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**ARAŞTIRMA MAKALESİ**

## **An Overview of Actuarial Profession in Insurance Industry: The Case of Turkey**

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### **Abstract**

Actuary is a qualified profession related with analyzing financial influence of risk for businesses via application of mathematical and statistical skills. Actuaries foresee and minimize financial uncertainty. Actuary is the professional title given to a person who employs statistical techniques and mathematical skills to assess the probability and financial consequences of an incident (event). The aim of this paper is to introduce the profession of actuary with particular reference to finance industry and –in particular- insurance industry. Literature on this profession is rather scarce, but this profession is becoming more attractive and necessary given the growing economic activity and business in Turkey as an emerging economy. Financial risks increase in line with the inclining business activity due to the fact that the spectrum of risks develops in today's business. This study covers the application of actuary in Turkey where life-insurance and private pension line of business have improved significantly since 2000 with growing asset under management and number of the insured.

**Keywords:** Actuary, Insurance, Life Insurance and Pension Industry.

**JEL Classification:** G20, G22, G52

## **Sigorta Sektöründe Aktüerya Mesleğine Genel Bir Bakış: Türkiye Örneği**

### **Öz**

Aktüerlik, matematiksel ve istatistiksel becerilerin uygulanması yoluyla işletmeler için riskin finansal etkisini analiz etmekle ilgili nitelikli bir meslektir. Aktüerler finansal belirsizliği öngörür ve en aza indirir. Aktüerya, bir olayın olasılığını ve finansal sonuçlarını değerlendirmek için istatistiksel teknikler ve matematiksel beceriler kullanan bir kişiye verilen profesyonel unvandır. Bu makalenin amacı, finans sektörü ve özellikle sigorta sektörü özelinde aktüerlik mesleğini tanıtmaktır. Bu mesleğe ilişkin literatür oldukça azdır, ancak yükselen bir ekonomi olarak Türkiye'de artan ekonomik faaliyet ve ticaret göz önüne alındığında bu meslek daha önemli ve gerekli hale gelmektedir. Günümüz iş dünyasında risk yelpazesinin gelişmesi nedeniyle, artan ticari faaliyete paralel olarak finansal riskler de artmaktadır. Bu çalışma, hayat sigortası ve bireysel emeklilik işkolunun 2000 yılından bu yana artan aktif büyüklüğü ve sigortalı sayısı ile önemli ölçüde geliştiği Türkiye'deki aktüerya uygulamasını kapsamaktadır.

**Anahtar kelimeler:** Aktüerya, Sigorta, Hayat Sigortası ve Emeklilik Sektörü

**JEL Kodları:** G20, G22, G52

## 1. Introduction

International Actuarial Association (IAA) defines the profession of actuary as follows: The profession of actuary is seen as a key function in making the correct decision in the finance sector, the field of social protection as well as risk management, and in this way it contributes to the well-being of society. What does an actuary do? This question is answered by IAA (in official website) as follows: Actuary evaluates the probability of future events; finds ways to bring down the probability of cases that are not desired; decreases the influence of undesirable incidents; assists in the analysis of risks; measures, manages, and mitigates risks; establishes premiums, policy and claim liabilities, and appropriate capital levels; assesses financial security systems; evaluates liabilities of a pension plan.

Society of Actuaries (SOA) provides a description of the profession in their official website: Risk is computed and managed by the actuaries; they have a comprehensive knowledge about mathematics, statistics and business management. Hence, they enable firms to enlarge and add value to clients. With the support of actuaries, leaders can take sound decisions and clients can prepare themselves for the upcoming days. On the other hand, Institute and Faculty of Actuaries defines the need for actuaries as follows; in the fast changing world of business, employers necessitate these professionals that have core actuarial abilities, are flexible and can add value to their work. What is ‘Actuarial Science’ is explained and answered by Corporate Finance Institute in the following way: Actuarial science is about implementing techniques (quantitative) to provide a solution for uncertainties related to the future; it is interested in fields in which there exists a probability of loss or injury.

Alternatively, Insurance Information Institute (2010) provides a simple definition for ‘actuary’: An insurance professional who is considered as talented in the analysis, evaluation and management of statistical information; he or she assesses reserves of insurance companies, settles rates and rating issues; and determines other business and financial risks as well. Actuarial science is considered to be developing career and be regarded as one of the most favored jobs in the US based on working conditions (Wilson and Walker (2020).

The Actuarial Club (TAC), regional community of India, describes the role of actuarial profession in insurance and pensions: Actuaries are professional expert in conducting issues like setting up premium prices for insurance firms, forecasting future claims and unforeseen liabilities; in general, it can be asserted that actuaries play important roles in pension industry in those specific areas: Funding, Actuarial Valuation, Investment, Individual Transfer Values, Additional Voluntary Contributions, Insured Plans, Bulk Transfers.

Those (companies) who are in need of the services of actuaries are cited by IAA as follows: Life insurance companies, banks, non-life insurance companies, and other related companies as well as customers and users of all of these. The International Actuarial Association (IAA) is the worldwide association of professional actuarial associations and it represents nearly 75,000 actuaries in more than 115 countries. The IAA was set up in 1895 and exists to promote the development of a global actuarial profession (The International Actuarial Association Annual Report, 2020). As of 31 December 2021, according to statistics by Insurance Association of Turkey, Turkish insurance market is composed of 71 companies (life and non-

life branch plus reinsurance companies) that employ a total number of 15.289 excluding direct sales personnel (7.992 female personnel plus 7.297 male personnel). Besides, the industry employs 5.635 direct sales personnel. In Turkey, as of the year 2020, consolidated balance sheet of insurance companies indicates that the industry has an approximate total asset value of TL 241.8 Million (including both non-life companies plus life and pension companies).

Asset under management of private pension system (both voluntary private pensions and auto-enrolment system) has grown remarkably despite global financial turbulence that appeared at the beginning of 2020 due to Covid-19 Pandemic. The reason behind the continuation of growth in AuM (and also number of contributors) can be attributable to the very nature of this industry in Turkey, that is, this line of business is still young when compared to other developing countries. Besides, the continuation of incentive through state contribution of 25% (that rate was increased to 30%) and favourable fund returns can be other factors that enable the pension products to be rather attractive in comparison to other investment tools as far as Turkey is concerned. Islamoglu et al. (2020) study Individual Pension System applications (namely, Private Pension System) in Turkey and G7 countries by SWOT analysis and based on the findings in the paper they argue that with the help of state contribution, private pension business in Turkey has improved considerably with respect to total AuM and number of contributors.

The motivation of the study is that literature on the link between actuarial profession and insurance market is scarce considering the leading emerging market, Turkey, where life and private pension market have grown remarkably since the year 2000 and share of foreign companies in the local insurance companies increased considerably given the sharp incline in this line of business.

To this end, the contribution of the study is that the relation between finance and the profession of actuary is reviewed for the first time with particular reference to the Turkish insurance market.

Organization of this study: Section 2 examines the previous studies related to the subject of the paper, therefore this section covers literature review. Then, the profession of actuary in Turkish Insurance Market is reviewed in Section 3. The 4th section, the last section, concludes with some general remarks.

## **2. Literature Review**

In this section, previous studies related to the profession of actuary is reviewed. After different descriptions of actuary is examined by the related associations and organizations, the link between financial economics, actuarial profession and insurance is analyzed with reference to the previous papers.

Hickman (2006) describes the history of the profession as follows: The actuarial profession commenced from life branch and private pension plans (insurance). Then, its improvement continued in line with the accounting profession. In order to secure the aims of this profession, actuarial organizations were founded on both international and national level where often rules for proper accreditation were set up. Financial and economic evolution has expanded actuary's required skills.

Life insurance is an important branch of insurance that benefits from the actuarial profession. The Actuarial, a professional magazine, handles this branch in relation to innovations and recent developments with actuarial focus and maintains that the current development of the industry is encountering problems. One of these problem is that the extensive operation in the past has caused inefficient consumption. Many clients are not familiar with the notion of insurance, and many insurance policies are issued thanks to personal relationships with clients; another issue is that degree of information transparency has improved. The industry is on the verge of the “customer sovereignty era,” and comparatively there exists less information asymmetry. This business line is transforming from an industry of product management to one of customer management. And, ultimately there exists a mismatch between supply and demand as far as ‘life insurance line of business’ is concerned.

Interactions between economics and actuarial practice is handled by Clasher (2019): One of the leading difficulties in economics turns out to be the dissimilarity between the notions of uncertainty and risk and this issue brought about a world in which financial economics supposed that all risks could be known from the universe of probability distributions.

Regarding financial economics and actuarial practice, it a very well-known fact that financial economics as a discipline is applied to the cases of actuary for many years. Day (2004) analyzes concepts from both these sciences (actuary and financial economics); and argues that many standard modes of actuarial thought are not defensible if they are analyzed via methods of financial economics. Clasher (2019) underlines that the profession is mostly related with financial economics (among all economic sub-fields). He continues to argue that however, relying too much on models (especially markets mathematically tractable) may be risky in that this makes long-term institutions short term in their outlook, in return this gives an incorrect feeling of security to companies and to decision-makers. Clarkson (1996) makes comparison (and contrasts) among the theories and techniques of financial economics generalizations and argues that as a scientific context, the modern financial economics theories are not complete; the two important areas of imperfection are the absence of a downside risk theory as well as the lack of a realistic model of human behavior under uncertainty conditions. Smith (1996:1057) examines the way actuaries can utilize financial economics and underlines that the use of financial economics in actuarial work continues to be controversial. Smith (1996:1058) maintains that despite lots of compromises and presumptions, financial economics can improve the actuaries’ studies.

In the pension actuary’s guide (2006), it is argued that actuaries should consider the fact that all over the world financial economics is discussed and has attracted attention of accountants, actuaries, stock analysts, investment bankers. As actuaries are not in need of accepting the results that many people reach if they make use of financial economic theory for pension plan management, actuaries should comprehend the ideas and viewpoint behind those results. Pension actuary needs to take into consideration the following issues: The reason for which people speak about traditional actuaries and financial economist actuaries?

In the study of ‘A Note on Financial Economics (2008), it is argued that influence of financial economic thinking upon applied actuary has been written, Nevertheless, they frequently leave practical actuaries confused regarding the application of the theory of financial economics in daily business life. The Financial Economics Task Force of the IAA Enterprise and Financial Risk Committee worked on this issue. Not surprisingly, they all focus on the issues of finding out present values for liabilities (in the future) and the consideration of equivalent values for assets. Arthur and Randall (1990) study the investment of pension and other funds, and focus on the linking assets to liabilities.

In a seminal paper, Daykin (1992) reviews the inclusion of these professionals in the audit of insurance in the United Kingdom and takes up the improvement of actuaries in state and argues that thanks to a powerful actuary, and a superior role in life insurance and in pensions, the worth of actuarial recommendation to government has long been recognized.

Since the onset of 1900, actuaries pre-date those who study financial economics, however the issues spoken by the two schools intersect to a considerable extent, financial economics introduced new terms and methods, plenty of these were developed in the framework of models of asset selection. Financial economics can be remarkably applied in fields of actuarial endeavor (Smith, 1996:1115).

Pugh (2006) addresses actuarial funding techniques and actuarial presumptions from the viewpoint of the rule-makers and considers that the fundamental is the degree to which pension legislation or the pension regulator ought to impose the utilization of a single actuarial funding method or specify the actuarial assumptions. Pugh argues that it is not easy to account for imposing a single actuarial funding method, employers in different sectors (or at different phases of their development) will have correspondingly different funding objectives.

Ellis et al. (2015) examines the function of actuarial computing and reviews for pension supervision from the viewpoint of surveyed actuarial professionals and pension supervisors, and they find that actuarial calculations and reviews play an important role in the control function, in particular during the control of defined benefit and hybrid pension funds; the paper specifies several potential difficulties that may be encountered by supervisors in regard to the conduct or role of actuarial professionals.

Regarding actuary’s life in offices, Brien et al (2016) study the roles of actuaries in UK life offices, challenges to and opportunities for these professionals. They conduct an analysis of senior roles in life offices, a questionnaire survey and interviews with relevant senior personnel and they find out that actuaries play significant roles in life offices and are considered as having good industry knowledge and technical skills, especially in financial modelling.

### **3. Actuary in Turkish Insurance Market**

After analyzing the theoretical side of this profession and literature, in this section, application side is examined with special reference to the insurance market where there is still room for growth considering the dynamic population and growing business as far as Turkey is concerned. The job description of the

actuary, who evaluates complex risks and analyzes the potential financial results of these risks, can be summarized as follows:

- To monitor risk in trading positions in order not to take high risks during trade,
- To advise on issues such as pension and benefits management,
- To create models (both mathematical and statistical),
- To work in collaboration with information technology personnel to develop systems to ensure compliance with the financial requirements of institutions,
- To engage with clients (for instance, investment manager, financial director and external stakeholders).

Actuary professionals are expected to have some qualifications. These may vary from an industry to another business sector. However, there are some features that are considered as common skills for all professionals: Having analytical skills; ability to employ information technologies for data analysis; strong verbal skills to explain complicated statistical techniques for those who have no actuarial knowledge; determining risks and strong skills to solve problems arising out of these risks.

As far as non-life (elementary) business line of insurance market, the actuary carries out the following tasks: Performing actuarial analysis; carrying out tariff studies for different insurance portfolios; conducting technical pricing studies based on the company's current practices for the related insurance branch. Besides, they are expected to work to improve database quality and portfolio segmentation, and to execute technical reserve studies.

Pertaining to financial actuary, the professionals make technical provision calculations, prepare monthly/quarterly reserve reports, support IFRS17 studies, perform plan and budget studies regarding technical provisions, prepare and develop some technical reports that are specified as the function of the actuary division. For life branch of insurance, actuary division carries out the following tasks in general (though these may vary from a life-insurance company to another):

- To back up preparation, analysis and presentation of technical reserves,
- To support the preparation of Treasury (that is, Ministry of Treasury and Finance) reports and evaluating the consequences,
- To ensure actuarial compliance as a company by closely following the legislative changes.
- To carry out profitability studies on reinsurance treaty renewals,
- To back up the IFRS 17 project.



When actuary becomes a part of pricing, then in some organizational charts of the insurance companies, actuary divisions are located under management of marketing and strategy. In this case, these actuaries are responsible from the pricing functions: To give support for pricing and profitability models and scenario analysis in the launch of new products or product revisions; to support preparation of demos for pension and life (to be employed by both customers of the firm, and business lines); to take part in profitability works and also data analysis.

#### **4. Conclusion**

Providing an insight on what an actuary does and examining the link between actuary, insurance (in particular life and pension business line) and finance is the main purpose of this study.

Throughout the paper, first of all, the actuarial profession and the term actuarial are discussed in terms of organizations and associations related to actuarial. Then, we reviewed the previous studies in connection the profession. Subsequent to the overview of this reputable profession and its connection with insurance (life and non-life branch), financial economics, the application of actuary in Turkey as an emerging economy with special reference to insurance market in the country is analyzed.

With the inclusion of the actuarial activities in Turkish Insurance market, this paper contributes to the literature. Considering all these we can conclude that the profession of actuary is getting more complicated and significant in Turkish Insurance Market in general, more specifically in non-life and life branch, which is largely attributable to the fact that insurance business is improving in the country in line with developing economy. This necessitates a sound risk assesment and professional solutions which can be ensured with only qualified actuary professionals.

Considering all these, it is highly recommended that qualified professionals in this field should be educated and trained in accordance with international developments in this process. Besides, reputable high educations institutions should open new education and research departments for ensuring quality in this profession.

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*Bu çalışmada, araştırma ve yayın etiği kurallarına uyulduğu yazarlar tarafından taahhüt edilmektedir.*

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*In this study, the rules of research and publication ethics were fully followed by authors.*