75, 383).

<sup>20</sup>There were limits to this evolution. In particular there was no formal attempt to ensure the financial security of underwriters, and underwriting remained on a strictly individual basis.

<sup>21</sup>Wright and Fayle (1928: 259-60).

<sup>22</sup>One contemporary underwriter, for example, believed that "if companies are sanctioned, individual underwriting must cease, as has been proved by the example of all other countries, more particularly by the recent example of America" (Marryat, 1810, p.265).

<sup>23</sup>Based on Guildhall Library MS 8749A.

and whereas it had made average annual profits of £32,500 in 1793-1813, it lost an average of over £20,000 in 1814-34 (Supple 1970: 201). Although several of the new companies managed to survive in this inhospitable environment, many others failed (Palmer, 1984). In 1844, the Joint Stock Companies Registration and Regulation Act enabled companies to obtain all the privileges of incorporation<sup>24</sup> by registering and meeting various legislative requirements, leading to a second large influx of new corporations. Again, many of the new companies failed. Lloyd's weathered the competition and remained the major commercial force in the marine insurance market.

#### MARINE INSURANCE IN AMERICA, 1720-1844

In the US, as in Britain, the Revolutionary and Napoleonic wars had a decisive and lasting effect on the development of the marine insurance industry; but unlike Britain, private underwriting in the US had virtually disappeared by 1815, and the business was carried on almost entirely by joint-stock corporations.<sup>25</sup>

In the early eighteenth century, American merchants generally obtained insurance in London, although the distance created considerable uncertainty and inconvenience. For example, orders for insurance on voyages to Britain were often sent ahead on ships expected to arrive before the ship being insured. If the ship to be insured made a fast passage and arrived before the orders for insurance, then the premium was sometimes saved, but this could also be precarious, as illustrated by the case of an agent in London who received instructions to insure a consignment of tobacco only an hour before the news of the ship's loss arrived, leaving the tobacco uninsured.<sup>26</sup>

The trade of the colonies was expanding rapidly, and private underwriting began to emerge. Insurance brokers were operating in Boston and Philadelphia by the 1740s (Gillingham 1933: 18, 109). Local underwriters had better information on local risks, and their proximity enabled quick payment in case of loss, facilitated resolution of disputes, and avoided the necessity for merchants to rely on agents to represent their interests.

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<sup>24</sup>Limited Liability was not a general feature of British corporations until 1855. However, all insurance companies had limited liability clauses in their policies (Shannon 1931: 282).

<sup>25</sup>On the history of marine insurance in America, see Huebner (1905), Ruwell (1993), Gillingham (1933), Fowler (1888), and Montgomery (1885).

<sup>26</sup>See Joshua Johnson's letterbook, 19 February 1774 (Price, 1979).

For example, in the early 1740s, Boston merchant Benjamin Dolbeare regularly obtained insurance in London on voyages between Boston and the West Indies. However, when the sloop *Tryall* was captured by the Spanish in 1739 on a voyage from Curacao to Boston, it took over a year to send the required proofs to obtain payment from London.<sup>27</sup> In 1742, he wrote for insurance on the *Friendship*, which was to sail to Antigua and then, if a war with France had not broken out, to Guadeloupe, and otherwise, to the English or Dutch leeward islands, and if markets there were unfavorable, to Jamaica, before returning to Boston. In the event, however, the vessel went no farther than Antigua and Dolbeare spent the next two years trying to prove this in order to obtain a partial return of premium, apparently without success.<sup>28</sup> In March 1745 he settled his account with his London agent and subsequently rarely obtained insurance in London except on transatlantic voyages. Most likely, he had begun to insure his West Indies ventures locally.

Other merchants remained suspicious of local insurance and continued to insure in London, where insurance was generally cheaper, and the underwriters were regarded as more financially secure. In 1743, writing to his London correspondent for insurance, Philadelphia merchant William Till observed

“I do not know but the Insurers in London may be unwilling on some Occasions to underwrite, as we have an Insurance Office here and imagine the most dangerous Policys may fall to their share, but for my Part I have always looked on the Thing as a Novelty . . . [and] shall constantly write to London for Common and honest Insurances.”<sup>29</sup>

Although colonial America had nothing that could compare with Lloyd’s, several active centers for private underwriting emerged. In Philadelphia, underwriters frequented the London Coffee House in the 1760s, and made several, apparently abortive attempts at organization (Gillingham 1933: 32-37). After the Revolution, the focus shifted to the City Tavern. In 1787, the broker Benjamin Fuller was able to obtain 34 underwriters on a large policy, “All the underwriters in the City (except 2 or 3) having Subscrib’d”.<sup>30</sup> Similarly, there were two Coffee houses which functioned as meeting places for marine business in New York (Harrington 1935: 154).

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<sup>27</sup>B. Dolbeare letterbook, Massachusetts Historical Society, Ms N-201, 1739-41.

<sup>28</sup>B. Dolbeare letterbook, Massachusetts Historical Society, Ms N-201, 19 October 1742-March 1744/5.

<sup>29</sup>William Till to Lawrence Williams, 5 August 1743. Philadelphia Historical Society ms 660.

<sup>30</sup>Benjamin Fuller papers, Historical Society of Pennsylvania (AMB 3485), BF to (the client) Herbert and Potts,



Independence freed Americans from the Bubble Act's restrictions on the formation of joint-stock corporations, and after a period of political debate and uncertainty, the newly-independent American states began to charter corporations for various purposes with increasing frequency during the late 1780s and early 1790s.<sup>31</sup> In 1792, as war loomed in Europe, a group of merchants, speculators and underwriters began making efforts to charter a marine insurance corporation in Philadelphia.

The Revolutionary and Napoleonic wars created enormous risks and opportunities for American merchants.<sup>32</sup> Britain's maritime superiority effectively closed off direct communications between France and its colonies, so at the outbreak of war, the French opened their colonies to trade with American vessels. Under the "Rule of 1756", Britain refused to recognize the neutrality of vessels trading directly between France and its colonies, but American vessels were able to carry on the trade indirectly by importing goods from French, Spanish and Dutch colonies to the United States, where they paid customs duties, thereby conferring neutral status on the goods so that they could be re-exported to France and the continent; while in the reverse direction, European goods flowed indirectly to the colonies.

As a result of these new opportunities, and of protective tariffs and regulations which had been introduced by Congress in 1789, American trade volumes and shipping tonnage grew rapidly (Figure 2). In the words of one contemporary American observer,

The affairs of Europe are certainly of less and less consequence to us in a political point of view; in a commercial, they rain riches upon us; and it is as much as we can do to find dishes to catch the golden shower.<sup>33</sup>

At the same time, however, this growing trade was subject to considerable risk. Although America was neutral, both belligerents employed their navies and commissioned privateers to seize food bound from America for the other, and to seize enemy property carried in American vessels.

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Virginia 9 August 1787.

<sup>31</sup>Until 1799, virtually all business incorporation was by special act of state legislatures. The total number of charters to business corporations grew from 33 from 1781-90 to 295 from 1791-1800 (Davis 1917: 17, 22-5)

<sup>32</sup>On the American position during the wars, see Clauder (1932), and Phillips and Reede (1936) .

<sup>33</sup>The *Columbian Centinel*, 5 November 1796, quoted by Smith and Cole (1935, p.15).

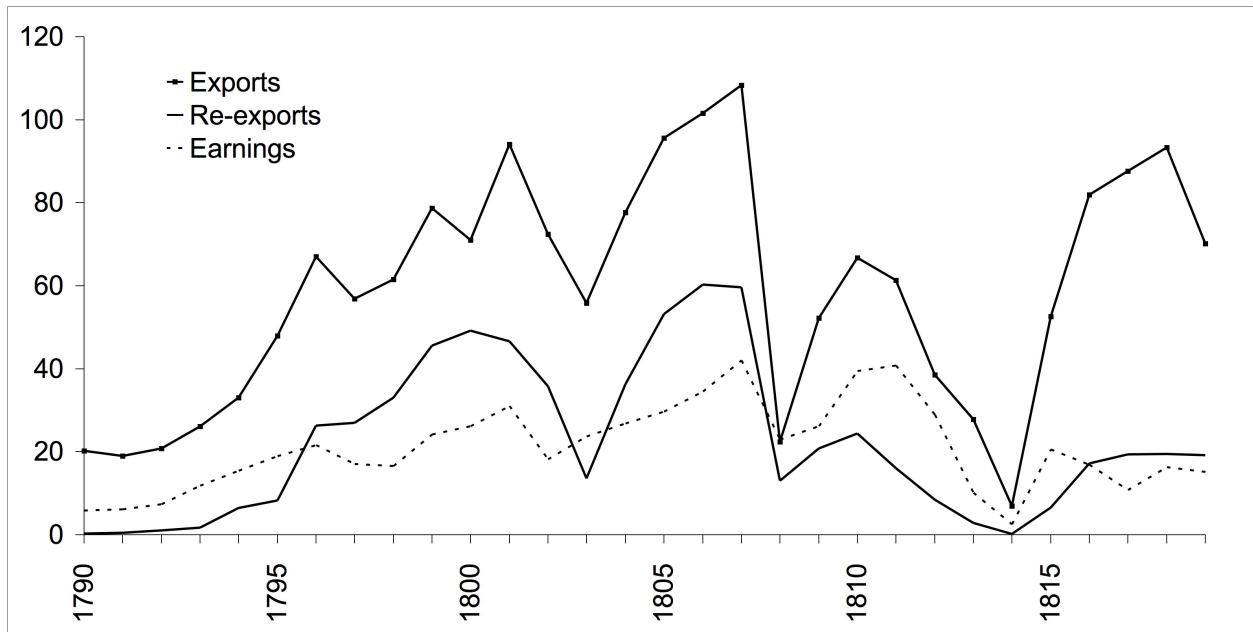


Figure 2: Value of exports and re-exports from the US, and net freight earnings of US shipping, 1790-1819, in millions of dollars. Source: North (1960).

The decrees regarding neutrality issued by the belligerents changed with sometimes extraordinary frequency,<sup>34</sup> and in any case were not always carefully observed. Six hundred American vessels were seized or detained in British ports between November 6 1793 and March 28 1794 alone (Huebner 1905: 436), and crucially, British insurers could not be held legally liable for losses on neutral vessels captured by British ships. French privateers also posed a serious threat at times. In 1796-7, when the French began to capture American vessels in the Caribbean in retaliation for Jay’s treaty between the US and Britain, the premium on one-way voyages to the West Indies rose from a range of 3 – 6% in the fall of 1796 to as much as 15 – 20% in the summer of 1797 and reached 25% in 1798, before American naval victories in 1799 and 1800 brought rates back down.<sup>35</sup>

<sup>34</sup>To give an extreme example, on 9 May 1793 the French issued a decree authorizing their vessels to arrest any vessels laden with provisions for an enemy port. On 23 May they exempted American vessels from this decree. On May 28 they suspended this exemption, but reversed this suspension on July 1. Finally, on 27 July they reversed their position again by repealing the decree of May 23 (Clauder 1932: 11).

<sup>35</sup>See, eg., Wharton and Lewis, “Account of Policies Underwritten”, Historical Society of Pennsylvania ms AMB 95591. In March 1797, the Insurance Company of the State of Pennsylvania usually charged  $2\frac{1}{2}$  or 3% to cover the

The growth in trade, coupled with its uncertainty, created the conditions for a rapid expansion of the American marine insurance market but placed considerable strain on the existing loosely organized system of private underwriting through brokers, thus providing ideal conditions for market entry by corporations. The first American marine insurance corporation, the Insurance Company of North America (ICNA), was formed in Philadelphia in 1792 and chartered in 1794. The President and Directors were all leading underwriters and most of the board were Philadelphia merchants. In contrast to Britain, where the two chartered corporations held a monopoly, no monopoly was sought in America. Philadelphia's remaining private underwriters initially opposed the INCA charter, but having observed its early success, they founded the rival Insurance Company of the State of Pennsylvania, which was also chartered in 1794.

Boosted by high wartime premia, the Philadelphia corporations quickly proved highly profitable, and this in turn encouraged the formation of incorporated companies elsewhere. Corporations were chartered in Maryland in 1795, in Connecticut in 1797, in New York and Virginia in 1798, in Massachusetts and Rhode Island in 1799, and in Maine in 1800.<sup>36</sup> By 1810 private underwriting had virtually disappeared in the US, and it was reported that “in every part of America the Insurances are done by incorporate companies”,<sup>37</sup> including seven in Boston, eight in Philadelphia, five in Baltimore, and six in New York.

#### HYPOTHESIS: AN ADVERSE SELECTION PROBLEM

Why did the newly chartered corporations fail to dominate marine insurance in Britain after 1720 or 1824? It was not because of an insufficient capital stock: in 1810, the Royal Exchange had a paid-up capital of £680,000, but it had the right to call up to £1.5 million from its shareholders.<sup>38</sup> sea risk only on one-way voyages to the West Indies, but 15% for all risks on voyages to British ports and 7 – 8% to French and Spanish ports though “it is to be remarked that Circumstances varying as they do We are obliged to vary premiums very often” (ICSP letterbook, Historical Society of Pennsylvania ms 2001: letter to Hercules Courtenay, 11 March 1797).

<sup>36</sup>See Roelker and Collins (1949) on Rhode Island; Fowler (1997) on Massachusetts; Woodward (1897) on Connecticut; Crothers (forthcoming) on Virginia; Davis (1917) on New York and Maryland.

<sup>37</sup>Select Committee on Marine Insurance (1810), p.11

<sup>38</sup>Select Committee on Marine Insurance (1810), evidence of P. Grenfell. Furthermore, Grenfell (who was a director of the Royal Exchange Co.) claimed that the corporation did not enjoy limited liability.

Furthermore, both corporations were able to substantially increase their underwriting activity during wartime, despite the higher risks (Figure 1), and even then, they both claimed that they would have liked to have done even more business.<sup>39</sup>

Neither was the corporations conservatism in underwriting a reflection of the exercise of monopoly power (although this was certainly a goal of those who petitioned for the charters in 1720). The corporations were simply too small a part of the overall market as it actually evolved to make this plausible, and besides, although they generally found marine underwriting profitable, their profits do not appear to have been extraordinary, *despite* charging higher premia than the private underwriters on apparently similar voyages.<sup>40</sup>

Conversely, if private underwriting was somehow more efficient - for example, because of agency problems within corporations - then why did a Lloyd's-like institution for private underwriting not develop in the US? After all, American underwriters and merchants were very familiar with Lloyd's.

In this section, we develop an hypothesis which can account for the divergence in institutional structure between Britain and the US. First, we argue that the marine insurance market was characterized by multiple equilibria, because the importance of information for assessing risk created a potential adverse selection problem for uninformed underwriters. Second, we argue that the timing of historical events led to the selection of different equilibria in Britain and America.

As described earlier, asymmetric information was a pervasive feature of marine insurance contracts in the eighteenth century. Merchants had strong incentives to conceal information which,

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<sup>39</sup>Select Committee on Marine Insurance (1810), evidence of J. Holland and T. Greathead. See also "The Case of the London Assurance Corporation and their objections to the Repeal of the Statute of 6 Geo I", in Guildhall Library MS 18833.

<sup>40</sup>For example, between 1761-65, William Braund, described as "a steady but by no means a great underwriter" at Lloyd's made average annual underwriting profits of about £1,700 on premium income of between £4,000 and £9,000 annually (Sutherland 1933: 65, 74-77). In comparison, the Royal Exchange Assurance corporation achieved average profits in the same years of about £6,100 on annual premia which averaged £36,600 (Supple 1970: 62). The London Assurance averaged profits of £7,300 on average premia of £43,300 (based on Guildhall Library MS 8749A). (It should be emphasized that this is a very crude comparison, because, as one would expect, there is considerable fluctuation over time).

if known, would raise the premium, and to represent other facts so as to reduce the premium. This model explores the consequences of the resulting agency problems. The key features of the model, motivated by the historical evidence, are as follows: there are many merchants who can purchase insurance from either private underwriters or corporations. Corporations are perceived as more financially secure. However, if many merchants insure with private underwriters, then because of network effects, these private underwriters gain an advantage in assessing risks. To summarize our earlier argument: the coming together of numerous merchants and underwriters, with the ability and experience to share and interpret a constantly-changing flow of information, created a disadvantage for less-informed underwriters. Furthermore, through repeated interaction, a reputation mechanism helped to constrain fraud and opportunism. Brokers played a central role in the operation of this reputation mechanism (see Kingston 2005 for a model and discussion). Here, we abstract from the repeated nature of the interactions, in order to focus on ex-ante opportunism (adverse selection) relating to a single risk in a one-shot game rather than on ex-post opportunism (moral hazard) in a repeated game. However, the model can also be loosely interpreted as a reduced form of a repeated-game model, in which the merchant’s “type” in any period reflects his “character” (reputation) rather than exogenous maritime risk.<sup>41</sup>

There are many merchants, who undertake voyages which either succeed, yielding income  $I$ , or fail, yielding 0. All losses are verifiable. Merchants have initial wealth  $W$ , and identical continuous and differentiable VNM utility functions  $u(\cdot)$  defined over non-negative values of wealth, such that  $u'(\cdot) > 0$  and  $u''(\cdot) < 0$ . The probability of a loss on merchant  $i$ ’s voyage is  $\theta_i$ , where  $\theta_i$  is uniformly distributed on the interval  $[\underline{\theta}, \bar{\theta}] \subset (0, 1)$ . The distribution of  $\theta$  is common knowledge, but its realization is observed only by the merchant. Since  $\theta$  is private information, we will refer to  $\theta$  as the merchant’s “type”.

There are many private underwriters, and at least two insurance corporations. All underwriters are risk-neutral and act competitively. A marine insurance contract is one in which an underwriter agrees to indemnify a merchant by paying him  $(1 - p)I$  in case of loss, in exchange for

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<sup>41</sup>See Kandori (1992) for a model of community enforcement which stresses the role of reputational information in overcoming opportunism. If a corporation found it harder to observe a merchant’s reputation, or to use the threat of gossip to constrain a merchant’s behavior, it might therefore attract a disproportionately “disreputable” clientele.

a premium payment  $pI$  in case of success.

This is a one-shot game. Play proceeds as follows. First, the corporations announce their premia,  $p_c$ . Because the corporations are unable to learn the merchant's type,  $p_c$  is the same for all merchants.<sup>42</sup> Bertrand competition between corporations is assumed to drive  $p_c$  down to a level (to be determined endogenously) which leads to zero expected profits for the firm. Next, merchants learn their types,  $\theta$ . Then all merchants simultaneously decide whether to apply to incorporate or private underwriters. For simplicity, we assume that all merchants inelastically purchase full insurance (this will not affect our qualitative conclusions; see discussion below).

If merchant  $i$  chooses to insure with a corporation he chooses the corporation which has set the lowest premium. If instead he chooses private underwriters, then those underwriters learn his type,  $\theta_i$ , with probability  $\sigma$ , where  $\sigma$  is the proportion of merchants who choose to purchase insurance from private underwriters. The premium charged by private underwriters will depend on the information available to them. If they learn the merchant's type, then competition will lead them to offer insurance at the actuarially fair premium,  $\theta_i$ . Otherwise, they offer a premium  $p_p$ , where  $p_p$  (to be determined endogenously) is driven by competition to a level which yields zero expected profits. Finally, private underwriters fail with probability  $\phi$ . If a private underwriter fails, any insurance contracts he has made are void, and neither premium nor indemnity is paid.

Let  $u_p(\theta)$  and  $u_c(\theta)$  denote the expected utility obtained by a merchant of type  $\theta$  by choosing private and corporate underwriters, respectively.

**Lemma 1.** *For any given values of  $p_p$ ,  $\phi$  and  $\sigma$ ,  $u_p(\theta)$  is strictly decreasing in  $\theta$ ; for any given value of  $p_c$ ,  $u_c(\theta)$  is independent of  $\theta$ .*

*Proof.* The expected payoff to insuring with a private underwriter is

$$u_p(\theta) = (1-\phi)[\sigma u(W+(1-\theta)I) + (1-\sigma)u(W+(1-p_p)I)] + \phi[\theta u(W) + (1-\theta)u(W+I)] \quad (1)$$

The term in the first square bracket shows the payoffs obtained in the case where the private underwriter does not fail. The second square bracket shows the expected payoff if the underwriter does fail, leaving the

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<sup>42</sup>The assumption that the corporations have *no* information is clearly extreme, but is made for analytical simplicity. If, for example, we assumed that the corporations become better able to assess risks as more merchants insure with them, the results would be qualitatively unaffected.

merchant uninsured. Both terms are strictly decreasing in  $\theta$ . The payoff to using a corporate underwriter is

$$u_c(\theta) = u(W + I - p_c I) \quad (2)$$

□

Lemma 1 ensures that in searching for equilibria of this game, we have only three possible cases to consider: pooling equilibria in which all merchants choose private underwriters and  $u_p(\theta) \geq u_c(\theta) \forall \theta$ ; pooling equilibria in which all merchants choose corporate underwriters and  $u_p(\theta) \leq u_c(\theta) \forall \theta$ ; and equilibria in which there is some critical value of  $\theta$ ,  $\tilde{\theta}$ , such that merchants with types  $\theta < \tilde{\theta}$  choose private underwriters and those with  $\theta > \tilde{\theta}$  choose corporate underwriters (and those with  $\theta = \tilde{\theta}$  are indifferent). However, in equilibrium,  $p_c$ ,  $p_p$  and  $\sigma$  are determined endogenously by the aggregated strategies of the merchants.

**Proposition 1.** *(i) There is no pooling perfect Bayesian equilibrium (PBE) in which all types of merchants insure with private underwriters.*

*(ii) There exists a pooling PBE in which all types of merchants insure with corporations.*

*(iii) For sufficiently small values of  $\phi$ , there exists a PBE in which merchants with types  $\theta < \tilde{\theta}$  (good risks) insure with private underwriters and merchants with types  $\theta \geq \tilde{\theta}$  (bad risks) insure with corporations, for some  $\tilde{\theta} \in (\underline{\theta}, \bar{\theta})$ .*

*Proof.* See Appendix. □

Proposition 1 shows that two kinds of equilibria are possible in this game. If nobody expects any merchants to apply to private underwriters, then the private underwriters will have no informational advantage, and given the insecurity of private underwriting, all merchants would indeed prefer to insure with the corporations. Thus we have an equilibrium in which all merchants choose corporate underwriters. However, if it is expected that at least some merchants will insure with private underwriters, then the best risks (low-risk) merchants might prefer private underwriters, since if the private underwriters observe their type, they will pay lower premia. But then, the corporations will be left with a disproportionately poor selection of risks, forcing them to raise their premia. This in turn will induce more of the better risks to apply to private underwriters; and so

on, until the corporations are left with only the very worst risks. Thus, in a variant of the familiar “lemons problem” logic, we arrive at an equilibrium in which the better risks are insured by private underwriters at low premia, while the corporations charge high premia and receive business only from the worst risks.<sup>43</sup>

The model departs from the bulk of the theoretical literature on insurance in that only allows underwriters to compete on price, thus ruling out the possibility of screening contracts.<sup>44</sup> However, screening contracts only work if customers can buy only one insurance contract. This assumption is not tenable for eighteenth century marine insurance, when it was quite common for merchants to insure with multiple underwriters in different ports and even in different countries, and insurers could not limit the total amount of insurance purchased.<sup>45</sup> We also assumed that all merchants inelastically purchase full insurance. Basic insurance theory reveals that, at a given premium, good risks would wish to purchase a lower quantity of insurance than bad risks (eg., Rothschild and Stiglitz 1976), and the historical record confirms that merchants frequently underinsured, particularly if they had a relatively small amount of merchandise travelling on a “good” ship.<sup>46</sup> Relaxing this assumption would add another twist to the adverse selection problem without affecting the qualitative conclusions: not only will the corporations get the worst risks, but the worse the risks are, the more insurance they will buy.

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<sup>43</sup>There are actually two reasons why bad risks prefer to insure with corporations. First, the corporations are unable to observe types; and second, since bad risks are more likely to face a loss, they are more severely affected by the possibility of private underwriters’ insolvency.

<sup>44</sup>For example, Rothschild and Stiglitz (1976) show that firms may be able to induce customers to reveal their type by offering a menu of price-quantity contracts (less risky customers will be willing to buy lower quantities of insurance at lower premia).

<sup>45</sup>To control moral hazard, a merchant could not legally recover more than the value lost. In the event of inadvertent over-insurance (for example, if the value of the cargo had been overestimated), only whichever insurance had been made first was effective, and the premia on the remaining policies were returned net of a small deduction (Weskett 1781). Deliberate, fraudulent over-insurance was a serious concern for underwriters. For example, in 1755 the London Assurance discovered a suspected fraud in which the same goods had been insured multiple times in London, Amsterdam and Hamburg (Guildhall Library MS 8755, 28 February 1755). See also footnote 2.

<sup>46</sup>For example, American merchant Henry Laurens instructed his agents in London that when his goods were shipped “by a good vessel and master” they should leave values below £100 uninsured, and only  $\frac{3}{4}$  of the value of larger shipments (Laurens to Bridgen and Waller, 7 January 1786 [Hamer 2003]).



Although our model is clearly a simplification of a complex reality, it can explain the British corporations' conservatism in underwriting - and thereby answer the central puzzle of why they failed to dominate the British marine insurance market.

Although they were not excluded from Lloyd's news service,<sup>47</sup> the corporations could not match the collective expertise and local knowledge of the private underwriters. On regular risks, their premia were generally 20-30% higher than at Lloyd's. After experiencing numerous instances of fraud in the early eighteenth century, they became increasingly reluctant to insure cross risks, and refused to cover the risk of seizure in a foreign port: both risks for which a specialist knowledge of local circumstances was of vital importance, and the corporations disadvantage was therefore particularly acute.<sup>48</sup> They also limited the amount they would insure on a single voyage, and placed stringent restrictions on deviations from the planned voyage. For many merchants, it was this restrictiveness, even more than the high premia, which induced them to insure at Lloyd's instead. One stated that

If I could do all my business at the public offices I should undoubtedly prefer doing it with them . . . In all risks that they will take, they in my opinion are preferable to Lloyd's Coffee house; in the first place, I feel myself perfectly insured, I feel that my property is safely insured . . . I do not think that I can state properly that they are of little service on account of the difference in premiums; I think it is in the amount that they take . . . instead of having a sum that they will do on one risk, it is three, four or five times as much as they will take.<sup>49</sup>

Another merchant, having insured with the London Assurance company, warned his corre-

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<sup>47</sup>It has been asserted that Lloyd's began to supply the two chartered corporations with shipping intelligence in 1814 in exchange for an annual payment of £100 (Wright and Fayle, 1928, p.316). But in fact, at least by 1762, the London Assurance Corporation was making regular annual payments to the coffee-house masters for *Lloyd's List*, and beginning in 1766 it also subscribed to "a register of shipping", the fore-runner of *Lloyd's Register* (Guildhall Library MS 8728/8, 13 January 1762 and 29 January 1766). Also, from as early as 1727, clerks of the London Assurance Corporation regularly attended Lloyd's to gather shipping news (Guildhall Library MS 8728/2, 10 May 1727, MS 8728/4, 14 September 1737).

<sup>48</sup>For example, the London Assurance insured risks worth £23,505 between the West Indies and North America between 19 August 1730 and 27 July 1731, but only £705 on the same routes between 16 November 1768 and 4 September 1770 (John 1958, Table 1).

<sup>49</sup>Select Committee on Marine Insurance (1810), evidence of Alexander Glennie.

spondent that in case of accident, he should have the documents relating to the claim “well arranged authenticated and sent by two conveyances” because “these Gentlemen or rather this Company are rather particular in respect to vouchers either for an average or loss”.<sup>50</sup> They were too particular, in fact, for an American merchant, resident in London, who explained to his partners in Maryland:

“I have not made it [insurance] in a public office [ie., a corporation]. The reason why I did not was their particularity; they must know who you are and a deal of that; then again you are plagued more than little enough before you can get the money after a loss and everybody prefer making theirs at Lloyds for that reason.”<sup>51</sup>

The key to understanding the corporations’ cautious approach to underwriting is the adverse selection problem which resulted from their disadvantage in evaluating risks. For example, in 1810, J. Holland, the chief clerk in the marine insurance department of the Royal Exchange Assurance Co., explained to a Parliamentary Select Committee that the company’s practice was to underwrite a maximum of £5 – 10,000 on any one ship in the West India or Baltic fleets, because it was usually only offered the opportunity to insure about one tenth of the ships in the fleet. If it could insure *all* the ships in the fleet, he claimed, it would “have no hesitation” in insuring £20 – 25,000 on each ship, “because it would be playing a more equal game”.<sup>52</sup> Furthermore, it was the existence of Lloyd’s which created this adverse selection problem:

“The two public offices . . . confine themselves to what are called regular risks . . . It would be absurd to expect any public office to act on any other system; for it is impossible that the acting director or secretary of a public office, should possess the same knowledge, as to the nature and extent of every new description of risk, . . . as 1,500 underwriters, mostly men of commercial habits, and consequently commercial knowledge, daily collected together for the purpose of communicating and receiving intelligence . . . who concentrate the scattered rays of information, as it were, into one focus at Lloyd’s. On this conviction the public offices, very wisely, refuse to take what they do not understand.”<sup>53</sup>

The corporations were also at a disadvantage in learning about the “character” of market

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<sup>50</sup>Francis Rotch to Christopher Champlin, 9 October 1786 [Massachusetts Historical Society 1915].

<sup>51</sup>Joshua Johnson’s letterbook, 26 July 1771 (Price, 1979, p.8)

<sup>52</sup>Select Committee on Marine Insurance (1810), evidence of J. Holland.

<sup>53</sup>Hansard, *Parliamentary Debates*, XV (1810), p. 407-8. Speech by Joseph Marryat.

participants. For example, Holland testified that although the Royal Exchange company would have liked to expand its business, it often refused to insure merchants who it did not know well because their insurances were not “tendered fairly”.<sup>54</sup> In fact, a substantial part of the business done by the companies was done for, or brokered by, their directors and shareholders (John, 1958).

Proposition 1 reveals the potential for multiple equilibria in the marine insurance market, which can account for both the success of marine insurance corporations in the US after 1792, and the persistence of private underwriting in Britain after 1720 and 1824. However, to see how these different equilibria came to be observed, we must turn to the historical record.

In Britain, the companies which were to become the chartered corporations initially did a large amount of business and were accused of undercutting the market in order to drive private underwriters out of business (Supple 1970: 20). However, the bursting of the South Sea Bubble left them in financial difficulties, primarily because many of their subscribers, who had paid in only a fraction of the nominal value of their stock, were themselves in financial trouble. As a result, they began with plunging share prices and low public confidence. The value of stock in the Royal Exchange Assurance corporation, which had risen from less than £20 per share in January 1720 to over £200 in August, fell below £10 by the end of the year.<sup>55</sup> The London Assurance suffered heavy losses as a result of a storm which sank twelve Jamaica ships in October 1720,<sup>56</sup> and was forced to borrow money to survive. Both were unable to raise the money they owed to the King’s civil list, only half of which was ultimately paid. In the words of Wright and Fayle (1928: 63), “The companies difficulty was the underwriters opportunity”, and within a few years the corporations were doing only a small proportion of the total marine insurance business.

As we have seen, the institutional structures and intelligence-gathering apparatus which enabled private underwriters at Lloyd’s to deal with the information asymmetries and agency problems inherent in marine insurance took time to evolve. Yet in America, the formation of joint-stock corporations became possible at a time when private underwriting was still at a comparatively early stage of development, and at a highly favorable time for marine underwriting. Since many

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<sup>54</sup>Select Committee on Marine Insurance (1810), evidence of J. Holland.

<sup>55</sup>Supple (1970: 38).

<sup>56</sup>Postlethwayt (1774): article on “Actions”

of the most prominent merchants and brokers were instrumental in founding the corporations, they suffered little or no informational disadvantage relative to private underwriters, and therefore no adverse selection problem. Like the British corporations before them, they were accused of undercutting the market in a deliberate attempt to drive private underwriters out of business (Montgomery 1888: 40). Unlike the British corporations, they succeeded.

We can only speculate as to whether a well-developed private underwriting institution might have been able to survive, once established, in the US. One might argue that such a development would have been hindered by the lack of a “London” in America: America had several major ports and numerous minor ports, so that the marine insurance market was really a fragmented collection of local markets. However, merchants corresponded freely all along the east coast, engaged in joint ventures, and insured each others voyages. New York merchant Gerard Beekman, for example, frequently brokered policies for Rhode Island merchants in New York in the 1750s, and in turn he sometimes insured his own voyages in Philadelphia, where he found the premia lower than in New York.<sup>57</sup> So, it is at least possible that the several existing centers for private underwriting might have evolved into more developed institutions, given time.<sup>58</sup> What is clear, though, is that private underwriting could not invade a market dominated by corporations,<sup>59</sup> and as a result no such institution ever developed in the US.

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<sup>57</sup>Gerard Beekman to Townsend White, 6 October 1754 (White 1956).

<sup>58</sup>In this regard, it is interesting to note the many parallels between the development of Lloyd’s and the London Stock exchange. Both originated in early eighteenth century coffee houses, and gradually developed mechanisms to deal with the increasing complexity of business as the century progressed. Both businesses relied crucially on timely information and trust among the market participants. Whereas Lloyd’s disseminated this information through *Lloyd’s List*, the Stock Exchange had the *Course of the Exchange*. Like Lloyd’s, the Stock Exchange received a huge impetus from the Revolutionary and Napoleonic Wars (because of the increase in the size and turnover of the National Debt). Thus, “by the end of the Napoleonic Wars in 1815, the Stock Exchange had become an accepted part of financial life displaying many features quite recognizable today” (Hennessy 2001: 32). In America, the New York Stock Exchange also developed from informal coffee-house origins into a formal centralized market for stocks and government debt (Banner 1998), but as we have seen, there was no parallel development of an American marine insurance marketplace.

<sup>59</sup>According to one account, there was a failed effort to create such an institution in New York around 1810 (Select Committee, 1810, evidence of John Bennett).

## CONCLUSION

In Britain, the provision of marine insurance by partnerships or companies, other than the two chartered corporations, was prohibited by the Bubble Act, enabling Lloyd's to develop as a center where private underwriters gathered and shared information. This information created an adverse selection problem which prevented the chartered corporations from taking over the market. The Revolutionary and Napoleonic Wars strengthened the system of private underwriting at Lloyd's, enabling it to survive competition from corporations even after the Bubble Act was subsequently repealed. In the US, in contrast, where the protection provided by the Bubble Act had been removed by American independence prior to the wars, private underwriting was quickly extinguished by competition from joint-stock corporations. Thus, although the two countries were in close commercial contact, and shared essentially the same technology and knowledge, temporary historical differences in the institutional environment ultimately led to the selection of different equilibria.

Theories of institutional change have viewed it as sometimes an unintentional, evolutionary process, and at other times as a process characterized by discrete, intentional changes driven by institutional entrepreneurs via the political process (Caballero and Kingston 2005). Aoki (2001: 243) offers a partial synthesis of these views, arguing that institutional change frequently involves short, turbulent periods of deliberate institutional change and experimentation, interspersed with longer periods during which these experiments are weeded out through a gradual, evolutionary process. The development of the marine insurance business in the eighteenth century appears to fit this pattern.

Exogenous events, including the South Sea Bubble, American Independence, and the Revolutionary and Napoleonic wars, created the conditions for deliberate institutional innovation at particular points in time, carried out primarily through the political process. For example, the efforts to obtain charters for the British corporations in 1719-20 and the Philadelphia corporations in 1792-4, the narrowly failed attempt to repeal the British duopoly in 1810, and the successful effort in 1824, were primarily political struggles. The development of a formal structure at Lloyd's also involved deliberate collective action to create formal rules through an essentially political process.

Between these turbulent episodes of deliberate innovation, and constrained by the previous

political choices, evolutionary processes, including competition between alternative institutional forms, gradually altered the rules of the game. For example, after the Bubble Act, business practices at Lloyd's, and insurance law in Britain, evolved in tandem as merchants, underwriters, and coffee-sellers gradually altered their perceptions and behavior in response to a gradually changing environment, and this evolutionary process generated relatively effective institutions despite a lack of centralized direction or deliberate institution-building. In the US, the pioneering "mutation" of the ICNA in Philadelphia sowed the seed that led to a rapid spread of corporate underwriting throughout the US.

Since Britain and America evolved quite different marine insurance institutions, one might conjecture that an inefficient arrangement arose in one or the other of the two countries. This would be all the more surprising since both countries were in close commercial contact and had a long history of "institutional transplants". It is not clear, however, whether either arrangement was more efficient in any meaningful sense. Both had drawbacks: under the Lloyd's system, even careful underwriters might be unable to meet their obligations if they suffered a run of bad luck. The corporate system in the US, however, lacked Lloyd's ability to gather and efficiently use underwriters' idiosyncratic information about risks.

Over time, both systems attempted to resolve these defects. In the 1860s, Lloyd's began to accept deposits from underwriters as a guarantee of security to the assured, and in 1871, it was incorporated as a Society with the power to make by-laws to regulate itself as a marine insurance marketplace. In the late nineteenth century, underwriters gradually began to form syndicates in which a single individual wrote on behalf of several underwriters. This further increased the security of policies by reducing the transactions costs of spreading risk more widely (Gibb 1957:177-8).

Some American corporations employed their own foreign correspondents, but they had nothing like the advanced information-gathering apparatus of Lloyd's. However, beginning in the 1830s and 40s, associations of marine insurers were formed in New York and Philadelphia to unify practices and counter fraud (Fowler 1888: 150, 198; Mitchell 1970: 11), and in 1881, a national association of marine underwriters was formed to unify practices and maintain a single network of correspondents worldwide (Mitchell 1970: 28).

APPENDIX: PROOF OF PROPOSITION 1.

(i) First suppose all merchants are expected to insure with private underwriters. We will show that this cannot occur in equilibrium. Because all insure with private underwriters,  $\sigma = 1$  and because of competition among private underwriters,  $p_p = (\underline{\theta} + \bar{\theta})/2$ , so, from (1) the expected payoff to a merchant of type  $\bar{\theta}$  from insuring with a private underwriter is

$$\begin{aligned} u_p(\bar{\theta}) &= (1 - \phi)[u(W + I - \bar{\theta}I)] + \phi[\bar{\theta}u(W) + (1 - \bar{\theta})u(W + I)] \\ &< (1 - \phi)[u(W + I - \bar{\theta}I)] + \phi[u(W + I - \bar{\theta}I)] \quad (\text{by risk aversion}) \\ &= u(W + I - \bar{\theta}I) \end{aligned}$$

Therefore, by offering a premium of  $\bar{\theta}$ , a corporation can profitably attract some of the worst risks (those with types close to  $\bar{\theta}$ ). Offering this premium is rational for the corporation no matter what its beliefs are about the distribution of the types of merchants who would accept the offer. Therefore there is no PBE in which all merchants insure with private underwriters.

(ii) Suppose instead that merchants expect all other merchants to insure with corporations. Then competition between corporations will ensure that  $p_c = (\bar{\theta} + \underline{\theta})/2$ , and the private underwriters will have no information advantage ( $\sigma = 0$ ), so

$$u_p(\theta) = (1 - \phi)[u(W + I - p_p I)] + \phi[\theta u(W) + (1 - \theta)u(W + I)]$$

whereas 
$$u_c(\theta) = u(W + I - (\bar{\theta} + \underline{\theta})I/2)$$

By insuring with private underwriters, merchants run the risk ( $\phi$ ) of being uninsured. Nevertheless, if the premium that private underwriters would charge without any information,  $p_p$ , were sufficiently low, some merchants might be willing to take this risk.  $p_p$ , however, depends on the private underwriters beliefs off the path of play. We can construct a PBE by specifying that private underwriters believe that merchants who apply to them for insurance have types randomly drawn from the population. Then,  $p_p = p_c = (\bar{\theta} + \underline{\theta})/2$ , so, all merchants strictly prefer corporate underwriters.

(iii) Merchants take  $p_c$ ,  $p_p$  and  $\sigma$  as given. However, suppose there is some  $\tilde{\theta}$  such that merchants with  $\theta < \tilde{\theta}$  choose private underwriters and those with  $\theta > \tilde{\theta}$  choose corporate underwriters. Then, because both kinds of underwriters must earn zero expected profits in competitive equilibrium, the following must hold:

$$p_p = \frac{\tilde{\theta} + \underline{\theta}}{2} \quad p_c = \frac{\tilde{\theta} + \bar{\theta}}{2} \quad \sigma = \frac{\tilde{\theta} - \underline{\theta}}{\bar{\theta} - \underline{\theta}}$$

Define

$$\begin{aligned} \tilde{u}_p(\theta) &= (1-\phi) \left[ \left( \frac{\theta - \underline{\theta}}{\bar{\theta} - \underline{\theta}} \right) u(W+I-\theta I) + \left( \frac{\bar{\theta} - \theta}{\bar{\theta} - \underline{\theta}} \right) u(W+I-(\theta+\underline{\theta})I/2) \right] + \phi [\theta u(W) + (1-\theta)u(W+I)] \\ \tilde{u}_c(\theta) &= u(W+I-(\theta+\bar{\theta})I/2) \end{aligned}$$

(these are the payoffs to a merchant of type  $\theta$ , assuming that he is the critical type, and that  $p_p$ ,  $p_c$  and  $\sigma$  reflect this). Since  $u(\cdot)$  is continuous and differentiable, so are  $\tilde{u}_p(\cdot)$  and  $\tilde{u}_c(\cdot)$ . Therefore we can establish the existence of a crossing point  $\tilde{\theta}$  such that  $\tilde{u}_p(\tilde{\theta}) = \tilde{u}_c(\tilde{\theta})$  by showing that  $\tilde{u}_p(\theta) < \tilde{u}_c(\theta)$  as  $\theta \rightarrow \bar{\theta}$  and  $\tilde{u}_p(\theta) > \tilde{u}_c(\theta)$  as  $\theta \rightarrow \underline{\theta}$ . The first inequality always holds since

$$\begin{aligned} \tilde{u}_p(\bar{\theta}) &= (1-\phi) \left[ \left( \frac{\bar{\theta} - \underline{\theta}}{\bar{\theta} - \underline{\theta}} \right) u(W+I-\bar{\theta}I) + \left( \frac{\bar{\theta} - \bar{\theta}}{\bar{\theta} - \underline{\theta}} \right) u(W+I-(\bar{\theta}+\underline{\theta})I/2) \right] + \phi [\bar{\theta}u(W) + (1-\bar{\theta})u(W+I)] \\ &= (1-\phi)u(W+I-\bar{\theta}I) + \phi [\bar{\theta}u(W) + (1-\bar{\theta})u(W+I)] \\ &< (1-\phi)u(W+I-\bar{\theta}I) + \phi [u(W+I-\bar{\theta}I)] \\ &= u(W+I-\bar{\theta}I) = \tilde{u}_c(\bar{\theta}) \end{aligned}$$

(the worst type of merchant would prefer safe insurance with a corporation at an actuarially fair rate of premium than insecure insurance with well-informed private underwriters at the same rate).

The second inequality holds if

$$\begin{aligned} (1-\phi) \left[ \left( \frac{\underline{\theta} - \underline{\theta}}{\bar{\theta} - \underline{\theta}} \right) u(W+I-\underline{\theta}I) + \left( \frac{\bar{\theta} - \underline{\theta}}{\bar{\theta} - \underline{\theta}} \right) u(W+I-(\underline{\theta}+\underline{\theta})I/2) \right] \\ + \phi [\underline{\theta}u(W) + (1-\underline{\theta})u(W+I)] > u(W+I-(\underline{\theta}+\bar{\theta})I/2) \end{aligned}$$

or

$$(1-\phi) [u(W+I-\underline{\theta}I)] + \phi [\underline{\theta}u(W) + (1-\underline{\theta})u(W+I)] > u(W+I-(\underline{\theta}+\bar{\theta})I/2) \quad (3)$$

which holds for sufficiently small  $\phi$ . Intuitively, (3) shows that unless private underwriters are so financially insecure that even the best type of merchant (type  $\underline{\theta}$ ) prefers safe insurance at a premium of  $(\underline{\theta} + \bar{\theta})/2$  (the actuarially fair premium rate for the overall population) to unsafe insurance at a fair rate of premium ( $\underline{\theta}$ ), there exists a  $\tilde{\theta}$  such that  $\tilde{u}_p(\tilde{\theta}) = \tilde{u}_c(\tilde{\theta})$ . If such a  $\tilde{\theta}$  exists, then there is an equilibrium in which merchants with types  $\theta < \tilde{\theta}$  choose private underwriters and those with types  $\theta > \tilde{\theta}$  choose corporate underwriters.  $\square$



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