

Adverse Selection and Institutional Change in Eighteenth Century Marine Insurance

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November 17, 2016

Abstract

This paper analyzes the institutional changes which occurred in the marine insurance industry during the eighteenth and early nineteenth centuries. Despite common origins and similar technology, by the early nineteenth century the manner in which marine insurance transactions were accomplished had evolved along two distinct institutional paths in different countries. I use a context-specific game-theoretic model to explore the hypothesis that the industry was characterized by multiple institutional equilibria. Institutional change in the industry is interpreted as a path-dependent process in which exogenous shocks (caused primarily by the wars of the eighteenth century) periodically disturbed these equilibria, inducing institutional change.

1 Introduction

Most approaches to the study of economic organization seek to explain observed organizational forms as efficient means of achieving goals subject to the constraints imposed by technology and the economic environment. Transaction-cost economics, for example, holds that transaction costs arise because of the bounded rationality and opportunism of the transacting parties, and seeks to explain governance structures as efficient (transaction-cost minimizing) responses to these problems (Williamson 2000). The focus on efficiency to explain

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organizational form is equally characteristic of the incomplete-contracts/property-rights approach (Hart 1995; Gibbons 2005). There are two main (though generally implicit) ways to justify this focus on efficient organizational forms: first, efficient organizational design could be a result of rational design, and second (and perhaps more common), in competitive environments, inefficient forms of organization will tend to be weeded out, so observed organizational forms can be assumed to be functional (Alchian 1950).

In many cases, of course, the assumption of efficient organizational form is entirely appropriate, and these approaches have proven empirically successful. However, a challenge arises in explaining the observed diversity of institutions which are used to accomplish apparently similar transactions in different countries.¹ In some cases, these differences do not appear to arise simply as efficient responses to varying environments, and this leads to an important set of puzzles regarding institutional diversity and change: Why do countries with less efficient institutions not copy the institutional structure of more successful ones? Is there a tendency towards convergence to a universal set of optimal institutions? If not, why not?

This paper studies long-run institutional change by describing and analyzing how the organizational forms used to govern a particular transaction - marine insurance - evolved during the eighteenth and early nineteenth centuries. Marine insurance played a vital role in the expanding trade of this period, enabling merchants to commit substantial assets to undertaking risky voyages without running the risk of ruin. The institutions used to enable and govern risk-sharing transactions evolved from common origins, but over time they developed in different directions in different countries. I use contemporary evidence and a context-specific model to explore the nature and emergence of these institutions, and interpret the findings in the context of the literature on institutional change.

In particular, I argue that the industry was characterized by multiple equilibria, each of which, once selected, was stable. In Britain, an equilibrium based on the ancient practice of private underwriting became institutionalized over time through the development of a set

¹I use the term “institutions” here broadly to mean systems of rules, beliefs, organizations, and internalized norms which together generate regular patterns of behavior; on various conceptions of the nature of institutions, see Greif (2006) and Greif and Kingston (2011).

of complementary institutions, especially Lloyd's of London, which developed from a coffee-house into a sophisticated marine insurance marketplace. In the United States and elsewhere, in contrast, private underwriting essentially died out during this period, and the industry became dominated by marine insurance corporations. Thus, although both intentional design and evolutionary competition created some pressure towards efficiency, in a broader sense the long-run trend was towards divergence and diversity. The timing of a series of historical events, involving both exogenous shocks (especially wars) and endogenous parameter changes and learning processes, drove the process of institutional change (equilibrium selection), leading ultimately to a bifurcation of institutional structure between Britain and the rest of the world. The organizational structures that emerged can therefore only be understood as outcomes of an historical process with multiple stable paths of development in a continually changing world, rather than being optimally designed to 'minimize transaction costs' in a static environment.

2 Agency problems in marine insurance

The marine insurance contract (the exchange of a premium for a specified indemnity to be paid in the event of a loss) developed in the Italian city states during the middle ages. Underwriting was carried out by private individuals who wrote their names on a policy along with the amount they were willing to insure. Because a knowledge of trade was necessary to evaluate risks, many of the underwriters were themselves merchants, and depending on the size of the risk, policies might have anything from one or two to as many as sixty or seventy underwriters. Transactions were typically facilitated by brokers, who played an important role in finding a set of underwriters for each policy, negotiating the premium, drawing up the policy and recording the transaction details, including the information provided about the vessel and her cargo and route, and handling payments.

Marine insurance transactions were made problematic by a variety of agency problems on both sides of the market (Kingston 2007). First, underwriters had to contend with the possibility of moral hazard on the part of the merchants. In some cases, merchants fraudu-

lently attempted to insure ships which they already knew to have been lost, or conspired to deliberately sink insured vessels. More subtly, merchants (or their captains) whose vessels were insured might be more likely to take risks such as sending an unseaworthy vessel to sea or attempting to run through a blockade. Because of the slow speed of communication, the difficulty of verifying information, and the strong likelihood of unforeseen events - particularly in wartime - it was virtually impossible to guard against all such possibilities in the contract.

Underwriters also faced serious adverse selection problems. In order to accurately assess the risk of a voyage, an underwriter had to have access to prompt and accurate information about the movements and condition of particular ships, about political developments at home and abroad, and about the “character” of the merchant being insured and the captain of the vessel, as well as the experience to weigh this information correctly. Some aspects of the risk, such as the time of sailing and route, could be specified in the policy; others, such as the probability of storms, or the risk of war, could be taken into account by the underwriters when setting the premium. But merchants often had better information than underwriters about some aspects of the risk, and had strong incentives to conceal negative information in order to try to keep the premium low. As the underwriter John Weskett complained:

“Concealment of circumstances, in matters of insurance, especially in time of war, [is] constantly practiced; the temptations to it [are] great; and the impositions, indeed the robberies, to which insurers, in England, are thereby daily subject, [are] various and enormous...” (Weskett 1781, p.113)

Naturally, underwriters attempted to protect themselves by making diligent efforts to stay informed about events and conditions which could affect the risks they underwrote, and by refusing to underwrite, or demanding high premia on risks about which they were doubtful for any reason:

“It is . . . of the utmost consequence for underwriters to be constantly upon their guard, at the time of policies being presented to them for their subscription; and

to make the most particular enquiries in regard to the *latest* dates of letters of advices, orders, &c. and even of such *verbal* informations, as may have been ultimately received by the assured; especially in time of *war*, or hostilities, and when the voyages, ships, goods, &c. meant to be insured, are in, or expected from, *remote* parts of the world :- for otherwise [they] will in too many instances find themselves egregiously deceived and defrauded". (Weskett 1781: 164).

For the merchant purchasing insurance, on the other hand, the major concern was the solvency and good faith of the underwriters. Any private individual could legally underwrite a policy as long as the merchant (or broker acting on his behalf) was willing to accept him as an underwriter, but the value of the policy ultimately depended on whether the underwriters would pay, and their financial stability was frequently uncertain, especially in wartime. And even if the underwriters proved solvent, they often had opportunities to contest claims or delay paying losses, even when a merchant had acted in good faith. The slow speed of communications and uncertain timing of voyages meant that it was advantageous to allow captains some discretion over the return cargo and route, but deviations from the planned route, though sometimes unavoidable, might render a policy technically invalid. Merchants were therefore willing to pay higher premia to underwriters they perceived as more financially secure, and had a reputation for readily paying reasonable claims.

All of these agency problems were exacerbated in wartime. War increased the risk to shipping (because of the threat of enemy capture), drove premiums up, disrupted information flows, and increased the demand for insurance. But while war created tremendous opportunities for profit for both merchants and underwriters, for the unlucky or unskilful it could prove ruinous.

3 Development of marine insurance institutions

From its Italian origins, marine insurance spread over a period of several centuries throughout the Atlantic world (de Roover 1945). As it did so, merchants gradually developed a set of customs for facilitating transactions and dealing with disputes, in part to help mitigate the

informational asymmetries and agency problems described above. Because the nature of the business meant that the market was relatively integrated and competitive, governments found that attempts to regulate the industry in various ways - though often tried - were generally either simply ignored, or induced merchants to shift their business to more accommodating jurisdictions. As a result, although some local variations developed in the form of the policy and the customs surrounding its use, the core features of the contract remained relatively consistent across countries until the eighteenth century (Kingston 2014). Most disputes were handled by merchants through informal arbitration, and even when disputes entered the formal court system, the courts generally attempted to resolve cases in accordance with merchant custom.

The broker-intermediated system of underwriting enabled flexible risk-sharing and immensely facilitated trade, but ‘transactions costs’ remained. The scope for sharing risk was largely confined to the community of merchants because of the need for underwriters to have expertise in judging marine risks. There was also the need to find (and negotiate with) a new group of underwriters for each policy, the difficulty of collecting losses from multiple underwriters, and the risk of underwriters’ insolvency.

A natural response was for underwriters to try to find ways to bolster the security of the policy and reduce the transaction costs of spreading the risk more widely. In some places, stable syndicates of private underwriters were formed to reduce the transaction costs of finding new underwriters for each policy, and some of these syndicates also raised a capital fund to increase faith in the security of the policy.² In the early eighteenth century, many turned to the corporate organizational form for a solution. Corporations reduced transactions costs by avoiding the need to find a new set of underwriters for each policy, and because their underwriting was backed by a large capital fund, corporations’ policies were widely viewed as more secure than those of the private underwriters. The corporate form also expanded the pool of capital available for underwriting by enabling those who had no specific knowledge

²On French insurance “chambres” (effectively, syndicates of private underwriters in the ports), see Boshier (1979, Dawson (1931). In Cadiz, similar syndicates proliferated in the 1780s and 90s, fueled by heightened war premiums, but they failed to raise an initial capital stock or to adequately diversify their underwriting, and the industry quickly collapsed under the burden of heavy wartime losses (Baskes 2016).

of maritime affairs to, in effect, entrust their underwriting decisions to experts.

Proposals for marine insurance corporations had been floated in several jurisdictions in the late seventeenth century (Bogatyreva 2016). Two marine insurance corporations were founded in London during the wave of stock market speculation which gave led to the “South Sea bubble”, and were granted charters by the ‘Bubble Act’ of 1720. In the same year, marine insurance corporations were founded in Rotterdam, Middelburg and Hamburg. Corporations were founded in Paris in the 1750s, in Amsterdam beginning in 1771, and in the United States after 1792.

In most places, the corporations existed side-by-side with private underwriters for a time, but gradually took over the market. In particular, corporations often proved better able to deal with the heightened risks during wartime, which tended to drive private underwriters from the market. This was the pattern in France (Clark 1978; Dawson 1931), in Holland (Spooner 1983), and in the United States, where, as will be described in greater detail below, the transition from private to corporate underwriting was hastened by the Quasi-War between America and France in the late 1790s.

The major exception to the trend towards corporate underwriting was in Britain. During the eighteenth century, London emerged as the world’s leading center for marine insurance. At the time of their chartering in 1720, it had been expected that the two London corporations would drive the private underwriters from the market and achieve a monopoly (Bogatyreva 2016). Instead, and unexpectedly, not only did private underwriting survive in Britain, but a loose association of private underwriters, centered at Lloyd’s coffee house, became the dominant force in the marine insurance industry. I have told this story in detail elsewhere (Kingston 2007). In summary, as elsewhere, the London corporations were not granted an absolute monopoly: private underwriting by individuals was still allowed, though it was widely expected that competition from the corporations would rapidly drive the private underwriters out of business. Crucially, the Bubble Act also prevented the formation of any other firm or partnership to underwrite marine insurance. Despite some initial success, the bursting of the South Sea bubble in 1720 temporarily prevented the corporations from

expanding their business. In the interim, Lloyd's emerged as a center for private underwriting, becoming a hub for information about ships and their crews, political and economic developments, and the many other factors affecting the risk of a voyage. In part, this was a result of entrepreneurial activity of Edward Lloyd himself: he made a systematic effort to gather marine information for the use of his customers, including building up a network of correspondents abroad and employing runners to gather the latest information from ships arriving at the docks and relay that information to the coffee-house, where it was publicly announced. But a great deal of the news came from the customers themselves. A network effect took hold, as merchants, brokers and underwriters wishing to conduct marine insurance business found that they could find trading partners more easily at Lloyd's than anywhere else; and because of the variety of people with expertise in different branches of trade, it was always possible to find someone qualified to evaluate any particular risk. The repeated interaction within this community also enabled the development of a reputation mechanism which helped to constrain opportunism.

By the early nineteenth century, therefore despite similar institutional starting points, two distinctly different institutional structures - based on private and corporate underwriting - had developed in the marine insurance industry. The merchants and underwriters in all these countries employed similar technology, and were very familiar with the modes of doing business in the others; indeed, there was active international competition between underwriting centres. So, why did these differences develop and persist? Kingston (2007) argues that the network of merchants and underwriters at Lloyd's, and the mechanisms they developed to share and interpret a constantly-changing flow of information, ultimately created a lemons problem for London's marine insurance corporations. Because of their inferior access to information, the corporations were at a disadvantage in evaluating risks, and this can explain their failure to take over the market despite their advantages. In other countries, the demise of private underwriting meant that no such lemons problem developed, and an equilibrium based on corporate underwriting became established.

In the next section, I present a model which explores the theoretical possibility that

the eighteenth century marine insurance market was characterized by multiple equilibria: that is, that there were different kinds of institutions (viewed as equilibrium patterns of behavior), each of which, once established, could persist. In subsequent sections I further substantiate this hypothesis by examining the process of equilibrium selection and episodes of institutional stability and change.

4 Model

The key features of the model, motivated by the historical evidence, are as follows: merchants can choose between two kinds of underwriters: private underwriters and corporations. Corporations are (correctly) perceived as more financially secure than private underwriters. Underwriters (of both kinds) face an adverse selection problem: merchants may have better information than underwriters about the true level of the risk on a voyage. However, if many merchants insure with private underwriters, then because of learning and network effects, these private underwriters gain an advantage in assessing risks.

There are many merchants, who undertake voyages which either succeed, yielding income Y , or fail, yielding 0. Merchants have initial wealth W , and identical continuous and differentiable 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 each merchant i 's voyage, θ_i , are i.i.d. random variables uniformly distributed on the interval $[\underline{\theta}, \bar{\theta}] \subset (0, 1)$. The distribution of θ is common knowledge, but its realization, θ_i , is observed only by merchant i . Since θ_i is private information, θ_i will be referred to as merchant i 's "type".

There are many private underwriters, and at least two insurance corporations. All underwriters are risk-neutral and act (Bertrand) competitively. A marine insurance contract is one in which an underwriter agrees to indemnify a merchant by paying him $(1 - p)Y$ in case of loss, in exchange for a premium payment pY in case of success, where p denotes the premium. All losses are costlessly verifiable, and contracts are costlessly enforceable.

This is a one-shot game. Play proceeds as follows.

First, the corporations announce their premiums, p_c (in equilibrium, because of com-

petition, p_c will be the same for all corporations). Because the corporations are unable to learn the merchant's type, p_c is the same for all merchants.³ Bertrand competition between corporations is assumed to drive p_c down to a level (to be determined endogenously) which leads to zero expected profits.

Next, merchants learn their types, θ_i . Then all merchants simultaneously decide whether to purchase insurance from corporate or private underwriters. For simplicity, I assume that all merchants inelastically purchase full insurance (this will not affect the 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, θ_i , with probability σ , where σ 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, θ_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 ϕ . 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 θ by choosing private and corporate underwriters, respectively.

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

Proof. The payoff for a merchant of type θ who purchases insurance from a corporation is

$$u_c(\theta) = u(W + Y - p_c Y) \quad (1)$$

The expected payoff for a merchant who insures with private underwriters is

$$u_p(\theta) = (1-\phi)[\sigma u(W+(1-\theta)Y) + (1-\sigma)u(W+(1-p_p)Y)] + \phi[\theta u(W) + (1-\theta)u(W+Y)] \quad (2)$$

³The assumption that the corporations have *no* information is clearly extreme, but is made for analytical simplicity. If the corporations become better able to assess risks as more merchants insure with them, the results would be qualitatively similar.

The term in the first square bracket shows the payoffs obtained in the case where the private underwriter does not fail. The term in the second square bracket shows the expected payoff if the underwriter fails, leaving the merchant uninsured. Both terms are decreasing in θ ; the second is strictly decreasing. \square

Lemma 1 ensures that in searching for equilibria of this game, there are 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 semi-separating equilibria in which there is some critical value of θ , $\hat{\theta}$, such that merchants with types $\theta < \hat{\theta}$ choose private underwriters and those with $\theta > \hat{\theta}$ choose corporate underwriters (and those with $\theta = \hat{\theta}$ are indifferent).

In equilibrium, p_c , p_p and σ are determined endogenously by the aggregated strategies of the merchants. As Proposition 1 shows, this implies that there are generally two possible equilibria in this game.

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 ϕ , there exists a PBE in which merchants with types $\theta < \hat{\theta}$ (good risks) insure with private underwriters and merchants with types $\theta \geq \hat{\theta}$ (bad risks) insure with corporations, for some $\hat{\theta} \in (\underline{\theta}, \bar{\theta})$.

Proof. See Appendix. \square

Proposition 1 shows that two kinds of equilibria are possible in this game. If no merchants are expected to apply to private underwriters, then the private underwriters will have no informational advantage, and because of the insecurity of private underwriting, all merchants would indeed prefer to insure with the corporations. Thus there is an equilibrium in which all merchants choose corporate underwriters. Figure 1 depicts the choices faced by merchants in this case.⁴

⁴The payoff to insuring with private underwriters is downward-sloping, even if they charge all merchants the same premium, because the failure of the private underwriters is more likely to affect merchants who are more likely to experience losses.

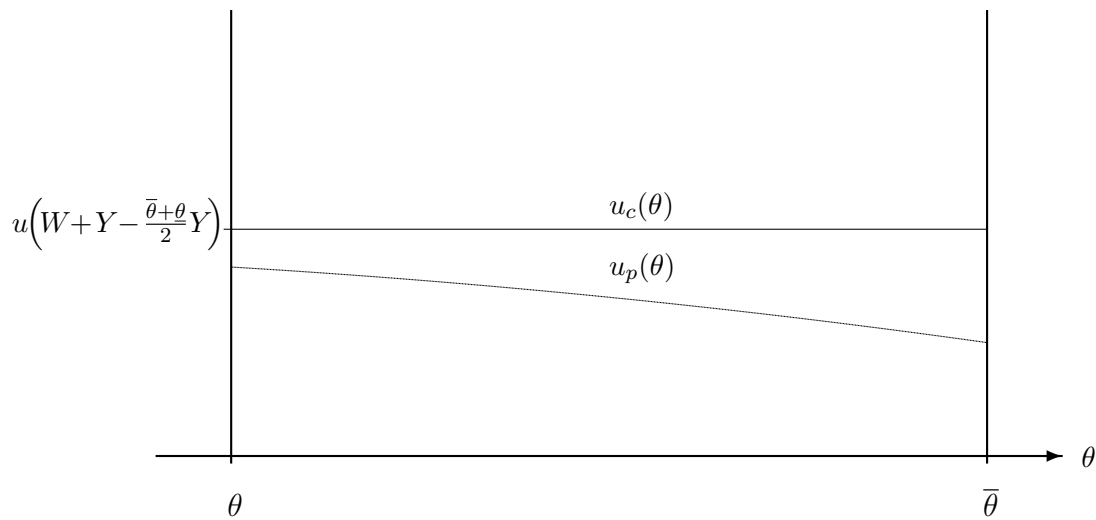


Figure 1: Payoffs to merchant's choices in pooling PBE

However, imagine that at least some merchants are expected to insure with private underwriters. Then the best risks (low- θ) merchants might prefer private underwriters, since if the private underwriters observe their type, they will pay lower premia. But then, the corporations would be left with a disproportionately poor selection of risks, forcing them to raise their premia (p_c), and lowering $u_c(\theta)$ for all θ . This in turn would 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 (high- θ merchants).⁵ Figure 2 depicts the choices faced by merchants for some given values of p_c , p_p and σ in the this case.

⁵There are two reasons why bad risks prefer to insure with corporations. First, the corporations are unable to observe their types (though they will correctly infer that their type is at least $\hat{\theta}$); but the more merchants insure with private underwriters, the more likely it becomes that the private underwriters would have learned their type anyway; and second, since bad risks are more likely to face a loss, they are more severely affected by the possibility of private underwriters' insolvency.

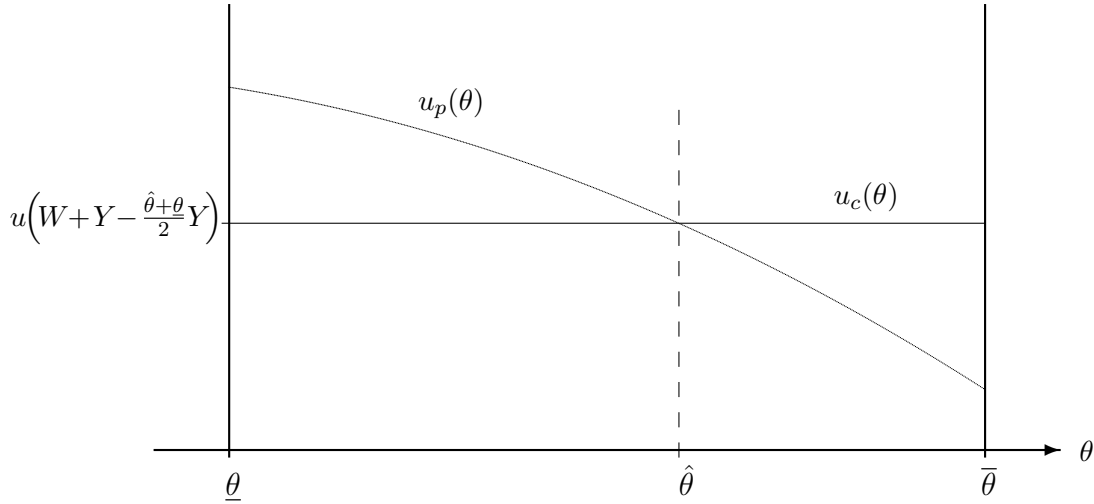


Figure 2: Payoffs to merchant's choices in semi-separating PBE

4.1 Model: discussion

The model departs from the bulk of the theoretical literature on insurance in that it only allows underwriters to compete on price, thus ruling out the possibility of screening contracts.⁶ However, screening contracts only work if customers are limited to purchasing 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.⁷

The model also assumes that all merchants inelastically purchase full insurance. Basic insurance theory reveals that, at a given premium, good risks would wish to purchase a lower

⁶For 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).

⁷To 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).

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.⁸ 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.⁹

The model treats the insurance transaction as a one-shot game. However, the theory of repeated games has shown that repeated interaction can be an important means of overcoming agency problems, and the historical evidence clearly shows that reputation effects were an important constraint on opportunistic behavior by both merchants and underwriters. On both sides of the market, reputable men valued their “connections”. Merchants were constrained from fraud by the threat that suspicious claims would make it harder for them to obtain insurance on reasonable terms with good underwriters in the future; underwriters cultivated a reputation for fair dealing and feared a reputation for litigiousness in order to attract future business. Brokers played an important role as intermediaries to channel information and facilitate trust through their repeated interactions on both sides of the market.¹⁰

Introducing repeated interaction would add complexity, but would not substantively change our conclusions; on the contrary, it strengthens our argument in the following way.

⁸For 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 insure $\frac{3}{4}$ of the value of larger shipments (Laurens to Bridgen and Waller, 7 January 1786 [Hamer 2003]).

⁹Indeed, the adverse selection problem may drive good risks from the market altogether. If merchants can choose to remain uninsured, then the equilibrium in which all purchase from corporations (and all pay the same premium, $\frac{\bar{\theta} + \theta}{2}$, will only survive if

$$u(W + Y - \frac{\bar{\theta} + \theta}{2}Y) \geq \theta u(W) + (1 - \theta)u(W + Y)$$

so that low-risk merchants purchase insurance. Otherwise, one could construct an equilibrium in which some merchants (the worst risks) purchase insurance from corporations, and some (the best risks) remain uninsured. However, this is not the case of interest here. Rather, I have shown that under suitable conditions, low-risk types may be driven to insure with (informed) private insurers instead of (uninformed) corporations.

¹⁰The prominent Lloyd’s broker and underwriter, J.J. Angerstein, for example, stressed that reputable underwriters and brokers would only deal with other men of “character” (Select committee on marine insurance, 1810, evidence of Angerstein).

Although the merchant’s “type” was interpreted above as a measure of exogenous maritime risk, the model can also be loosely interpreted as a reduced form of a repeated-game model, in which a merchant’s “type” would reflect their “character” (or reputation).¹¹ Applied to this context, the basic idea is that just as it was easier for an underwriter at Lloyd’s to procure information about the nature of a risk, it may also have been easier for him to learn about the reputation and past behavior of a prospective customer, while 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. This likely helps to explain why a substantial part of the business done by the two British corporations was done for, or brokered by, their directors and shareholders, and that they frequently refused business from merchants with whom they did not have a “connection” (John 1958).

5 Equilibrium selection and Institutional Change

The persistence of private underwriting in Britain presents a marked contrast to the French and Dutch, and especially to the American experience, where private underwriting largely died out and the market became dominated by marine insurance corporations. Each of these institutional equilibria, once established, was stable over time, suggesting that the market was characterized by multiple equilibria. The model in the previous section explores the nature of these equilibria, in a static sense. But this raises further questions: how did these equilibria arise, and why did they persist? What processes drove the bifurcation of institutional structure between Britain and other countries? And what, if anything, prevented merchants in one country from copying the institutions in another?

¹¹See Kandori (1992) for a model of community enforcement which stresses the role of reputational information in overcoming opportunism.

5.1 From private to corporate underwriting in America

Marine insurance played an important role as the trade of the American colonies expanded during the eighteenth century. In the early years of the century, the amount of capital available for underwriting in the colonies, and the scale of the market, was as yet insufficient to support marine insurance on any substantial scale, so American merchants generally obtained their insurance in London, although the distance created considerable inconvenience. American merchants had to pay their London agents to purchase the insurance on their behalf, and they had to trust them to effect it on the best possible terms, to obtain ‘sound’ underwriters, to handle disputes, and to represent their interests when settling claims. Orders for insurance sometimes arrived too late, and when losses occurred, sending the documentation required to receive payment was a time-consuming process. Particularly in wartime, it became difficult to adequately monitor these agency relationships, and disputes and misunderstandings were frequent.

All of this encouraged American merchants to find ways to share risk among themselves rather than insuring in Britain. In Philadelphia, marine insurance was being practiced on a small scale by the 1740s, but it was during the French and Indian War (1754-63) that the industry really took off. French privateers drove up premia on West Indies voyages from the peacetime rate of $2\frac{1}{2} - 3\%$ (one way) to $15 - 20\%$, and rates to Europe were even higher. At the same time, the war disrupted channels of communication with Britain, which made it even harder to place orders and settle claims, and exacerbated the agency problems between Philadelphia merchants and their British agents and underwriters (Kingston 2016). This gave a substantial boost to Philadelphia’s marine insurers, and their business boomed. By the end of the war, Philadelphia had an established marine insurance market with several active brokerages, and was receiving orders for marine insurance not just from local merchants, but from those in other American ports and the West Indies. Similarly in Boston, hundreds of vessels were insured through Ezekiel Price’s brokerage during the French and Indian War. Although the volume of business fell off for a time with the return of peace in 1763, the brokerage continued to do a steady business, and became intensely active during the

Revolutionary War, when the supremacy of the Royal Navy drove premiums to unprecedented levels, often exceeding 50% on some routes.¹²

Throughout the remainder of the eighteenth century, brokerages for private underwriting remained active in Philadelphia, New York, Boston, and to a lesser extent in smaller ports. Although no central marketplace akin to Lloyd's developed, and there was a natural tendency to insure locally, the market was relatively well-integrated, and merchants also purchased insurance in other ports if they found the rates cheaper. Merchants in Rhode Island and Virginia, for example, frequently purchased insurance in New York or Philadelphia, through their correspondents in those ports. And, apart from an interlude during the Revolutionary War, American merchants continued to purchase a substantial amount of insurance in London, particularly on transatlantic voyages.

In the 1790s, things changed quite suddenly. American independence had removed the constraint of Britain's Bubble Act, which had forbidden the formation of marine insurance partnerships or corporations in America. In 1792, the first American marine insurance corporation was formed in Philadelphia, and during the next decade many more corporations were formed in large and small American ports. These corporations proved highly successful, and faced with this flood of competition, private underwriting rapidly withered away. Although some private underwriting was practiced in outlying ports until the 1820s, the business was by then dominated by corporations.

What drove this rapid institutional change? Kingston (2011), comparing archival records from a private underwriter and an early American insurance corporation, argues that the transition to corporate underwriting was accelerated by a substantial exogenous shock, the increased risks to American shipping from French privateers during the "Quasi-War" between America and France (1796-1800), during which French privateers captured hundreds of American merchantmen. As in previous wars, insurance rates on the important West Indies routes rose from 3% to 6% in the autumn of 1796 to 15-20% in the summer of 1797, and reached 25% in 1798, before American naval victories in 1799 and 1800 brought

¹²Ezekiel Price papers, Boston Athenaeum, Ms. .L50.

rates back down. The security of the policy therefore became particularly important (because the probability of having to make a claim rose) just as the financial security of the private underwriters, who were mainly merchants, became more uncertain. In this way, the war accentuated an important advantage of corporations and shifted the demand for underwriting services in their favor.

The supply of private underwriting services also fell as the nature of the information required to assess risks changed. In peacetime, what had mattered most for assessing the risk on particular voyages was idiosyncratic voyage-specific information, such as the experience of the captain and crew, and the condition and sailing qualities of the vessel - information that the private underwriters, as merchants intimately familiar with the various branches of trade and with each other, were well-placed to gather and interpret. To assess risks in wartime, however, what mattered most was information about systemic dangers resulting from political and military developments, the activities of enemy privateers, the disposition of prize courts, and so on. This made it harder for risk-averse private underwriters to diversify their risks, and they responded by raising their premiums: whereas in mid-1795, private underwriters had typically charged premiums that were significantly cheaper than those charged by the corporations, by 1798-99 they were charging premiums that were significantly higher, and their market share had collapsed (Kingston 2011).

Thus, the temporary increase in risks caused by French privateering in the Caribbean during the Quasi-War arrived at a key moment when newly-formed corporations were competing side-by-side with established private underwriters, and highlighted the advantages of corporate form, particularly the security of the policy, catalysing a shift from private to corporate underwriters. In terms of the model, the war caused an upward shift of the distribution of risks, $[\theta, \bar{\theta}]$. This would increase both p_c and p_p , but because of private underwriters' risk aversion, p_p would increase by more, above the competitive (actuarially fair) levels. In addition, the war increased the probability of failure for private underwriters (ϕ). Both of these effects reduce $u_p(\theta)$, as depicted in Figure 3. As can be seen, the fraction of risks covered by private underwriters ($\frac{\hat{\theta}-\theta}{\bar{\theta}-\theta}$) falls (possibly to zero). Kingston (2011) shows

that this is what happened in Philadelphia during the Quasi-War. Philadelphia's private underwriters were not quite driven out of business by the Quasi-War, but their business fell off dramatically; and in 1803 the leading brokerage firm reorganized their business as a marine insurance corporation.

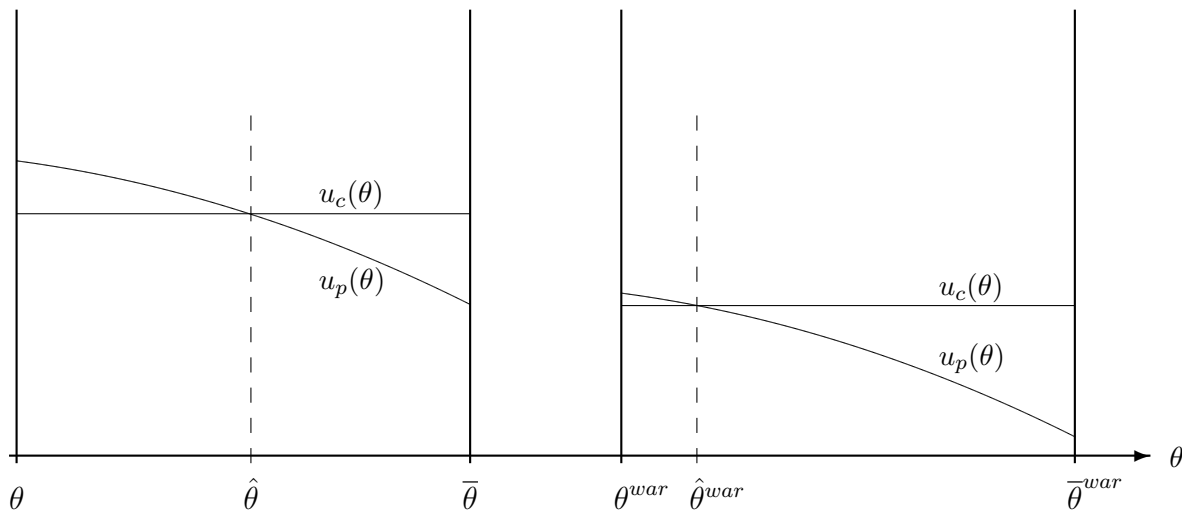


Figure 3: Effect of the Quasi-War

Thus, institutional change in the American marine insurance industry follows a pattern in which the exogenous shock caused by heightened war risks undermined existing patterns of behavior, creating opportunities for the development of new institutions. After the temporary stimulus of the war ended, some private underwriting persisted for a time, but the equilibrium had shifted and the eventual dominance of the corporate organizational form was assured.

5.2 Institutional stability in Britain: The Baltic seizures of 1810 and the War of 1812

In Britain, as discussed above, two marine insurance corporations had been created by the Bubble Act of 1720, which also forbade market entry by new corporations or other firms. Yet, these corporations had failed to take over the market as expected. Kingston (2007) presents

evidence in favor of the hypothesis that the development of Lloyd's as an information hub gave rise to a lemons problem for the British marine insurance corporations. On a level playing field, the companies ought to have been able to compete with the private underwriters at Lloyd's; one merchant stated that "If the terms were the same, I say I should prefer the company on account of their security, but on no other account".¹³ Yet, as the lemons model predicts, the corporations charged higher premia than the private underwriters, and they were very wary in the selection of risks, frequently turning down business out of a concern that insurances were not being "tendered fairly". For example, one broker complained that "There are a great many risks, and parts of risks, which [the chartered companies] will not take upon the insurances to and from the Baltic". Asked why, he answered: "I presume from their being incompetent judges of the value of those risks; individual underwriters are many of them merchants in those lines of trade, and are therefore more competent to decide upon the risk they run; but the companies, I believe, refuse them altogether".¹⁴ Consistent with this interpretation, the corporations also paid claims less readily than the private underwriters, and were more stringent in demanding formal proofs in the even of a loss.

Lloyd's itself began as a coffee-house, and for most of the eighteenth century, it lacked any formal structure. This marketplace coexisted with the two marine insurance corporations, but the Bubble Act shielded it from competition from other types of companies or partnerships. The first elements of a formal organization at Lloyd's began to emerge in 1769, but it was not until the 1790s that an ad-hoc governing committee began to meet regularly to deal with various issues which arose during the Revolutionary Wars with France. In 1800, in response to overcrowding, the committee instituted a formal system of membership; those who were not subscribers to the committee were excluded from the underwriting rooms; and required that new subscribers be recommended by at least six existing subscribers. Despite these steps, at the start of the nineteenth century the organization of Lloyd's remained relatively rudimentary.

The impetus for further formalization of Lloyd's arose from a dispute which revealed

¹³Select committee on marine insurance, 1810, evidence of James Forsyth.

¹⁴Select committee on marine insurance, 1810, evidence of John Rogers.

the inadequacy of the existing informal organization. In 1804, as the volume and importance of Lloyd's correspondence grew, a secretary had been appointed by the committee to handle it. In 1810, large numbers of British ships were seized in the Baltic, and shortly afterwards it emerged that the secretary had failed to make public some pertinent information which he had received from a correspondent. Those underwriters who had suffered heavy losses as a result of the Baltic seizures objected furiously, and a committee was appointed to investigate.¹⁵ The committee's report was unfavorable; the ad-hoc committee resigned en bloc; and an overhaul of the organization ensued. "A point had been reached . . . at which some more formal organisation was required, to deal adequately with the great volume of current business, to hold together the loose aggregation of merchants, underwriters, and brokers, who composed the Society, and to ensure the smooth running of the machinery of Lloyd's" (Wright and Fayle 1928: 274). Ultimately, a new committee was formed, with regular elections; and a Trust Deed was signed by all the subscribers, binding them to obey the new rules, and turning Lloyd's for the first time into a formal institution with legal standing.

Thus, the extended period of heightened risk during the Revolutionary and Napoleonic wars (1793-1815) were critical in the development of Lloyd's, transforming it from an informal association into an increasingly formal marine insurance marketplace. In 1824, the relevant sections of the Bubble Act were repealed, enabling an influx of new marine insurance corporations, and again, it was widely expected that as a result, as one underwriter predicted, "the whole business of underwriting by individuals will be altogether annihilated."¹⁶ Confounding these predictions, however, Lloyd's survived and retained a substantial share of the marine insurance market down to the present day.

This poses a puzzle: How is it that the strains caused by war led to such a rapid decline in private underwriting in the US in the late 1790s and early 1800s, while similar stresses a

¹⁵See "Report of the Committee, appointed at a General Meeting of the Subscribers to Lloyd's, held on the 5th of April, 1811, "To examine into the manner, in which information has hitherto been conveyed to the Members of this House, and particularly with reference to that material information received last year from the Secretary of the Admiral upon the Baltic Station", in Guildhall Library MS 31571.

¹⁶Hansard, *Parliamentary Debates*, XV (1810), p. 410. Speech by Joseph Marryat.

decade later ultimately had the effect of strengthening private underwriting in Britain?

To investigate this question, I focus on how the latter part of the Napoleonic wars affected the British marine insurance industry. Data are scarce; Lloyd's itself kept no records of the volume of business done by the private underwriters who met there. However, it is possible to roughly gauge the corporations' share of the market by comparing the amounts of Stamp Duty paid on policies by private underwriters in London and by the two corporations active in London.¹⁷ Premium data were also not collected systematically at Lloyd's, but one source of data is available, based on the accounts of the private underwriter George Hobson, collected and analyzed by Danson (1894).

Comparing these data reveals that in Britain, as elsewhere, the disruption occasioned by war appears to have shifted business away from private underwriters and into the hands of the corporations. By the Milan decree of 1807, Napoleon had proclaimed a blockade on the whole of the British Isles, in effect forbidding any trade with Britain. The French navy was powerless to enforce the blockade at sea, but the idea was to close continental ports and markets to British trade. For several years, the decree was laxly enforced, and British ships continued to trade with the Baltic. But in 1810, under pressure from Napoleon, the Russian, Swedish and Prussian authorities suddenly and unexpectedly seized hundreds of British ships in Baltic ports, causing millions of pounds in losses to Lloyd's underwriters (Rose 1903, Wright and Fayle 1928). As a result, premia on Baltic voyages rose sharply (Figure 4). And the corporations' share of the market appears also to have increased substantially in 1811, possibly as a result of the Baltic seizures, reaching 13.5% of the British market (18.4% of the London market). This increase, however, was apparently not enough to break the prevailing equilibrium dominated by private underwriting, even after American privateering during the war of 1812 drove up premia on West Indian routes. Accordingly, as the threat of capture faded and rates declined, the corporations' share of business also steadily declined, falling as

¹⁷This data is only meaningful after 1807, however; before that date, evasion of Stamp Duty was rampant. See Guildhall Library, MS 31571 (Minutes of the Committee of Lloyd's), May-June 1807. Stamp Duty on foreign voyages was 2/6 per £100 insured, where the premium was 20% or less; and 5 shillings per £100 insured when the premium was over 20%; rates for coastal voyages were half as much. (Wright and Fayle 1928: 289).

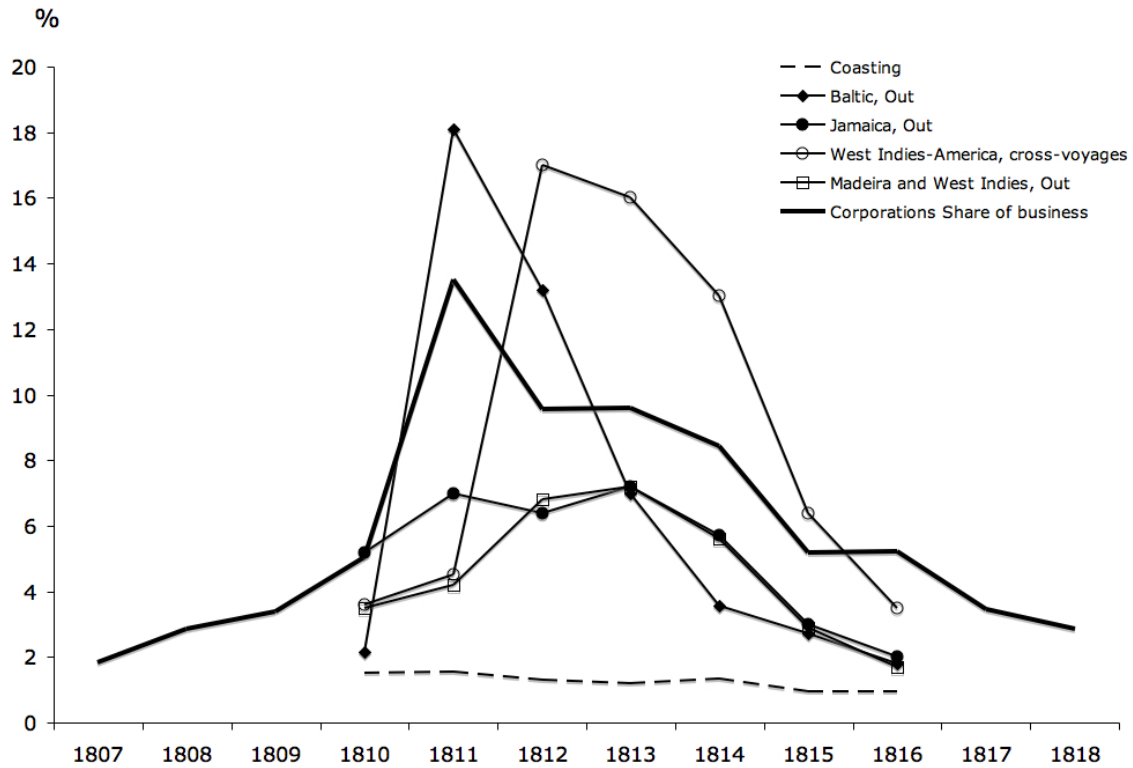


Figure 4: British corporations' share of the British marine insurance market, and premia on selected routes, 1810-16. Source: British Parliamentary Papers 1824(316) XVII.501; Danson (1894: 90-1)

low as 1.7% of the British market (2.2% of the London market) by 1821.

Thus, although the turmoil of the Napoleonic wars apparently disrupted the British marine insurance market and caused a temporary increase in the corporations' share of business, the effect was not sufficient to push the system to the "tipping point" and into a new equilibrium based on corporate underwriting. Instead, the ultimate impact was to strengthen the institutions of private underwriting at Lloyd's.

What if the tipping point *had* been reached, and Lloyd's had disappeared? It seems likely that because private underwriting was based on a network of private individuals (merchants, brokers, and underwriters), if the institutions of private underwriting had been extinguished, re-creating them deliberately from scratch would have become virtually impossible. Lloyd's had evolved over the course of a century; and it had developed not through the lead-

ership of an “entrepreneur” but through a gradual evolution of informal business practices that were later formalized. The deliberate creation of such a “community” would involve a coordination problem considerably more complex than creating a firm. Precisely this fear was voiced during the parliamentary debates over the repeal of the Bubble Act in 1824, when it was argued that

“the commercial world would suffer considerably by the establishment of [a new corporation]: for when such a valuable institution as that of Lloyd’s was once destroyed, it would be impossible to restore it again. The information which had been received in this country through the agents of Lloyd’s, from all parts of the world, had been of the highest consequence to its commercial interest.”¹⁸

In the event, as discussed above, the growth and formalization of Lloyd’s had by then made the equilibrium based on private underwriting sufficiently well-established and stable that these fears proved unwarranted. Although the Baltic seizures caused severe strains for the private underwriters at Lloyd’s, they ultimately led to a formalization and strengthening of its organizational structures. This contrasts with the American case, where private underwriting had not developed to anything like the level of sophistication of Lloyd’s; and in America, once the private underwriters had exited the business, they never reappeared.¹⁹ This is consistent with the model’s claim that an equilibrium based on corporate underwriting, once established, would also be stable.

6 Conclusion

At the start of the eighteenth century, the marine insurance industry was everywhere dominated by private underwriters. During the course of the century, a series of wars disrupted the industry, raising premia and exacerbating agency problems. In Britain, the Bubble Act

¹⁸Hansard series 2 vol 11 (March-June 1824). (need a more exact citation here).

¹⁹In 1810, there was a report of an attempt to found an association for private underwriting in New York, but the effort evidently failed, no doubt because the established dominance of marine insurance corporations prevented such an organization getting off the ground. (Select Committee on Marine Insurance, 1810, evidence of John Bennett Jr).

introduced corporations, but also unintentionally provided shelter to private underwriting, ultimately leading to the development of Lloyd's and giving rise to a "lemons problem" that prevented the corporations from driving the private underwriters out of business. In America, a marine insurance industry based on private underwriting emerged in the 1740s and developed further under the stimulus of wars that disrupted channels of communication with London. However, private underwriting in America never reached the level of complexity of Lloyd's, and there was a rapid shift in the 1790s to a new equilibrium based dominated by joint-stock marine insurance corporations. Similarly in France and Holland, private underwriting was ultimately eclipsed by corporations.

This suggests that the industry was characterised by multiple equilibria. The timing of exogenous shocks appears to have played a key role in equilibrium selection and institutional change. American independence removed the protection of the Bubble Act from America's private underwriters, enabling market entry by corporations. Then, just as the corporations were finding their feet, the Quasi-War highlighted the advantages of the corporate form, accelerating an institutional transition which might in any case have been inevitable given the rudimentary level of organization of the American private underwriters. In Britain, in contrast, the Napoleonic wars battered the informal institutions for private underwriting at Lloyd's, but sheltered by the Bubble Act, and stimulated by high wartime premiums, Lloyd's survived, so that the ultimate effect of these shocks was to formalize and strengthen those institutions rather than to destroy them. The formal structure developed during that time provided the framework for further reforms and institutional development in later years, and conferred a resilience on Lloyd's which enabled it to survive even after the subsequent repeal of the Bubble Act exposed it to competition from new waves of corporations.

Theories of institutional change highlight two main categories of processes at work: on the one hand, evolutionary change based on selection of those institutions which prove most successful in a particular environment; and on the other, the intentional design and creation of institutions by "entrepreneurs" who deliberately design new organizations and attempt to implement new rules through the political process (Kingston and Caballero 2009). Both

kinds of processes were evident in eighteenth century marine insurance. Exogenous shocks, particularly wars, tested the resilience of existing patterns of interaction, leading in some cases to deliberate institutional innovations, which then had to withstand the evolutionary pressure of competition to survive. But while wars provided the proximate cause of institutional change, other more gradual parameter shifts - changes in the amount of information gathered at Lloyd's, the amount of capital available for underwriting, the volume of trade, the fraction of trade which was insured, and so on - also generated new strains on the existing institutions and opened up new possibilities for institutional change. Some of these changes were at least partially endogenous to the development of the marine insurance industry: "quasi-parameters" in the terminology of Greif and Laitin (2004).

The comparative development of marine insurance institutions is a particularly apt case study to consider the puzzles raised in the introduction concerning the persistent diversity of institutions over time and space. From a similar starting point, despite extensive commercial contact and few informational barriers to institutional transplants, the institutions developed in different ways in different countries. The argument developed here illustrates how institutional change can be a path-dependent process, in the sense that the institutions observed at any time can be a function not just of current technological parameters, but also of the historical process through which they have developed.

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Appendix: Proof of Proposition 1.

(i) First suppose all merchants are expected to insure with private underwriters. I 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 (2) the expected payoff to a merchant of type $\bar{\theta}$ from insuring with a private underwriter is

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

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

$$\begin{aligned} u_p(\theta) &= (1 - \phi)[u(W + Y - p_p Y)] + \phi[\theta u(W) + (1 - \theta)u(W + Y)] \\ \text{whereas } u_c(\theta) &= u(W + Y - (\bar{\theta} + \underline{\theta})Y/2) \end{aligned}$$

By insuring with private underwriters, merchants run the risk (ϕ) 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. One 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 σ as given. However, suppose there is some $\hat{\theta}$ such that merchants with $\theta < \hat{\theta}$ choose private underwriters and those with $\theta > \hat{\theta}$ choose corporate underwriters. Then, because both kinds of underwriters must earn zero expected profits in competitive equilibrium, the following must hold:

$$p_p = \frac{\hat{\theta} + \underline{\theta}}{2} \qquad p_c = \frac{\hat{\theta} + \bar{\theta}}{2} \qquad \sigma = \frac{\hat{\theta} - \underline{\theta}}{\bar{\theta} - \underline{\theta}}$$

Define

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

(these are the payoffs to a merchant of type θ , assuming that he is the critical type, and that p_p , p_c and σ 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 $\hat{\theta}$ such that $\tilde{u}_p(\hat{\theta}) = \tilde{u}_c(\hat{\theta})$ 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

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

(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

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

or

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

which holds for sufficiently small ϕ . 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 $\hat{\theta}$ such that $\tilde{u}_p(\hat{\theta}) = \tilde{u}_c(\hat{\theta})$. If such a $\hat{\theta}$ exists, then there is an equilibrium in which merchants with types $\theta < \hat{\theta}$ choose private underwriters and those with types $\theta > \hat{\theta}$ choose corporate underwriters. \square