12. Maritime Insurance, Life Insurance and Other Subjects

Origins of Maritime Insurance

Insurance involves some type of contract or procedure that provides for compensation when undesirable events such as commercial loss, death, damage or injury occur. Because insurance typically involves the payment of a premium, insurance involves setting a 'price for peril'. In effect, insurance arises when the risk inherent in a specific situation is unbundled and priced in a separate transaction. Taking each risk separately, the practice of selling insurance is similar to gambling. However, the modern subject of actuarial science provides techniques for pooling of policies relevant for managing the risks associated with providing insurance. It was during the period under study that the foundations for modern actuarial science were developed.

Insurance has roots going back at least to the Greeks and likely even to ancient times. Initially, insurance was embedded in the structure of long distance commercial trade in times when transport was difficult and capital was not plentiful. As the bulk of long distance trade was sea-borne, a form of maritime insurance was involved. In early times, shipowners were also traders and would seek to acquire goods on consignment in one port for sale in another. Due to the significant possibility of shipwreck, some agreement was required on which party would be liable for the loss of goods. An early form of insurance was embedded in the consignment agreement where the shipowner was exempt from liability for the costs of goods in the event of shipwreck, but the consigning merchant was permitted to claim a larger share of the profits to compensate for assuming this additional risk.

By Roman times, this type of consignment transaction had been recognized in contract law as the *foenus nauticum* (bottomry). The extra charge associated with the assumption of risk was permitted to be double the legal rate of interest, 'the price of peril', for the time period the goods were under risk at sea (Noonan 1957, p.134). Such insurance-like contracts followed naturally from the business arrangements associated with long distance commercial trade during that

period. However, bottomry did differ substantively from a modern third party insurance contract. The arrangement was structured as a combination of partnership and loan. As such, bottomry did not escape the notice of the canon law as a possible candidate for the usury prohibition. A decretal issued in 1237 by Pope Gregory IX, known as the *Naviganti*, was aimed at bringing the loan component of the agreement within the scope of the usury prohibition.

The *Naviganti* makes the following statement (quoted in Noonan 1957, p.137): 'One lending a certain quantity of money to one sailing or going to a fair, in order to receive something beyond the capital for this that he takes upon himself the peril, is thought to be a usurer.' Taken at face value, this statement appears to undermine the licitness of the bottomry agreement by emphasizing the loan aspect of the transaction while ignoring the licit partnership component. This decretal was much debated at the time and did curb some of the attempts to circumvent the usury prohibition using sea-loan contracts where the risks of shipwreck were remote. However, the *Naviganti* did not stem the evolution of maritime insurance significantly. If anything, the *Naviganti* induced a redefinition and clarification of contracting terms, leading to the emergence of third party insurance.

By the early 14th century, maritime insurance had evolved to the point where third party, premium-based contracts were commonplace enough to warrant detailed codes regulating this trade in various port cities throughout Europe. The first known instance of such a third party contract occurs in Marseille in 1328 (Ball 1977, p.180). Detailed civic ordinances regulating the trade appeared, for example, in Genoa (1369), Barcelona (1435), Florence (1522) and Amsterdam (1598) (Daston 1988, pp.118-20).[1] These ordinances covered conditions such as the maximum percentage of the value of the cargo that could be insured, penalties for fraud, time periods for claims and the size of the deductible. It is significant that the ordinances did not make any attempt to specify a range for premiums.

The methods used for setting premiums provide essential insight about an important topic in the early history of financial economics, the pricing of risk. Unfortunately, as is the case in other areas of early financial economics, the available literature is largely silent on the matter. Available manuals on insurance, such as Estienne Cleirac's *Us, et coutumes de la mer* (1656), offer only general guidelines based on qualitative factors such as the type of cargo, the route, the season, the presence of pirates and so on. Statistical information on factors such as the frequency of shipwrecks do not appear to have been kept. That

there was an expertise associated with the setting of premiums is apparent, with certain insurers having established reputations for accurately assessing risks. However, as is the case for other topics such as covered interest arbitrage and derivative security pricing, participants in the market had limited incentive to reveal trade secrets.

Gerard Malynes (1622, p.150) gives information on the range of premiums that were charged in London during the 17th century:

> Concerning the price of Assurances or *Premio* (as the Spaniards call it) it is differing in all places, and according to the situation of the place, and the times of either war or peace, or danger of Pirates, men of war, or rocks, and unaccessible places, seasons of the year and such like: and the said *Premio* was never less than at this time, for Assurances are made for Middleborough and Amsterdam at 3 *pro cent.* the like from London to Roan and Dieppe, Edinborough in Scotland and Hamborough in East-land: and from London to Bordeaux and Rochelle, Lubeck, Denmark, 4 upon the hundreth: as also for Barbarie, for Lisbon, Biscay, Ireland, Danzig, Riga, Revell, and Sweden, 5 in the hundreth: Seville, Gibralter, Maliga, and the Island, 6 and 7: for Ligorne, Civita Vecchia, 8 and 9: Venice 10, Wardhouse 9, Russia 9, Santo domingo 11 and 12: and for East Indies 15; nay for both going and coming hath bin made at 20 *pro centum*.

Coming at the end of a chapter that discusses various types of assurances, it is not completely certain what types of assurance are associated with these premiums, though it is most likely that these premiums are for 'goods laden or to be laden outwards' in a ship. Malynes observes that 'the price of assurance upon Ships is almost double' (p.148).

As the maritime insurance market grew, specialization increased. By the beginning of the 15th century in Italy, insurers were combining into companies that featured as *toccatore*, an individual or group of individuals with the responsibility for setting premiums, a precursor of the modern insurance underwriter. Similarly, these companies of insurers were the first instances of modern insurance syndicates, such as Lloyd's of London. The growth of international seaborne trade led to the spread of Italian practices to other centres in Europe. International competition for insurance business increased, with Antwerp, Amsterdam and Hamburg surpassing the Italian insurers in importance during the 17th century. It was not until the 18th century that London emerged as an important force in the maritime insurance market.

Development of the English Maritime Insurance Market

Maritime insurance was most likely introduced to England by Italian merchants and early practice basically conformed to the insurance ordinances of the Italian city republics. The earliest English maritime insurance policies of which there is any record date from 1547 and 1548, were drawn up in Italian, and covered the goods in Italian ships. The original policies were 'all very rudimentary in development. Their common features are simply the names or names of the Assured and of the ship and Master; the subject matter of the assurance; the duration of the adventure ... and a clause providing that the policy shall have as much force as the best made in Lombard Street' (Wright and Fayle 1928, p.139). Even though numerous clauses that were to later appear in maritime insurance policies were missing, such as a list of perils and a stated right to sue, the reference to Lombard Street made an immediate connection to the Italian maritime insurance ordinances that were intimately connected with Lombard Street.

Gerard Malynes in *Lex Mercatoria* (1622) provides an excellent reflection of the considerable progress that maritime insurance had made in England by the first half of the 17th century. Five chapters, 24 to 28, are dedicated to discussing assurances. Chapter 24 (p.146) starts with the claim that the Roman emperor Claudius:

> did bring in this most laudable Custome of Assurances, whereby the danger and adventure of goods is divided, reparted, and borne by many persons, consenting and agreed upon betweene them, what part every man will be contented to assure, make good and pay if any loss or casualtie should happen to the goods adventured, or to be adventured at the Seas, as also by Land, to the end that Merchants might enlarge and augment their Trafficke and Commerce, and not adventure all in one Bottom to their loss and overthrow, but that the same might be reparted and answered for by many.

In the practice of the times, referencing of sources is absent so it is not possible to trace the source of this novel historical interpretation. However, Malynes was quite aware of the distinctions between bottomry and maritime insurance, dedicating a later chapter (chapter 31) to the *foenus nauticum*.

After recognizing the early role of Lombard Street, Malynes observes that by 1622 assurances were being written 'in the West end of the said Royal Exchange of London' and that the issuing of assurances was governed by a Standing Commission responsible for the trial and adjudication of insurance cases. This seemingly arcane reference to the

prevailing practice of issuing assurances reveals somewhat more about Malynes and the *Lex Mercatoria* than is immediately apparent. Around 1574, seizing upon an opportunity for profit, 'an ingenious gentleman named Richard Candeler' obtained a Patent granting a monopoly on the issuing of assurance policies (Wright and Fayle 1928, p.35). The rationale for granting of the Patent was that the secrecy surrounding insurance practices permitted a variety of fraudulent practices, such as double insurance.

Judging from Malynes's discussion in *Lex Mercatoria*, particularly in chapter 25, maritime insurance in the 17th century was indeed subject to a variety of fraudulent practices, including over-insurance, fraudulent claims, and double insurance or duplication of policies. However, the proposed monopoly was a threat to the 30 Brokers and 16 Notaries that had previously been the central intermediaries in the trade. Various arguments were made against the monopoly, such as the role of brokers in facilitating trade and the need for secrecy involved in certain types of legal trade. However, in the end, the monopoly was allowed to proceed in the form of the Office of Assurances, albeit with reasonable fee schedules for registrations, searches, copies and certificates. The Office of Assurances was located in the Royal Exchange. Because parties to an insurance agreement were required to register policies, this contributed significantly to making the Royal Exchange the centre of English insurance business during the 17th century.

What has all this to do with Malynes and the contents of the *Lex Mercatoria*? As it turns out, the Office of Assurances was profitable and continued to function up to 1688 when, like many of the monopolies and privileges of the Stuart and Tudor periods, the Office disappeared. However, during the whole time in which the Office was in place, the monopoly could not be enforced (Wright and Fayle 1928, p.37). Whether this was due to the desire of certain merchants to avoid fees, to keep policies secret, or for convenience, merchants continued to undertake assurances outside the framework of the Office of Assurance. This reluctance of merchants was not unique to assurance. In numerous instances where a monopoly or other prohibition was established to restrict prevailing business practice, a segment of the merchant community continued (options trading in the 18th century being another useful example), as much as possible, to conduct business as usual.

As someone with intimate and firsthand knowledge of the assurance business, Malynes almost certainly was aware of the distinction between what Charles Molloy (1676) described as 'public' and 'private'

assurances.[2] Yet, Malynes chooses only to describe the 'public' assurance process. This speaks both to the content of the *Lex Mercatoria* and to Malynes character. According to de Roover (1974, p.347) Malynes 'was not always trustworthy and would not shrink from telling a lie if he had any interest in doing so. In his later years, having become an adviser to the English government, it was precisely in his interest to cultivate the image of a loyal subject of King James I and a devoted servant of the Commonweal whose prescriptions were intended to promote economic welfare of the Realm.' A detailed discussion of assurances issued outside of the strictly legal 'public' process would not have reflected well on a 'devoted servant of the Commonweal'.

Lloyd's of London

The collapse of the Office of Assurance can be dated 'at, or shortly after the Revolution of 1688'. The Office 'seems to have disappeared altogether, like many other Tudor and Stuart monopolies' (Wright and Fayle 1928, p.39). This led to the re-emergence of an exclusively 'private' assurance market, which was to prevail until 1720. Much as in Elizabethan times, assurers were private merchants, usually engaged in other forms of business, where underwriting policies could be an amusing, and profitable, sideline. Unlike Elizabethan times, the insurance broker of the late 17th century was specialized. There were a number of great defects in the system of private insurers, not the least of which was the market power of the insurance brokers or 'office-keepers'. For example, it was 'customary' for insurance brokers to claim 16% of the payout for any loss, representing a considerable claim for brokerage.

Two other great defects of the private insurance system 'were the lack of any kind of guarantee for the stability of the underwriter, and the lack of a recognised centre for the transaction of business... it was necessary for brokers to trail round to a score of coffee-houses and merchants' offices, in order to make up a policy' (Wright and Fayle 1928, p.40). In the absence of pressure to change, the private assurance system flourished, and developed a sizable constituency of merchants, office-keepers and shippers. Driven by the successes of the Bank of England and East India joint stock issues and fanned by the passions of various projectors, attempts were made to gain a charter for a joint stock company specializing in maritime insurance. The great defects of the private insurance system would be neatly handled and the government would receive a tidy sum of capital from the sale of the

monopoly rights. To say the least, such proposals attracted considerable interest from the private insurers.

The private insurers were not without persuasive arguments in their favour. The 'main objection was simply the novelty of the proposal. There was nowhere in Europe any corporation for the insurance of ships; the business had always been carried on in the same way as at present, and that method was generally approved both at home and abroad'. Using a combination of persuasive argument and political influence, the private marine insurers were able to beat back the projectors until 1720 when the Bubble Act was passed (Wright and Fayle 1928, p.61):

> The provisions of the Bubble Act, as it was called, reflect clearly its dual origin. It begins with a preamble, setting forth with all due solemnity the evils caused by persons who had 'become Bankrupts, or otherwise failed in answering or complying with their Policies of Assurance ... to the Ruin and Impoverishment of many Merchants and Traders, and to the Discouragement of Adventurers at Sea, and to the great Diminution of the Trade, Wealth, Strength and publick Revenues of this Kingdom.' So much was necessary in order to cloak decently the real motives that had swayed King and Parliament. The Bill then defines, in its first seventeen clauses, the terms on which His Majesty may grant two charters to corporations for marine insurance; after which it proceeds to prohibit in general but drastic terms all undertakings tending to the prejudice of trade, or acting as bodies corporate without legal warrant, or carrying on business under obsolete charters, with provisos excepting privileges of the East India and South Seas Companies, and all corporate undertakings 'settled' before June 14, 1718.

It was a stated desire to protect the joint stock monopoly of the two maritime insurance companies, the Royal Exchange Assurance and the London Assurance, that the operative features of the famous Bubble Act of 1720 were imposed.

As for the specific business of underwriting maritime insurance, the Bubble Act of 1720 went even farther than restricting the activities of unchartered joint stock companies, the restrictions were also extended to partnerships. This restricted the competition for maritime business to private individuals, 'each for himself and not one for another', and the two chartered companies. This attempt to open the maritime insurance field for the two chartered companies 'had a great and altogether unexpected effect, not only on the development of private underwriting, but on the development of Lloyd's Coffee House'. The network of private insurance was obliged to confront this challenge to

their livelihood by altering the fashion in which the private maritime insurance business was conducted. The method of securing an assurance was 'increased, incalculably', a change that 'tended to hasten the development of underwriting as a specialized business, carried on by persons who made it their chief, though not necessarily their sole concern' (Wright and Fayle 1928, p.66).

Another reaction from the private underwriters in response to the threat posed by the Royal Exchange and London Assurance Companies was to focus trading activities at a specific location (Wright and Fayle 1928, p.66):

> In order ... to make head against the competition of the Royal Exchange, and London Assurance, it was necessary for the private insurers to offer equal facilities as well as equal security. The nuisance of being obliged to 'pick up Insurers here and there' was so obvious that, when once attention had been drawn to it, the underwriters and brokers were bound to find a remedy. It was clearly necessary for them to settle upon some recognized headquarters, and where better could they turn than to Lloyd's Coffee House, with its extensive mercantile and shipping connection? Many of the private insurers were, no doubt, already frequenters of Lloyd's, and once the need for centralization was realised, their presence would attract other customers of the same class.

At this point in time, Lloyd's Coffee House was one of a number of locations important in the shipping and maritime insurance market and, though there was a centralization of activities at Lloyd's starting after 1720, Lloyd's did not have a stranglehold on this business:

> Indeed, down to the end of the century there were many merchants who continued to write policies at other coffee-houses or at their own offices. It is nevertheless clear that, from (1720) onwards, the business of Lloyd's Coffee House acquired a more and more specialised character, and that, by the middle of the eighteenth century, the influence of its frequenters dominated the world of marine insurance.

After a brief splitoff into Lloyd's and New Lloyd's, a group of 79 merchants, underwriters and brokers took up a subscription for the erection of a building dedicated exclusively to the private maritime insurance business, which was to be known as New Lloyd's Coffee House.

The benefits of this move from the coffeehouse, which was obliged to provided public access, to a subscriber owned facility, which could determine the rules of admittance and participation, were much the same as in the evolution of the London Stock Exchange from

Jonathan's. The move was a major step in the evolution of the maritime insurance business into what is the modern day Corporation of Lloyd's. The success of the private insurance system in maritime insurance stands in contrast to the success of joint stock companies in the life insurance business. The disparate organizational development of these two forms of insurance can be traced back to the mid-18th century and are, ultimately, a testament to the market's ability to develop institutions that most 'efficiently' price different types of risk.

A Brief History of Lloyd's Coffeehouse
Wright and Fayle (1928)

Wright and Fayle (1928) is a classic study of what, in modern times, is known as the Corporation of Lloyd's, the most important underwriting entity in the world. The name Lloyd's is inherited from a seventeenth century coffeehouse proprietor (p.88):

> From its foundation by Edward Lloyd, to the Mastership of Samuel Saunders, Lloyd's Coffee House enjoyed a career of uninterrupted prosperity. Under Lloyd himself it took rank with the foremost establishments of its class, and became a recognized auction mart for ships and prize goods. Under Jemsen, Baker, and Saunders it not only retained the position, but established itself as the headquarters of the underwriting interest, and the source of 'the Freshest and most Authentic Ship News'. The foundation of *Lloyd's List* in 1734, and the establishment of the Register Book Society in 1760, bore clear witness to its unique position among the great commercial coffee-houses of London. This position it owed less to the merits of its proprietors than to the character of its frequenters and the plain necessity, after the controversies of 1718-20, of some convenient meeting-place for the transaction of marine insurance business; but it is clear that the house itself must have been well equipped and well managed, to attract and retain so extensive and respectable a body of customers. (The year 1769 marks) the period of its decline, and its eventual supersession by a New Lloyd's Coffee House which is still in existence today, as the Corporation of Lloyd's.

It is generally known, in England at least, that the genealogy of the 'Lloyd' in Lloyd's of London can be traced back to an obscure 17th

century coffeehouse man, though the exact details are less well known. The business was started around 1689 by Edward Lloyd, a coffeehouse man whose birth, parentage and earlier history are obscure. In 1691, the business took up premises at No. 16 Lombard Street, which 'was in the very centre of the business world'. It was at this address that one of the most important chapters of the history of maritime insurance was written. The early success of the coffeehouse was due to its deserved reputation for being one of the best social venues for shippers, insurers and related merchants. The maritime business thrives on information, and such locales were essential to obtain intelligence on matters such as the location of ships, the progress of foreign wars and the operations of privateers.

It is a testament to the business acumen of Edward Lloyd that (Wright and Fayle 1928, p.22):

> Lloyd made a more ambitious attempt to cater for his patrons' thirst for knowledge, by setting up a newspaper of his own. The expiration of the Licensing Act in 1695 led to a great revival of journalistic enterprise, and among the new candidates for popularity was *Lloyd's News*, a single leaf appearing three times a week and bearing the imprint 'Printed for Edward Lloyd (Coffee-Man) in Lombard-Street'.

One of the reasons for Lloyd's popularity within the maritime business was that the coffeehouse served as an important venue for auction sales of goods and ships. Edward Lloyd died on 15 February, 1713. From this point, the proprietorship of Lloyd's past through a sequence of hands. Oddly enough, Lloyd died well before the 1720 Bubble Act and the selection of Lloyd's as a focal point of the private maritime insurance underwriting business.

The Development of Life Insurance

The genesis of modern life insurance can be traced to the establishment of the Society for Equitable Assurances on Lives and Survivorships, the 'Equitable', in England in 1762. This is the first organization to offer long-term life insurance policies along the lines of those available in modern times. Premiums were priced using actuarially sound principles that recognized both age and type of policy. Risks were spread across a large number of policy holders. The regular premium payments made to the Equitable were invested in a fund that, earning compound interest, was determined to be actuarially sufficient to discharge the Equitable's future liabilities arising from policy payouts. If anything,

the Equitable erred on the side of being too conservative, setting premium levels that were more than sufficient to settle future claims.

Prior to the establishment of the Equitable, various types of life insurance schemes had been tried, some of which were outright gambling and others that had noble causes but that did not accurately price the associated liabilities. Life insurance has a history stretching back at least to Italy in the Middle Ages (Ogborn 1962, p.19). Early policies were often short-term and associated with travel. Malynes (1622, p.149) describes such policies:

> a traveller undertaking a voyage to Jerusalem or Babylon, delivering out money payable at his return, will providently assure a sum of money upon his life, either to secure some men that do furnish him with money to perform his voyage, and to put forth the greater sum, or to leave some means unto his friends, if he should die and never return.

Policies related to overseas travel were written for the duration of a single voyage and typically involved other perils, such as capture and ransom, which were also eligible claims.

By the early 17th century, the practice of life insurance had progressed somewhat. As Malynes (1622, pp.148-9) indicates, life assurances were available 'for diverse respects':

> Other Assurances are made upon the lives of men, for diverse respects, some because their estate is merely for term of life, and if they have children or friends to leave some part of their estate unto, they value their life at so many hundreth pounds for one or more years, and cause that value to be assured at five, six, ten or more for every hundreth pounds, and if he do depart his life within that time, the Assurors pay the money; as it happened of late, that one engaged for *Richard Martin* Knight, Master of the Mint, caused £300 to be assured upon the life of the said Sir Richard, being some 90 years of age, and therefore gave twenty and five *pro centum* to the Assurors: The ancient knight died within the year, and the said Assurors did pay the money. Also one master *Kiddermaster* having bought an office of the six Clerks of the Chauncerie, and taken up money of others, caused for their assurance for many years together £2000 to be assured upon his life at four and five in the hundreth, until he had paid that money, which is very commodious.

The comparison with modern insurance practices is striking. A one year policy on a 90 year old man, with a premium equal to 25% of the possible payout, is more of a gamble than an actuarially sound policy. The first life policy of this type to be recorded in England was a policy registered in 1588 with the Chamber of Assurances, a policy written on

the life of William Gibbons with a term of one year (Cockerell and Green 1976, p.35). Though the range of situations for which policies were available had expanded over time, policies were still written on single lives and were typically of short duration.

The possibility of extending these early life assurance schemes to gambling on lives is evident, and some of those willing to underwrite such policies were also willing to participate in outright gambles, usually written upon lives of important persons. The early coincidence of life insurance with gambling and, to a lesser extent, usury produced numerous legislative attempts throughout Europe to restrict these insurance activities. For example, the 1570 Code of the Low Countries banned 'insurances on the lives of persons' and 'wagers on voyages and similar inventions' (Daston 1987, p.239). With the exception of Naples and England, life insurance had been made illegal throughout Europe by the end of the 17th century with the various bans remaining in effect until the 19th century.[3] Despite these bans a form of life insurance was generally available through the purchase of life contingent financial instruments such as joint life annuities. Forms of crude life insurance protection were also available through membership in certain social organizations, such as guilds, and, where available, through participation in mutual benefit societies.

Legal and social restrictions on the availability of life insurance can be contrasted with the real pressures for such an instrument. The bulk of society did not have sufficient disposable income to afford the relief provided by purchasing life annuities. Many of the life insurance schemes available were not on a sound footing, some were downright fraudulent. In addition, many families did even not qualify for participation in the schemes that were available, for example, due to restrictions on the maximum age of inclusion or not belonging to the group providing protection. Obtaining a secure assurance of payment in the event of death in exchange for a fair premium payment was difficult. In the face of the difficulty of obtaining insurance, the death of the primary breadwinner could be enough to impoverish many families.

The development of life insurance, based on the principles of modern actuarial science, can be traced to the mid-18th century in England. Despite the limited understanding of modern life insurance principles before this time, the social need for some form of life insurance had generated an array of schemes. Due at least partly to a more liberal legal environment, England featured the widest range of schemes available in European countries. Of these schemes, the mutual benefit

societies moved a substantial intellectual distance towards modern life insurance. These early societies, such as the Union Society and the Society for the Assurance of Widows and Orphans, both founded in 1699, had a maximum number of possible subscribers. Aside from a nominal entrance fee, participation in the society required either the payment of a levy in the event of a member's death sufficient to ensure a fixed payment to the member's survivors or a regular subscription to be distributed among those making claims during the period.

To illustrate how such mutual benefit societies worked, consider the Society for the Assurance of Widows and Orphans, founded in 1699. This Society had a maximum of 2000 members each of which was required to pay an entrance fee that was to defray the expenses of running the Society. Upon the death of a member, a levy of 5 shillings was imposed on the remaining members and the proceeds paid to the dying member's survivors. Given that there were 2000 members in the Society, this translated into a payment of £500 to the dying member's widow or children. Membership was restricted to those under the age of 45. In addition, there were a number of other provisions restricting eligibility.

The design of these mutual benefit societies was not complicated and, as such, did not contribute much toward the intellectual development of modern life insurance schemes. One feature of modern schemes is that premiums paid into an investment fund are the basis for future policy payouts. This notion of creating a fund to be used for future payouts was first introduced in a scheme adopted by the Mercers' Company in 1698 (Pearson 1978, p.133; Francis 1853). This scheme required a substantial initial subscription in exchange for the designated survivor to receive a reversionary annuity from the fund created by the subscriptions. The plan also differentiated across subscribers according to age. In the Mercers' Company scheme, the maximum subscription was £100 for married men under 30, £500 for 30-40 and £300 for 40-60. For this payment, widows were entitled to an annuity payment equal to 30% of the value of the subscription.

The Mercers' Company scheme was first proposed by William Assheton (1641-1711), a country parson who was motivated by the absence of a suitable assurance scheme for the widows of clergymen. Assheton shopped his scheme around, without success, to both the Corporation of the sons of the Clergy and the Bank of England before the scheme was undertaken by the Mercers' Company. In 1699, Assheton published a pamphlet containing an account of the plan and its implementation. This pamphlet proved popular and, by 1724, six

editions had been published. Pearson (1978) credits Assheton's scheme with being 'the earliest attempt in England on a large scale in the direction of modern life insurance'. This claim may be overstated as, ultimately, the scheme was found to be actuarially unsound, the 30% payout being far too generous. In 1738, annuities were reduced by one-third. Even this proved insufficient and in 1750, the Mercers' Company plan was obliged to obtain further relief from Parliament.

Both the mutual benefit societies and the Mercers' Company plan were still substantially different from modern life insurance schemes where an actuarially determined premium is paid at regular intervals in exchange for an assured payout at the time of death. Another step toward the development of modern life insurance was made in 1706, when the Amicable Society for a Perpetual Assurance Office was chartered in London.[4] The Amicable limited membership to 2000 persons between the ages of 12 and 45. Each member paid an entrance fee of £7 10s and an annual fee of £6 4s. Initially, the bulk of the annual fees, £10,000, was to be divided equally between the survivors of those dying in a given year. Hence, the payout from the plan was not certain. If there were only a small number of deaths in the year, the payout would be large; if deaths were high, then the payout would be small. This deficiency in the plan was partially offset in 1757 when a minimum benefit of £125 was guaranteed, the amount was later raised to £150 in 1770.

While a number of life insurance schemes with admirable motives had emerged in England by the early 18th century, social attitudes towards insurance were still relatively underdeveloped.[5] This is reflected in the flurry of ill-conceived and even fraudulent insurance schemes that emerged in the decade or so preceding the South Sea Bubble. Most of these schemes originated either as part of the 190 new company promotions that appeared during the September 1719-August 1720 new issue bubble or during the 'bubbling year' of 1710. In numerous cases, the object of the fraud was the fund that was established for the future payouts. The schemes, whether frauds or merely ill-conceived ventures, were not limited to life assurances. There is no evidence that any of the 1710 plans survived the bursting of the bubble in 1720 (Ogborn 1962, p.21).

These bubble era insurance companies were often associated with specific taverns and coffeehouses, and offered protection against a bewildering array of possible perils. The following examples from Francis (1853, p.82) illustrate the venues and type of insurance: 'At the Marine Coffee House, for insuring seamen's wages', 'At the Rainbow,

Cornhill, for granting annuities for widows and orphans, £1,200,000', 'At Cooper's, for insuring against thieves and robbers, £2,000,000', and 'William Helmes, Exchange Alley, Assurance of Female Chastity'. Scott (1910) provides an number of other examples of the types of perils covered: 'A society to insure all masters and mistresses whatever loss they may sustain by theft from any servant that is ticketed and registered with the society', 'house breakings and robberies on the highway' and 'for assuring the proprietors of tickets in the government lotteries'.

Not all of the bubble era insurance schemes were eccentric. The London Assurance and the Royal Exchange Assurance, both chartered in 1720, did a small amount of life assurance business. However, this business was not substantial and was conducted under antiquated procedures such as selling contracts for a year at a time, not unlike the practice for fire insurance policies. A flat premium of £5 was charged and was applicable to a wide range of ages, an upper limit of 60 being imposed in 1752. That the life assurance business of these large chartered companies was not substantial is evident from the discussion of the experience of the life insurance department of the Royal Exchange Assurance (Supple 1970, p.64):

> There can be little doubt that ... the fact that life policies were issued only on an annual basis, and at a £5 premium irrespective of age ... seriously limited the development of the Department. And, conforming to this unscientific procedure, the Corporation did not credit the account with interest, and subtracted from each year's premium income the losses and returns for the same period. With these results and attitudes, it is little wonder that, in opposing the Equitable's petition for a Charter at the end of the 1750s, the Royal Exchange Assurance should bring forward its own disheartening experience as evidence of the market's lack of potential. In the thirty-eight years between 1721 and 1759 its *total* gross life premium income had been only £18,446 —— and out of this it had to pay £15,944 in losses and return of premium, quite apart from the costs of management. In any case, returns are likely to have reduced the premiums to less than £11,000, or an annual average of just under £300.

In contrast, the annual gross premiums of the Royal Exchange Assurance for 1771-1775 period were £23,000 for marine insurance and £19,200 for fire insurance. It is an understatement to say that life insurance was not an important source of business to the chartered insurance companies.

The Contribution of James Dodson

To a modern observer, the connection between de Moivre's contributions on pricing life annuities and the creation of life insurance companies seems apparent. However, judging from the market practices of the mid-18th century, the connection was far from obvious at that time. Credit for seeing the connection and charting the correct path can be given to two individuals: James Dodson (c. 1710-1757), who made the first steps toward the establishment of the Equitable, and Richard Price (1723-1791), who finished the task.

Little is known of the early life of James Dodson. Both his grandfather and father were tailors, with his father, John Dodson, being a freeman of the Merchant Taylors' Company. James Dodson was also admitted as a freeman to the Merchant Taylors' Company, though under the provision of patrimony, not apprenticeship. It is not known whether James Dodson ever worked as a tailor, though it is likely that he had some small inheritance with which he was able to marry in 1735 and establish himself as a writing master; 'it seems reasonable to assume that James Dodson had the writing-school "Hand and Pen" in Warwick Lane (near St Paul's Cathedral) from, say, the time of his marriage until his removal to Wapping, some time before 1747' (Ogborn 1962, p.25). The Hand and Pen was a writing school with some pedigree, counting George Shelley, 'one of the most formative influences in the development of copper plate', as a previous writing master.[6]

Dodson had a keen interest in mathematics that went well beyond the commercial arithmetic needed to instruct students at the Hand in Pen. This is evidenced by Dodson's 1742 publication of the *Antilogarithmic Canon*, dedicated primarily to the calculation of antilogarithms. Dodson's situation appears to have changed with his relocation to Wapping, next door to the 'Blue Legge', Bell-dock. The preface to his 1747 publication, *The Calculator*, refers to his occupation as 'Accomptant, and Teacher of Mathematics' involved in consulting merchants on auditing and general accounting, as well as designing accounting systems for specialized business situations. *The Calculator* itself was a type of ready reckoner, a book of tables for use in making various mathematical calculations. During his time at Bell-dock, Dodson also established himself as an expert and consultant in life annuities, the area from which he developed his contributions on life insurance.

The precise connection between Dodson and de Moivre is not detailed in modern secondary sources. For example, Ogborn (1962,

p.23) refers to Dodson as 'a pupil and a friend of Moivre', without further elaboration. De Moivre was in his seventies when Dodson moved to Wapping. Dodson did write some letters that were read before the Royal Society on certain aspects of the valuation of life annuities that, almost certainly, would have come to de Moivre's attention. There are various avenues for connections between the two: their mutual interest in mathematics and life annuities, as well as the similarities of their situations when Dodson was at the Hand in Pen. Despite the connection between the two, the possibility that de Moivre contributed significantly to Dodson's work on life insurance seems remote.

The major work that secured Dodson's election to the Royal Society, the three volume *The Mathematical Repository* (1748, 1753, 1755), makes reference to life insurance only in the preface to the third volume. As 'a classic of actuarial science', the *Mathematical Repository* is of interest for its treatment of annuities. Dodson's seminal work on life insurance is contained in his still unpublished, *First Lectures on Insurances* (1756).[7] Dodson's work on insurance was apparently spurred by his being refused admittance to the Amicable Society because he was just beyond the maximum acceptance age of 45 years. If correct, this means that his substantive work on life insurance started after de Moivre's death. The origin of modern life insurance can be traced to Dodson's 'advertisement in the *Daily Advertiser* asking those who were interested in the project (of starting a life insurance society founded on scientific principles) to meet him at the Queen's Head, Paternoster Row, on March 2, 1756' (Ogborn 1962, p.26).

The meeting at the Queen's Head was the first of a sequence of meetings, held weekly, enabling Dodson to explain his proposals and to garner support from individuals willing to participate in securing a charter for the proposed company. The most remarkable feature of Dodson's proposal was in the size of the premiums that were much smaller than the year-to-year premiums charged by the chartered companies. It was quickly recognized that, in order to start such a company, subscription money would be needed and a formal plan put forth. Following a period where subscribers were enlisted and details worked out, a petition for a charter was presented to the Privy Council on 20 April, 1757. Not surprisingly, this drew almost immediate opposition from the Amicable and, to a lesser extent, the chartered insurance companies. What followed was a period of protracted negotiations, where the petitioners were ultimately unsuccessful in

securing a charter. It was during this period that, on 23 November, 1757, James Dodson died.

Richard Price, Life Assurance and the Equitable

On 14 July, 1761 the Attorney General and Solicitor General delivered the final, negative report on the petition for a charter for the insurance company proposed by Dodson's group. Included in the arguments for denial was the view that the scheme was 'a mere speculation, never yet tried in practice'. It was suggested that the scheme proceed, not with a charter, but as a 'voluntary partnership, of which there are several instances now subsisting in this business of insuring'. The development of modern life insurance, based on the principles of actuarial science, could not be restrained by failure to secure a charter. The company did proceed, almost immediately, along the suggested procedural route of a voluntary partnership, using a deed of settlement. On 7 September, 1762, the deed of settlement was entered and the Equitable Life Assurance Society commenced operation.

Richard Price (1723-1791) was neither a subscriber or a director for the Equitable. Rather, Price served as a consultant on actuarial matters for about 15 years, starting around 1768. In this capacity, Price can be credited for taking Dodson's initial work and expanding its practical implementation. The difficulties of commencing the Equitable were considerable. Price was singularly well suited to this task, as evidenced in the theoretical contributions to insurance contained in the *Observations on Reversionary Payments* (1772). Benjamin Franklin has been quoted as calling Price's *Observations*, 'the foremost production of human understanding that this century has afforded us' (Ogborn 1962, p.92). Mortimer (1774, pp.370-1), who was not particularly kind to his intellectual opponents, praised the *Observations*:

> so far as it respects schemes for providing annuities for widows, and for persons in old age, (the *Observations*) is a most useful, and, at this time, a most valuable performance ... It is impossible to read Dr. Price's introduction to his Treatise, and his proofs of the inadequacies of the plans of the several annuitant societies started up within these very few years, without lamenting the folly and avarice of mankind; at the same time, we cannot but wish that so valuable a member of society should be duly noticed and properly rewarded, for having conveyed such useful information to the public.

More recently, Pearson (1978, p.393) refers to the *Observations* as 'perhaps the most remarkable textbook ever issued on actuarial science'.

Contents of *Observations on Reversionary Payments*, Richard Price (1772, 3rd ed.)

The full title of the work is *Observations on Reversionary Payments; on Schemes for providing Annuities for Widows, and for Persons in Old Age; on The Method of Calculating the Values of Assurances on Lives; and on the National Debt*. The title continues as: "To which are Added Four Essays on different Subjects in the Doctrine of Life-Annuities and Political Arithmetic. Also an Appendix, Containing a complete Set of Tables; particularly, Four New Tables, shewing the Probabilities of Life in London, Norwich, and Northampton; and the Values of *joint* Lives." The Table of Contents follows appropriately:

(cont'd)

The *Observations* contains three chapters, four essays, an appendix and a supplement. The first chapter is decidedly in the spirit of de Moivre's *A Treatise of Annuities on Lives*. Theoretical questions are posed and answers are provided. Some of the questions are decidedly

Contents of *Observations on Reversionary Payments*, Richard Price (1772, 3rd ed.) ... cont'd

CHAPTER III
Of Public Credit, and the National Debt.

ESSAY I.
Observations on the Expectations of Lives; the Increase of Mankind; the Number of Inhabitants in London; *and the Influence of great Towns on Health and Population. In a Letter to* Benjamin Franklin, *Esq, L.L.D. and F.R.S., To which is added a Postscript, containing Observations on* Edinburgh, Paris and Berlin.

ESSAY II.
On Mr. De Moivre's *Rules for calculating the Values of* joint *Lives.*

ESSAY III.
On the Method of calculating the Values of Reversions depending on Survivorships.

ESSAY IV.
On the proper Method of constructing Tables for determining the Rate of human Mortality, the Number of Inhabitants, and the Values of Lives in any Town or District, from Bills of Mortality, in which are given the Numbers dying annually at all Ages.

APPENDIX.
Containing Algebraical Demonstrations; Tables; and Rules for computing the Increase of Money bearing Compound Interest.

SUPPLEMENT. *Containing additional Observations and Tables.*

practical (p.1):

> QUESTION I.
> A Set of married men enter into a society for securing annuities to their widows. What sum of money, in a single payment, ought every member to contribute, in order to entitle his widow to an annuity of 30 *l. per ann.* for her life, estimating interest at 4 *per cent*?

Some of the questions are more theoretical (p.28):

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QUESTION XI.

A person of a given age, having a yearly income which will fail with his life, wants to make provision for another person of a given age, in case the latter should happen to survive. What ought the former to give in a single payment, and also in annual payments during their joint lives, for a given sum, payable at his death to the latter?

And so it goes, but always with an objective in mind. While interesting, in comparison with de Moivre, Thomas Simpson and others, the material covered in Chapter 1 is not theoretically sophisticated and, on its own, would not constitute a particularly seminal contribution.

The full force of the arguments being developed in Chapter 1 is reserved for the discussion of Chapter 2. In assessing Price's contribution to the histories of statistics and actuarial science, Pearson (1978, p.395) makes the following observation: 'Where from, therefore, does the importance of Price's *Observations on Reversionary Payments* arise? I think undoubtedly from the second chapter.' In a truly singular intellectual exercise, in Chapter 2 Price examines the schemes of the various beneficial societies and insurance societies of his time and demonstrates that all but one will, ultimately, lead to bankruptcy. Only the Society for Equitable Assurances on Lives and Survivorships, the Equitable, is able to meet Price's acid test. Of the Equitable Price (p.102) observes that 'if due care is taken, it may prove a very great public benefit'. The substance of Price's analysis was overwhelming. Many of these societies were founded with noble motives, with no honest intent to produce this type of outcome. Within a short period of time, numerous societies either folded or restructured their premium/payout structure.

It was a natural progression for Price to move from the academic sphere of the *Observations* to the practical realm of implementing an actuarially sound life insurance scheme. It was also natural the Equitable would be the venue. Price explicitly recognizes that Dodson had worked out basic ideas for the practical implementation of a sound life insurance scheme. Price's connection with the Equitable was both moral and personal. He acted as a consultant to the Equitable at various times, passing judgment on various tables that had been prepared, the method of arranging the life company's accounts (Ogborn 1962, p.104) and other issues, with the advice usually being given without payment. However, this does not mean that the Equitable would follow Price's advice to the letter. For example, at various times Price criticised the Equitable for setting premiums too high.

On the personal side, Price was responsible for establishing his nephew, William Morgan, as an actuary for the Equitable. Pearson (1978, pp.395-6) relates the following anecdote about how William Morgan came to be an actuary for the Equitable:

> (Price) said to his nephew William who was staying with him at Newington Green —— 'Billy, do you know anything of Mathematics?' 'No, Uncle,' was Billy's reply, 'but I can learn'. Through Price's influence Billy was made an assistant actuary to the Equitable in 1774 and actuary a year later. It was a beneficent act of nepotism. Billy became famous as 'Actuary Morgan', the man who made the great reputation of the Equitable, which he served for 50 years. He made a great textbook of Price's *Reversionary Payments*, became an F.R.S. and the great authority in his life-time on actuarial science.

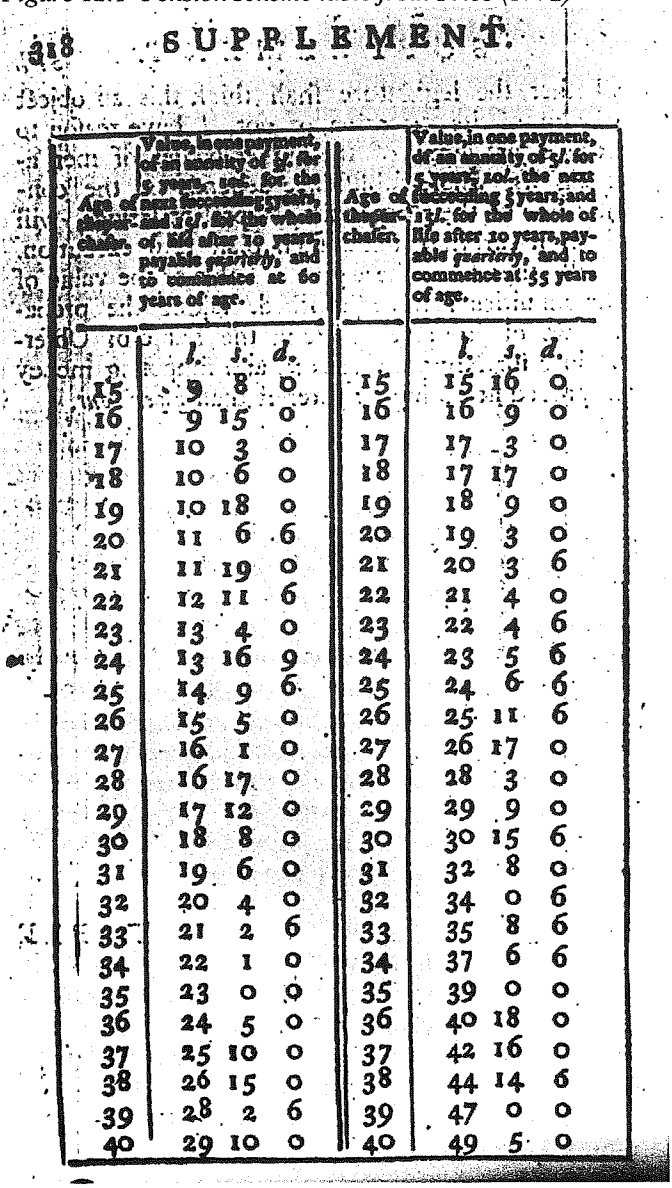
Yet another of Price's practical contributions was the insistence that life insurance companies be under the direction of a capable mathematician, the actuary.

The Origin of Old Age Pension Plans

Social mechanisms aimed at providing for the elderly and infirmed have a long and complicated history. The Church, the extended family, inheritance practices and charitable organizations have all been important vehicles at one time. However, it was not until Bismark's Germany in the 1880s that a state plan with universal coverage was implemented. Yet, in 1772, Richard Price proposed an actuarially sound plan to provide state pensions and allowances for the poor who are elderly or sick. This plan was to be a replacement for the inadequate support provided by the Poor Laws. In 1773, the plan was well received by the House of Commons and was passed, only to be rejected by the House of Lords. In 1789, the plan was revived and passed, once again, the House of Commons only to be, once again, rejected by the House of Lords.

Price (1772) describes his Old Age Pension Plan in the second Supplement to the *Observations*, which is concerned with schemes for providing annuities for widows and the elderly. At this time in England, support for many elderly people fell within the scope of the Poor Laws. Price's plan was quite novel. Though the scheme allowed for the use of local funds and local management, the ultimate objective was aimed at universal coverage. In this respect, Price's proposal is of considerable interest. The ensuing attempts to incorporate the plan into legislation justify considering Price to be the 'Father of Old Age

Figure 12.1 Pension scheme table from Price (1772)



218 SUPPLEMENT.

Age of the chuser.	Value, in one payment, of an annuity of 5*l.* for 5 years, 10*l.* for the next 5 years, and 15*l.* for the whole of life after 10 years, payable *quarterly*, and to commence at 60 years of age.			Age of the chuser.	Value, in one payment, of an annuity of 5*l.* for 5 years, 10*l.* the next 5 years, and 15*l.* for the whole of life after 10 years, payable *quarterly*, and to commence at 55 years of age.		
	l.	*s.*	*d.*		*l.*	*s.*	*d.*
15	9	8	0	15	15	16	0
16	9	15	0	16	16	9	0
17	10	3	0	17	17	3	0
18	10	6	0	18	17	17	0
19	10	18	0	19	18	9	0
20	11	6	6	20	19	3	0
21	11	19	0	21	20	3	6
22	12	11	6	22	21	4	0
23	13	4	0	23	22	4	6
24	13	16	9	24	23	5	6
25	14	9	6	25	24	6	6
26	15	5	0	26	25	11	6
27	16	1	0	27	26	17	0
28	16	17	0	28	28	3	0
29	17	12	0	29	29	9	0
30	18	8	0	30	30	15	6
31	19	6	0	31	32	8	0
32	20	4	0	32	34	0	6
33	21	2	6	33	35	8	6
34	22	1	0	34	37	6	6
35	23	0	0	35	39	0	0
36	24	5	0	36	40	18	0
37	25	10	0	37	42	16	0
38	26	15	0	38	44	14	6
39	28	2	6	39	47	0	0
40	29	10	0	40	49	5	0

Source: Adapted from Price (1772).

Pensions'. That Price was unsuccessful speaks more of the attitude in the House of Lords, than to the soundness of his plan. 'It is doubtful whether our gratitude to Price should be more voluble than our execration of the Lords' (Pearson 1978, p.404).

Compared to modern ill-conceived, pay-as-you-go public pension plans, Price's plan was exceptional. As with much of Price's work, it was motivated by moral obligation: despite the substantial amount of money raised by the Poor Laws, 'in many places' the poor were 'indifferently provided for' (p.313).[8] As a sizeable number of the poor were elderly, Price wanted to apply the principles that he proposed in *Observations* to providing for the poor. Using this approach, it was apparent that the poor lacked adequate investment vehicles for retirement savings (p.313):

> To make provision for one's old age is so natural a piece of prudence, that it seems at first sight wonderful, that it should not be generally practised by the labouring poor, as it is almost universally by persons in the higher paths of industry: Nor can their negligence in this respect be accounted for, in any other way so naturally, as by ascribing it to their wanting proper opportunities of employing the money they might save, in some safe and easy method that would procure them a suitable advantage from it in the latter periods of their lives.

Price's idea was the establishment of 'Parish Annuities'.

The basic plan underlying the parish annuities was to have the poor provide for their own old age as much as practical. In Price's time, there were few outlets for small savers, in general, and virtually no actuarially sound pension schemes, in particular. These annuities would be administered at the local level, by the Churchwardens and overseers of the parish. The administrators would be responsible for collecting the annuity payments and investing in bank annuities. Any deficiencies in the fund could be made out of the poor rates of the parish. The fund would make payouts starting at the age of 55 or 60, at the option of the annuitant. The payout would be staggered, for example, £5 for the first five years, £10 for the next five and £15 pounds thereafter (*Observations*, p.316):

> For instance, Let the annuity begin with 5*l.* for 5 years. At the end of 5 years, let it rise to 10*l.* for 5 years more; and after that let it be 15*l.* for the whole remainder of life. Let also every purchaser be allowed to chuse at which of the two ages 55 or 60 his annuity shall commence; and as a further advantage, let it be payable *quarterly*, and let him be allowed to purchase ⅓, ½, ⅔, 1, 1⅓, 1½, 1⅔, or 2 annuities, just as he shall like or can best afford —— A plan

> of this kind, established by the legislature, for the benefit of the infirm and aged poor, would, instead of lessening industry among them, promote it; and at the same time, it would ease parishes of a considerable part of their present burdens.

To facilitate the scheme, Price provides a table that could be used to determine the appropriate payments to be made under the scheme (see Figure 12.1).

It is unfortunate that the House of Lords rejected this scheme, both in 1773 and 1789. Compared to modern universal government pension plans, which are often little more than disguised welfare schemes, Price's parish annuity scheme would have started Old Age pension plans on a sounder intellectual footing. Price's plan was designed for actuarial soundness. The plan was voluntary, effectively unbundling the government payments to the aged into a welfare component, provided under the Poor Laws, and a pension component, the parish annuities, which would reward industry and thrift among the poorer classes. The various wrinkles, such as allowing the option of selecting a specific starting date and the staggered annuity payments, are ingenious.

The Development of Other Types of Insurance

In addition to marine and life insurance, other major types of insurance cover risks associated with fire, other life contingencies such as disability, as well as accidents and theft or damage to property. In modern times, due to social acceptance of the principles of actuarial science, insurance is viewed as a risk-reducing activity, in contrast to the risk-increasing activity of gambling. However, in the absence of risk-pooling, adequate premium pricing, sound investment practices and other elements, an insurance policy has decided similarities to gambling. Recognizing that modern principles of actuarial science were only beginning to be introduced at the end of the period under study, much of the early trading in insurance for lives and special event risks such as accidents was viewed as being more related to gambling and usury than risk management. Policies were often short term and offered by gamblers. Aside from maritime and life insurance, only fire insurance had made substantial progress towards a more modern understanding of insurance principles.[9]

The progress towards modern forms of insurance varied according to the differing characteristics of the types of risk involved. Whereas life insurance is fundamentally dependent on age, with a nominal adjustment

for the present state of health, the types of contingencies associated with fire, accident and shipwreck are more individualistic, making these risks less suitable as candidates for seminal theoretical analysis. Maritime insurance had a long history and 'by careful classification of risks and expert use of the lessons of experience' (Dickson 1960, p.15) maritime insurers had developed methods for setting premiums that adequately accounted for the haphazard accident rate in shipping. The methods used to determine a given premium were a combination of convention, intuition, and experience.

In practice, the risks associated with fire were somewhat closer to the irregular occurrences in shipping than the regular patterns of the life table. Fire insurance also posed a range of new problems. The specific risks associated with fire are quite readily identified and priced. For example, fire risk depends on the type of construction, the availability of fire-fighting equipment, and adequate appraisal of the value of the building and contents. The risk is partially controllable through the creation of fire stations. Care has to be taken in creating policies that there is not too much exposure to specific events, such as insuring all the houses in a specific neighbourhood where a large loss could be incurred from one fire, due to the fire spreading to a number of buildings.

In England, plans for fire insurance were advanced as early as the 1630s (Dickson 1960, p.3):

> In 1635, for example, a plan for fire insurance in London at 1*s*. per cent. per annum was laid before the Privy Council, and it was followed three years later by a more elaborate scheme including provision for fire-engines in each Ward of the City, a nightly watch for fires, and the deposit of £5,000 in the Chamber of London as a security for the insured.

It is significant that the 1638 plan specifically allowed for a security fund, a provision that was initially considered to be necessary for the viability of an insurance scheme. For various reasons, none of these early schemes was implemented prior to the Great Fire of London.

It is difficult for modern observers to appreciate the scar that the Great Fire left on the psyche of London. The fire itself started on Saturday night, 1 September 1666, in a baker's house in Pudding Lane. Despite considerable measures against the blaze, aided by a high wind the fire spread uncontrolled until Wednesday 5 September when the wind dropped and efforts to control the blaze finally succeeded. On Thursday, the blaze was deemed to be under control (Dickson 1960, p.4):

> The citizens, clambering over piles of rubble deep in dirt and soot, were able to take stock of the damage. The reckoning was formidable. 'With the pen alone', wrote a German resident of London, 'it is hardly possible to set down an adequate account of the pitiful state of things brought about by the most destructive fire England has ever seen.' An area equal to an oblong a mile deep and a half a mile wide had been devastated. The Royal Exchange, the Customs House, the halls of 44 companies, St. Paul's Cathedral, 87 parish churchs, and about 13,000 houses had been destroyed; the loss was computed at over £10 million, a sum equivalent to a quarter of the national income according to contemporary estimates.

Virtually overnight, fire insurance in London had been transformed from a convenience into an urgency.

For a period after the Fire, London was consumed with rebuilding. Fire insurance was an urgent need, especially considering that London-after-the-Fire still contained a substantial amount of housing of the same construction as that which had burned in the Fire. However, the most appropriate method of proceeding was not apparent. A number of schemes were unsuccessfully proposed until, in 1681, two proposals were implemented. One scheme, that featured the City of London, was abandoned about a year later. The other scheme, the 'Insurance Office for Houses', commonly referred to as the Fire Office, was a partnership of twelve associates. The driving force behind this proposal was an individual who is well known in the pre-Smithian history of economic thought: Dr Nicholas Barbon (1637-1698).

Barbon is another of the colourful figures in the early history of financial economics. 'As Child's life is an epitome of the Restoration mercantile magnate, so Barbon's is the type of the late seventeenth century "projector"' (Letwin 1964, p.52). Barbon's father was a leather merchant whose religious views could be characterized as baptist fanatic. His father gained public notoriety from his time spent in Parliament, his name being immortalized in the 1653 'Barebones Parliament'. Nicholas Barbon, himself, was well educated, studying medicine at Leiden and Utrecht, earning an MD, and being admitted as an Honorary Fellow of the College of Physicians in London in 1644. Barbon spent little, if any, time as a doctor, turning his attention instead to building.

By the time of the Great Fire, Barbon was established as, perhaps, the most important builder in London, using business and building techniques that by all accounts were unscrupulous. Based on his track record, Barbon would seem to be ill suited to undertaking a viable scheme for fire insurance. Despite this, due to a combination of

business skill, appropriate caution and good luck, Barbon was able to successfully introduce the first viable fire insurance company. Similar to the older fire insurance proposals, the Fire Office had a fund to provide security for policy holders. Other significant features of Barbon's scheme were a limitation on the number of policies and the provision of fire prevention services to policy holders. Being a builder, Barbon was also in an excellent situation to assess the viability of specific structures for risk from fire.

The Fire Office's limitation on the number of policies to be issued left the field open for competitors. In 1683, the first competitor appeared as 'The Friendly Society for Securing Houses from Loss by Fire'. Though the Friendly did had a small fund for the settlement of claims, the Friendly was effectively organized as a mutual society, where members were jointly responsible for making contributions when a fire loss occurred. This new competitor naturally drew the attention of Barbon, whose criticisms of the Friendly were a reflection of his understanding of the correct operation of a fire insurance company (Dickson 1960, p.10):

> (William) Hale and (Henry) Spelman ... established (the Friendly) Office on a workmanlike footing, and within a year of its foundation had insured over 1,000 houses. This success was naturally unwelcome to Barbon, who set out to discredit his rivals' business by comparing it unfavourably to his own. The security of the 'Friendly', he observed, consisted in mutual covenants between the insurers and the insured, and not in lands and rents. This was a serious objection, because 'there can be no Insurance, unless there be a Fund Settled, that is both Certain and Able to make good the Loss'. In addition, the number of contributors available to pay claims would always be uncertain because of forfeitures, insolvency, and surrender of policies. The older the society grew the weaker it would become, for members would be constantly bled to meet new claims. Lastly, in contrast to his own Office, it had no experienced fire-brigade and, in view of the unlimited liability of the insured to meet losses, had no incentive to create one.

At the time the Friendly was formed, the Fire Office was meeting with considerable success, with some 4,000 policies issued. So, it is not clear whether Barbon's comments were motivated more by a desire to attack a business competitor seeking an unfair advantage or by a civic compulsion to warn the public of the dangers of the mutual form of insurance being used to protect against fire risks.

Barbon died in 1698, only two years after a third competitor, 'The Amicable Contributorship' better known from its badge as 'The Hand-in-Hand Fire Office', came into being. This society was purely a

mutual form, with only the deposit money of contributors providing a fund for the payment of claims. Various other companies and societies followed. A variety of methods of business organization were tried, including the Royal Exchange Assurance and London Assurance joint stock companies. Perhaps the most successful of these ventures was the Sun Fire Office, established by Charles Povey (1650?-1743). The history of this company, and the evolution of the English fire insurance business, has been ably constructed in Dickson (1960).

At the time of Barbon's death, the most appropriate form of organization for a fire insurance company was still an unresolved issue. Even though Barbon's writings on this subject represent an important early contribution to the resolution of this practical problem, his contributions on this subject have been largely ignored by historians of economic thought. Letwin (1964, p.59) makes the following observation: 'Of Barbon's writings, a number are of no importance as economic theory. His pamphlets and broadsheets on fire insurance ... are straightforward pieces of advertising'. In this vein, Barbon is a caricature for the role that the early history of financial economics played in the conventional history of economic thought. The mundane day-to-day activities of financial market participants pale in comparison with the weighty issues involved in affairs of state.

Appendix: The Francis (1853) List of South Sea Bubble Era Assurance Schemes

Francis (1853) is a fascinating, if not always completely accurate, account of the early history of assurance, dealing primarily with life assurance in England. Included in this text (pp.81-3) is: 'The most correct list which can be obtained of the assurance projects of the South Sea Bubble era'. Though the claim of being 'the most correct list' is questionable, the items in the list do provide a stark contrast between the 'sound and salutory', the 'Utopian' but unworkable, and 'many plans ... commenced with no other view than that of receiving deposits and spending them'. The list provided by Francis is as follows:

1. The Royal Exchange.
2. The London Assurance.
3. For a general insurance on houses and merchandise, at the Three Tuns, Swithin's Alley, 2,000,000*l.*
4. For granting annuities by way of survivorship, and providing for widows, orphans, &c., at the Rainbow, Cornhill, 1,200,000*l.*
5. For insuring houses and goods from fire, at Sadler's Hall, 2,000,000*l.*

6. For insuring houses and goods in Ireland, with an English earl at the head of it.
7. For securing goods and houses from fire, at the Swan and Rummer, 2,000,000*l.*
8. Friendly society for insurances.
9. For insuring ships and merchandise, at the Marine Coffee-house, 2,000,000*l.*
10. British Insurance Company.
11. For preventing and suppressing thieves and robbers, and for insuring all persons' goods from the same, at Cooper's, 2,000,000*l.*
12. Shales Insurance Company.
13. For insuring seamen's wages, Sam's Coffee-house.
14. Insurance Office for horses dying natural deaths, stolen or disabled, Crown Tavern, Smithfield.
15. A company for the insurance of debts.
16. A rival to the above for 2,000,000*l.*, at Robin's.
17. Insurance Office for all masters and mistresses against losses they shall sustain by servants, thefts, &c., 3000 shares of 100*l.* each, Devil Tavern.
18. For a general insurance in any part of England.
19. A copartnership for insuring and increasing children's fortunes, Fountain Tavern.
20. For carrying on a general insurance from losses by fire within the kingdom.
21. Insurance from loss by Garraway's Fishery, Crutchley's, at Jonathan's Coffee-house.
22. Mutual Insurance for Ships.
23. Symon's Assurance on Lives.
24. Baker's second edition of Insurance on Lives.
25. William Helmes, Exchange Alley, Assurance of Female Chastity.
26. Insurance from house-breakers.
27. Insurance from highwaymen.
28. Assurance from lying.
29. Plummer and Petty's Insurance from death by drinking Geneva.
30. Rum Insurance.

Francis provides little or no further information about the amounts raised by these schemes. Yet, audacious schemes, such as those for assurance of female chastity or assurance from lying, were not restricted to the South Sea Bubble era. For example, Francis (p.283) makes reference to a scheme from his own time, the Society for Assurance against Purgatory. As for the accuracy and completeness of Francis's list, Scott (1910) can be used to fill in any relevant omissions. In fairness to Francis, his claim may have been accurate at the time he was writing.

Notes

1. Included in one of these ordinances, that for Florence (1523), is the earliest preserved form of a standardized policy. 'This policy is already in an advanced stage of development, and has a strong family resemblance in form to a Lloyd's policy of today' (Wright and Fayle 1928, p.135).

2. The relevant reference is Charles Molloy (1676), *De Jure Maritimo* pp. 240, 270 as quoted in Wright and Fayle (1928, p.39).

3. In some jurisdictions the bans related only to gambling on lives of individuals who were not related to the person undertaking the assurance. The public perception of life insurance was not helped by the presence of unscrupulous promoters and usurers involved in underwriting such policies. In *Curiosities of Literature*, D'Israeli gives accounts of the infamous seventeenth century usurers Hugh Audley, Judah Lopez and Vulture Hawkins. In addition to more lucrative loan sharking activities, all three of these individuals also dabbled in the practice of writing short term policies on lives (Pearson 1978, p.135).

4. The Amicable had a 'long and venerable history' (Supple 1970, p.9), eventually being taken over by Norwich Union in 1866.

5. Among the various societies proposed was an 'Office for the Ensurance of Widows', whose author was one Daniel Defoe. In the *Essay upon Projects* (1697) Defoe stressed the benefits of insurance organized on the basis of mutual contributions, with the insurance of widows being a potential application.

6. Copper plate was the flowing English script which was developed by writing masters in the later 17th and early 18th centuries. The success of copper plate was reflected in its inclusion as 'the principal subject of commercial education' (Ogborn 1962, p.24), which by the early 18th century also covered commercial arithmetic and bookkeeping. Being a writing master was a useful prerequisite for sustaining a successful early 18th century English reckoning school.

7. Ogborn (1962, pp.257-8) corrects an error which is sometimes made in attributing a role to Thomas Simpson in the early work on insurance.

8. The quotes being provided on pp.313-6 are, in turn, being directly quoted by Price from a 22 July, 1772 article in the *Public Advertiser*. Price refers to 'the ingenious proposer of this scheme' set out in the *Public Advertiser*. However, Pearson (1978, p.403) observes that the 'ingenious proposer' was actually Price himself, the author of the article in the *Public Advertiser*.

9. Though there were some unsuccessful attempts to launch scientifically valid schemes, actuarially sound accident insurance did not emerge until the early 19th century.