

History of Actuarial Profession

Introduction

A profession serves a public purpose. Consequently, an outline of the history of the actuarial profession must follow the public purposes served by actuaries in applying their basic science.

The formation in London in 1762 of the Society for Equitable Assurances on Lives and Survivorships as a **mutual company**, initiated a process that created a public purpose for actuaries. A mutual insurance company is owned by its policyholders and is operated for their benefit. The policyholders share in the profits of their company through dividends on their policies. Ogborn [1] has written a comprehensive history of the Equitable.

Because of the long-term nature of most **life insurance** policies, the estimation of the period profit of a mutual life insurance company involves more than counting the cash in the vault. The estimation requires a valuation of contingent liabilities involving future benefit payments less future premium payments, which may not be realized as cash payments for many years. The resulting estimate of the value of future liabilities must be subtracted from an estimate of the value of assets. The existence of market values may assist the asset valuation, but the asset valuation also involves assigning a number to the value of future uncertain payments. The difference between the estimated asset and liability values is an estimate of surplus. Increase in estimated surplus can be viewed as an initial estimate of periodic profit and as a starting point in the determinations of policy dividends.

The future cash flows arising from the assets owned and the insurance liabilities owed are, however, random. To provide a suitably high probability that the promises embedded in the insurance contracts can be fulfilled, the initial estimate of the profit that might be paid as dividends may be reduced to what is called divisible surplus. This is to create the required assurance of the ultimate fulfillment of the contracts.

The assumptions used in the process of valuing assets and liabilities must be selected with a combination of analysis of past experience and informed judgment about future trends. In the early years of the Equitable, the basic model had to be created, the information system to support the valuation established, and suitable approximations confirmed.

The fulfillment of contracts is a legitimate public goal. The realization of this goal is one of the justifications for the legal profession and the court system. In this case, the fulfillment of mutual insurance contracts is at stake. It was clear that the determination of policy dividends required technical knowledge, business judgment, and a commitment to equitably fulfilling contracts. These factors combined to create a public purpose foundation for the actuarial profession. Bolnick [2] covers some of this history.

The accounting profession, in common with the actuarial profession, got its start in the middle of the nineteenth century in Great Britain. At first its members performed the public function of supervising bankruptcies with the goal of assuring creditors that they would be treated fairly. The initial public assignments of accountants and actuaries were related. Both professions were seeking fair treatment of creditors or partial owners of a business. Porter [3] covers the somewhat parallel history of the accounting and actuarial professions.

The accounting profession grew to perform additional public functions such as auditing the accounts of public companies. The public role of actuaries also expanded. The overriding public responsibility in the nineteenth century became the promotion of the organization of insurance companies on scientific principles.

The second quarter of the nineteenth century was a period of turmoil in the life insurance industry of Great Britain. For example, in 1845, no less than 47 companies were provisionally registered to transact life insurance business and of these, not one existed in 1887. The collection of stories of shady insurance operations assembled by a Select Committee of Parliament on Joint Stock Companies even had an impact on literature. These events apparently influenced the novelist Charles Dickens who was writing *'The Life and Adventures of Martin Chuzzlewit'*. The novel was serialized from January 1843 to July 1844. When Dickens needed a fraudulent enterprise to serve as a vehicle for the villain in

the novel, he created the Anglo-Bengalee Disinterested Loan and Life Assurance Company. In this chaotic situation, some actuaries, as public-spirited citizens, persistently pushed for a scientific basis for the organization and management of life insurance companies. Cox and Storr–Best [4] provide statistics on the confusion in life insurance during this period of the nineteenth century. Bühlmann [5], in a call for a broader mission for the actuarial profession, also covers this period.

The determination of divisible surplus and the promoting of science-based life insurance did not end the professional development of actuaries. As the scope of actuarial practice broadened, society's views on the attributes of a profession also changed. Bellis [6] surveys the definitions of a profession and the relevance of these definitions to actuaries.

Definition of Profession

Gordon and Howell [7] list the criterion for a profession, which we will use initially to guide our review. 'First, the practice of a profession must rest on a systematic body of knowledge of substantial intellectual content and on the development of personal skill in the application of this knowledge to specific cases. Second, there must exist standards of professional conduct, which take precedence over the goal of personal gain, governing the professional man's relations with his clients and his fellow practitioners. These two primary criteria have led in practice to two further ones. A profession has its own association of members, among whose functions are the enforcement of standards, the advancement and dissemination of knowledge, and, in some degree, the control of entry into the profession. Finally, there is a prescribed way of entering the profession through the enforcement of minimum standards of training and competence. Generally, the road leading to professional practice passes through the professional school and is guarded by a qualifying examination.'

The actuarial profession satisfies the first of the Gordon and Howell criteria. This criterion establishes the fundamental difference between the basic science on which a profession is based, and the necessary professional application of this science. There is, for example, a difference between the medical profession and the science of human biology.

The systematic body of knowledge is not, however, invariant across time. For actuaries, it has

changed as the scope of the financial security systems that they design and manage have changed. The body of knowledge has always contained elements of the mathematical sciences, economics, law, and business management. When there developed an actuarial role in the design and management of old-age income **social security** systems, **demography** and macroeconomics became part of this systematic body of actuarial knowledge. These subjects clearly have a smaller role in designing and managing an individual **automobile insurance** system.

The standards of professional conduct for actuaries that are required by Gordon and Howell's second criteria have been implicit rather than explicit for most of the history of the actuarial profession. For example, in 1853, in response to a Parliamentary Select Committee on Assurance Associations' question on the accuracy of financial reports, Samuel Ingall replied, 'I think the best security is the character of the parties giving them.' Before the same Committee, William Farr provided the assurance that 'actuaries are gentlemen'. Porter [3] describes these hearings.

By the early twenty-first century the expansion of the scope and complexity of actuarial practice, as well as the increased number of actuaries, created a different situation. This expansion made it difficult to depend solely on the good character of individual actuaries to define and promote the public interest in designing and managing financial security systems. The development of supporting codes of professional conduct and standards of actuarial practice has not been uniform all over the world. For example, in the United States, the actuarial profession has a Joint Code of Professional Conduct, Qualification Standards, and Actuarial Standards of Practice. The situation in Australia, Canada, Great Britain, and Ireland is similar.

The two derived criteria for a profession as stated by Gordon and Howell are, in general, satisfied by the actuarial profession. There are actuarial organizations in many parts of the world and, almost uniformly, they engage in the advancement and dissemination of knowledge, and influence the method of entry into the profession. As indicated earlier, the articulation and enforcement of standards is not a function of all of these organizations.

The process for gaining entry into the actuarial profession is through an educational portal that is the subject of continual discussion within the world's

national actuarial organizations. The first of these organizations, the **Institute of Actuaries**, started a system of examinations in 1850, only two years after the founding of the Institute. The Actuarial Society of America was organized in 1889 and followed the lead of the Institute by starting an examination program in 1897. The **Casualty Actuarial Society** was founded in the United States in 1914 and within a few months started an examination system. In other nations, especially those in Western Continental Europe and Latin America, completing a university program became the path into the actuarial profession. The curriculum in these university programs was, to a varying extent influenced by the profession. Cole [8] provides a critical review of these education and examination systems.

An Alternative Definition

The detailed and restrictive definition of a profession by Gordon and Howell does not correspond to the reality of the organization of the actuarial profession in much of the world. The first element of their definition, the reliance on a systematic body of knowledge, is, however, almost universal among actuarial organizations.

This fact, which is also true for some other professions, leads to an alternative and simplified definition. A profession is an occupation or vocation requiring advanced study in a specialized field.

Under the alternative definition, the existence of professional actuarial standards may be implicit rather than involving formal statements of standards and a professional enforcement agency. Entry into professional actuarial practice, under the alternative definition, may be controlled by universities and regulators rather than by professional actuarial organizations. It would be unnecessarily limiting to ignore the history of those professional actuarial organizations that fit the more general alternative definition.

The actuarial profession in the United Kingdom, and in those countries with close cultural ties to the United Kingdom, by and large satisfies the Gordon and Howell definition. This is illustrated by developments in India. The Actuarial Society of India was founded in 1945. The stated objectives of the new organization centered on the first element of the Gordon and Howell definition. The growth of the Society was inhibited by the nationalization of

Indian life insurance in 1956. Not until 2000 were private firms authorized to again enter the life insurance business. The regulations for the new industry required each company to designate an appointed actuary. The responsibilities of the appointed actuary were to safeguard defined public interests in insurance operations. This was modeled on a regulatory device introduced earlier in the United Kingdom.

In Western Continental Europe, on the other hand, the actuarial profession tends to satisfy the alternative definition. The practice of actuarial science tends to be more regulated by central governments than by private professional organizations. Entry into the profession tends to be monitored by universities and regulators with indirect influence from the profession.

Bellis [6] assembles references that build on the political history of the United Kingdom and Western Continental Europe to explain these differences. The core of the proposed explanation is that, following the French Revolution, centralized governments in Western Continental Europe tended to sweep away private institutions not subject to the sovereignty of the people. The United Kingdom did not experience the cataclysmic revolutionary event, and private institutions evolved along diverse paths.

A short case study of the history of the organized actuarial profession in a Western-Continental European country may illustrate these differences.

We will examine the history in Switzerland. Political and economic stability has helped make Switzerland a center for international banking and insurance. In addition, the intellectual contributions of scholars with Swiss connections helped create actuarial science. The extended **Bernoulli family** provides examples. Jacob Bernoulli contributed to the law of large numbers, and Daniel Bernoulli constructed the foundations of **utility theory**.

The Association of Swiss Actuaries was founded in 1905. In 1989, the words were permuted to **Swiss Association of Actuaries**. Unlike the United Kingdom, entry has not been gained by passing examinations. Most entrants have typically been university graduates with majors in mathematics who have practical experience.

The official role of actuaries in Switzerland is confined to **pensions**. A pension-fund regulation law, enacted in 1974, provided for training and qualifications for pension-fund experts. These experts were

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entrusted with enforcing legal requirements for pensions and guarding the security of promised benefits. The Association has, since 1977, organized the pension training courses and examinations leading to a diploma for pension-fund experts. This operation is separate from the traditional activities of the Association.

The history of the actuarial profession in the United Kingdom and Western Continental Europe are different. The United States, as is true in many issues involving cultural differences, took elements from both traditions.

The Classical Professions

The classical professions are law, medicine, and theology. The roots of these professions extend into the middle ages. Early European universities had separate faculties devoted to each of these professions. The trinity of these early professions clearly satisfy the Gordon and Howell criterion. Indeed, the attributes of this trinity have served to shape the definition of the profession. They have served as models for other groups coalescing around a body of knowledge, useful to society, that are seeking to organize a profession. Accountancy, actuarial science, architecture, dentistry, nursing, and pharmacy are examples of the process. The goals of the organizational process is usually to serve the public and, perhaps, to promote the self-interest of the profession's members.

The development of professions was not independent of the earlier guilds. Guilds were known in England from the seventh century. Guilds were associations of persons engaged in kindred pursuits. Their purposes were to regulate entry into the occupation by a program of apprenticeships, to strive for a high standard of quality in the guild's product or service, and to manage prices. It became difficult to maintain guilds when, in the industrial age, production became automated and no longer depended on ancient skills. With the triumph of free markets, the private control of entry into a guild and the management of prices seemed to be impediments to the efficiency derived from free markets.

The twentieth and twenty-first centuries have been unfriendly to guilds, and events have altered, and probably weakened, the sharpness of the definition of the classical professions. For example, students of theology now find themselves doing counseling, and

managing social welfare and education programs in addition to their ecclesiastical duties. Students of the law have found that in an age of business regulation and complex tax law, it has become more difficult to identify the mainstream of the law. In addition, a host of specialists in taxation and regulation perform services closely related to legal services. Even medical practitioners are finding their previously independent actions are constrained by governmental or corporate managers of health plans. A number of other specialists, devoted to a particular disease or technological device, are now also members of health teams.

History of Actuarial Organizations

The birth of the actuarial profession can be conveniently fixed as 1848. In that year, the Institute of Actuaries was organized in London. The **Faculty of Actuaries** in Edinburgh followed in 1856. Victorian Great Britain provided a favorable environment for the development of professions. The idea of professional groups to protect public interest was in the air. In 1853, Great Britain started using competitive examinations for entry into the civil service. The objective in both the civil service and the private professions was to establish objective standards for entry and to improve and standardize the quality of the entrants.

The development of the actuarial profession in Canada and in the United States followed the path blazed by the Institute and Faculty. There were, however, deviations related to the adoption of elements from both the United Kingdom and from Western Continental European traditions. This development will be outlined in part because of the large size of professional organizations in Canada and the United States as well as the interesting blending of traditions. In 1889, the American Society of Actuaries was founded with members in both Canada and the United States. In 1909, the American Institute of Actuaries was organized. Its initial membership came largely from the west of the Appalachian Mountains. The motivation for the new organization was in part regional and in part a conflict over the suitability of preliminary term-valuation methods in life insurance. The Society and the American Institute merged in 1949 to form the **Society of Actuaries**. Moorhead [9] has written extensively on the history of actuarial organizations in the United States and Canada.

The third professional actuarial organization founded in the United States had different roots. The public response to the mounting human cost of industrial accidents was the enactment, by many states and provinces, of workers' compensation laws. These laws placed responsibility for on-the-job injuries on employers. These laws were enacted around 1910. The new liability of employers was managed by **workers' compensation insurance**. This insurance became, depending on the state or province, a legal or at least a practical requirement for employers. It had features of both group and social insurance, and it had different legal and social foundations from individual life insurance. In 1914, the Casualty Actuarial and Statistical Society of America was organized. It grew out of the Statistical Committee of the Workmen's Compensation Service Bureau. The first president was **Isaac Rubinov**, a pioneer in social insurance. The name of the organization was shortened to Casualty Actuarial Society in 1921.

In 1965, both the **American Academy of Actuaries (AAA)** and the **Canadian Institute of Actuaries (CIA)** were organized. The CIA was established by an Act of the Canadian Parliament. Fellowship in the CIA was soon reorganized in federal and provincial insurance and pension legislation. Chambers [10] describes the history of the CIA and its recognition in law.

The AAA had a somewhat different genesis. It was organized as a nonprofit corporation, an umbrella organization for actuaries in the United States. Its assignment was public interface, professional standards, and discipline.

The UK model influenced the organization of the actuarial profession throughout the Commonwealth. As previously indicated, the path in Western Continental Europe was somewhat different. For example, in Germany, starting as early as 1860, a group of mathematicians met regularly to discuss problems related to insurance. Bühlmann [5] summarizes some of this history.

The founding of national actuarial organizations are often associated with major political and economic events. The opening of Japan to world commerce in the nineteenth century is related to the founding of the **Institute of Actuaries of Japan** in 1899. The end of the Pacific phase of World War II helps create a foundation for the **Korean Actuarial Association** in 1963 and The **Actuarial Society of Philippines** in 1953.

The end of the Cold War, in about 1990, was a political event of cosmic importance. It also created a shock wave in the actuarial organizations of the world. New national actuarial organizations were created in response to the practical requirement for people with technical skills to organize and manage private insurance companies. Examples of Eastern European countries and the dates of organization of their new actuarial group include: Belarus (1995), Croatia (1996) (*see* **Croatian Actuarial Association**), Latvia (1997) (*see* **Latvian Actuarial Association**), Lithuania (1996), Poland (1991) (*see* **Polskie Stowarzyszenie Aktuariuszy**), Russia (1994) (*see* **Russia**), and Slovak Republic (1995) (*see* **Slovak Society of Actuaries**). Greb [11] wrote of the first 50 years of the Society of Actuaries, but on pages 258 and 259, the national actuarial organizations of the world are listed in order of their establishment.

Actuaries as Instruments of Regulation

In the last half of the twentieth century, the size, complexity, and economic importance of the financial security systems designed and managed by actuaries had grown. Many of these systems, such as insurance companies and pension plans, were regulated enterprises. The increase in size and complexity left a gap in the existing regulatory structure. It became difficult to capture in a law or regulation all of the aspects of public interest in these financial security systems.

An alternative to an even more detailed regulation, with resulting retardation in innovations, was to turn to the actuarial profession to monitor compliance with broadly stated goals. This alternative seemed to be in accordance with the professional status of actuaries. In many ways, the alternative was parallel to the assignment (in the United States and some other countries) of formulating financial reporting standards and monitoring compliance with these standards to the private accounting profession. This movement was not without problems, but it elevated the public purpose of the actuarial profession from being a slogan to being a reality.

In the following list are examples of more direct roles for actuaries in private employment in regulation. The list is not exhaustive.

- *Canada, Valuation Actuary.* An amendment to federal insurance legislation in 1977 required life insurance companies to appoint a Valuation Actuary

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who was granted a wider range of professional judgment than in the past in selecting valuation assumptions. Chambers [10] discusses this development.

- *Norway, Approved Actuary.* In 1911, a law was enacted that required that an approved actuary be designated for every life insurance company. In 1990, this requirement was extended to nonlife insurance companies. These requirements are independent of the Norwegian Actuarial Society.
- *United Kingdom, Appointed Actuary.* This concept was by a 1973 Act of Parliament. The Appointed Actuary is to continuously monitor the financial position of the assigned insurance company. Gemmell and Kaye [12] discuss aspects of the responsibilities of Appointed Actuaries. The duties and derived qualifications for Appointed Actuaries were developed largely by the two professional actuarial organizations in the United Kingdom.
- *United States, Enrolled Actuary.* The 1974 Employee Retirement Income Security Act (ERISA) created the position of Enrolled Actuary. The designation is conferred by the Joint Board for the Enrollment of Actuaries, an agency of the federal government, rather than a private actuarial organization. Enrolled Actuaries are assigned to report on the compliance of defined benefit pension plans with the funding requirement of ERISA and to certify the reasonableness of the actuarial valuation. Grubbs [13] discusses the public role of actuaries in pensions in the United States.
- *Appointed Actuary.* This position was created by the 1990 National Association of Insurance Commissioners (NAIC) amendments to the standard valuation law. The Appointed Actuary is responsible for ensuring that all benefits provided by insurance contracts have adequate reserves.
- *Illustration Actuary.* This position within each life insurance company was created by the 1995 NAIC Life Insurance Illustration Regulation. The regulation was in response to the use of life insurance sales illustrations that seemed divorced from reality. The regulation supplied discipline to life insurance sales illustration. The Illustration Actuary was assigned to keep illustrations rooted in reality. Lautzenheiser, in an interview with Hickman and Heacox [14], describes these life insurance professional actuarial roles.

These delegations of regulatory responsibilities to actuaries in private employment have created perplexing ethical issues and a need for guidance in carrying out the new duties. In many instances, national actuarial organizations have issued standards or guides for carrying out the new responsibilities.

Factors Influencing the Future

The actuarial profession has passed its sesquicentennial. It is not possible to forecast with certainty the future course of the profession. The forces that will affect that course can be identified.

- *Globalization of business.* Some cultural and political barriers may impede this trend. Nevertheless, powerful economic forces are attacking the walls that have compartmentalized business activity and they are tumbling. The actuarial profession is fortunate in having in place a mechanism for creating a worldwide profession to serve worldwide business. The first International Congress of Actuaries (ICA) was held in Brussels in 1895. Such Congresses have been held, except for war-induced cancellations, periodically since then. The 2002 ICA was held in Cancun, Mexico. These Congresses are organized by the **International Association of Actuaries (IAA)**. Originally, IAA had individual members and carried out activities to promote the actuarial profession, but the principal activity was promoting ICAs. In 1998, the IAA changed. It became an international organization of national actuarial organizations. Periodic ICAs remain a function of IAA, but providing a platform for actuaries to be a force in the new global economy also became important. The platform might permit actuaries to be represented in activities of international economic organizations such as the International Monetary Fund or the World Bank. The creation of an international standard for basic actuarial education is another project of IAA.

An excellent illustration of how the international dimension of business practice is the Statement of Principles – Insurance Contracts issued by the International Accounting Standards Board. The statement existed in draft form in 2002. The impact of associated **International Accounting Standard (IAS) 39** will be direct in the European Union in 2005. IAS 39 relates to Financial Instruments and Measurement. Insurance contracts are excluded from its scope, but its provisions do cover the accounting

treatment of the invested assets of insurance companies. The resulting waves will be felt throughout the world. It is obvious that actuaries have a professional interest in financial reporting for insurance contracts and must be organized to influence these developments. Gutterman [15] describes the international movements in financial reporting.

- *Expanding the body of knowledge.* The remarkable growth of the theory of financial economics since Markowitz's 1952 paper [16] on **portfolio theory**, and the equally rapid application of the theory to managing financial risk has had a profound impact on actuarial practice. The original developments came from outside actuarial science. As a result, actuaries had to play catch-up in incorporating these new ideas into their practices. The excitement of these new ideas also attracted a large number of bright young people into the field of financial **risk management**. These young people did not come up the actuarial ladder. Capturing and retaining intellectual leadership is the most important step in promoting the prosperity of the actuarial profession.

- *Continuing education.* The world's actuarial organizations have expended considerable energy developing an educational portal for entering the profession. Because of the rapid pace of business and technological change, an equal challenge is to develop continuing educational programs. No longer can an actuary spend a working lifetime applying skills acquired in the process of entering the profession.

- *Resolving conflicts between private and public responsibilities.* The assignment to actuaries in private employment, the responsibility of monitoring compliance with regulatory objective, is a compliment to the profession. Nevertheless, to manage, if not resolve, the inevitable conflicts in serving two masters must be faced. Standards, guidance, and disciplinary procedures, built on an ethical foundation, will be necessary if a private profession serves a regulatory purpose. The crisis in the accounting profession in the United States in 2002, as a consequence of misleading financial reporting by some major corporations, illustrates the issue. It is likely that the survival and prosperity of the actuarial profession will depend on its credibility in providing information on financial security systems to their members, managers, and regulators.

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(See also **Actuary; History of Actuarial Education; National Associations of Actuaries; Professionalism; History of Actuarial Science**)

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