

**"GEORGE EMIL PALADE" UNIVERSITY OF MEDICINE,
PHARMACY, SCIENCES AND TECHNOLOGY FROM TARGU MUREȘ**

**DOCTORAL SCHOOL OF LETTERS, HUMANITIES AND APPLIED
SCIENCES**

FIELD: ENGINEERING AND MANAGEMENT

**MANAGEMENT OF INSURANCE CLAIMS GENERATED BY
CATASTROPHIC RISKS IN ROMANIA
DOCTORAL THESIS**

Summary

PhD Student:

Narcis Sebastian PĂVĂLAȘCU

Scientific leader:

Prof. univ. dr. habil Manuela Rozalia GABOR

General

In recent decades, there has been an exponential increase in the number of events due to various causes (Păvălașcu & Gabor, 2020). Some hold attention for a longer time - those that strike instantly and cause widespread loss and human suffering, such as earthquakes, tsunamis, hurricanes and floods. On the other hand, there are many serious geomorphological risks that have a slow onset, such as the drought in the Horn of Africa (2011), soil erosion, land degradation, desertification, glacial retreat, sea level rise, loss of biodiversity, etc. These processes and related events can cause long-term local, regional and global impacts, but generally receive less attention.

Regarding mega catastrophes, the insurance industry tracks catastrophes to monitor claims costs by allocating a number of claims to each catastrophe. Each claim resulting from the event is flagged so that total industry-wide losses can be compiled. The term catastrophe is often used in the property insurance industry narrowly to mean a catastrophic event that exceeds a dollar threshold in claim payments. This figure has changed over the years with inflation and increased development of areas subject to natural disasters.

The typical homeowner's insurance policy covers damage caused by fire, storms, hail, riots, and explosions—as well as other types of losses, such as theft and the cost of living, while the structure is repaired or rebuilt after it has been damaged. Commercial property insurance policies generally cover the same causes of loss with some variation depending on the coverages selected.

The insurance industry is divided according to the market of which it is a part. Some experts say that under the current system, the government (and therefore taxpayers) pays for reconstruction through government grants and low-interest loans, and that the funds would be better spent in an organized and predictable manner. Other insurance specialists say that there is enough reinsurance capacity worldwide to protect primary insurers against catastrophe losses, and that people who choose to live in disaster-prone areas should not be shielded from the costs of their decisions by subsidies from people who they choose to live in a less risky location. They believe the solution is for insurance regulators to develop stricter building codes and tax incentives for homeowners to prepare for hurricanes and or earthquakes

These aspects of the catastrophic events, the changes in the civil and/or corporate insurance industry as well as the doctoral student's own professional experience in the field of insurance constituted the starting point for this complex doctoral research, structured on only five of the multitude of research directions in insurance but focused on the current trend in the field of insurance and insurance claims management generated by catastrophic risks starting from the international situation and targeted specifically for Romania.

Catastrophic risk management is a crucial topic in the current context, given the increasing frequency and severity of natural and man-made disasters. In Romania, these risks are amplified by geographical diversity and economic and infrastructural vulnerabilities. This doctoral thesis explores the management of claims in insurance generated by catastrophic risks, analyzing the existing framework and proposing solutions for its improvement using in this sense both the results of the present doctoral research and the vast professional experience of the doctoral student.

Through a systematic literature review, the importance of using sophisticated risk models and coherent risk management policies is highlighted. Significant contributions in this field, including recent publications (both in scientific and professional journals), such as "the paradox of nuclear power plants (npps) between high-efficiency energy and waste management concerns in the context of disasters worldwide" and the volume "basic principles in the activity of liquidating damages", emphasizes the complexity and the need for a multidisciplinary approach in the management of catastrophic risks.

Importance of theme

Catastrophic risk management and management are especially important these days as natural and man-made disasters become more frequent and severe. In Romania, these risks are accentuated by the geographical diversity and the existing economic and infrastructural vulnerabilities.

The main purpose of this doctoral thesis is to analyze the way in which insurance manages damages caused by catastrophic risks in Romania, evaluating the current framework and proposing solutions for its improvement.

The specific objectives

The objectives of the doctoral research are:

- *O1. Identifying the risks that can create catastrophic situations at the national level in Romania.*
- *O2. Comparative study of protection solutions and practical management of situations generated by catastrophic risks adopted in various geopolitical systems.*
- *O3. Analysis of the general system of management and protection against disasters adopted by Romania and identification of the possibilities for their improvement.*
- *O4. Creation of national disaster management models for each identified risk, which take into account the best financial recovery solutions in the event of a catastrophe for Romania.*

During my doctoral research, I explored various theories and models of risk, as well as the international regulatory framework that influences national and local policies. We analyzed the paradigm changes in risk management approaches and we will present examples of good practices from other countries that could be successfully applied in Romania.

General research hypotheses

H1	<i>Romania is exposed to multiple catastrophic risks, including earthquakes, floods and landslides, which require adequate management to minimize their impact.</i>
H2	<i>Catastrophic risk management solutions adopted in other geopolitical systems can provide viable models for improving protection strategies in Romania.</i>
H3	<i>The current risk management system in Romania can be improved by integrating effective international practices and adapting them to the local context.</i>
H4	<i>Disaster management models must be customized for each type of risk, taking into account the geographic and demographic specificities of the affected regions.</i>

H5	<i>Continuous evaluation and adaptation of insurance policies to reflect the actual risks and potential costs of disasters is essential to ensure effective financial recovery.</i>
-----------	---

The content of the work

This PhD thesis explores in detail essential, defining aspects of catastrophic risk management and is structured in two large parts:

- (1) *the current state of knowledge*, structured in three chapters and
- (2) *own contribution* structured in five chapters to provide a comprehensive, exploratory, integrative perspective on the subject of claims management in catastrophic risk insurance.

The first chapter entitled "**The Evolution of Catastrophic Risk Management**" provides a systematic review of the specialized literature, highlighting the evolution of catastrophic risk management and paradigm shifts in risk management approaches. It includes an analysis of the history of risk management approaches and discusses the relevant theories and models used in the assessment and management of catastrophic risks and the impact of climate change on catastrophic risks. A centralizing table with the models identified in the specialized international literature used in the assessment and management of catastrophic risks is presented to provide a unitary, integrative picture of the available tools. The chapter concludes with the international regulatory framework.

Chapter two entitled "**Catastrophe Risk Taxonomy and Catastrophe Risk Management**" introduces the taxonomy of catastrophe risks, discussing in detail the catastrophe risk management framework and the technical process for resolving catastrophe claims. Multi-peril risk assessment, the insurer's loss adjustment process, negotiations between the parties and the unique challenges of international claims are discussed. International partnerships and cooperations (such as Oasis Hub, GAR Atlas, NATHAN, SENDAI, NatCatService, etc.) are also presented, as well as special disaster programs in developing countries, providing concrete examples of effective approaches.

The third chapter of the state of knowledge is entitled "**Nuclear energy between energy efficiency and risk management in the context of disasters around the world**" and points out the theoretical framework by going through the specialized international literature, the theoretical conceptualization related to the concepts of nuclear incidents, nuclear energy and the risk and management of radioactive waste , compensatory schemes and provisions for nuclear incidents and radioactive waste with the presentation and highlighting of the particularities of the main schemes, respectively the American and the European. This chapter contains a special focus on the case of Fukushima and the contribution of the insurance industry to nuclear risk management.

The fourth chapter, the first of the five dedicated to the doctoral student's own contribution, is entitled "**Risk management in the corporate insurance industry - the loss and incidence of catastrophic risks**" follows the classic structure of a publication, the results being published in the BDI article, respectively: introduction and theoretical conceptualization , purpose and objectives, the international evolution of the incidence of catastrophic risks - statistics and realities, particularities and applications in the corporate insurance industry of the concepts of TQM, quality control globally and in Romania, respectively the conclusions of this research.

The fifth chapter refers to "**Management of nuclear risks in the context of energy efficiency**" the results of this very extensive research being published as an ISI - Web of Science article in the journal Q2 - Processes and is structured from the introduction and theoretical conceptualization to the detailed description of the data (over 2000 statistical records from the last 120 years), to the complex statistical methodology applied in order to identify the best predictor of nuclear incidents and the risk of radioactive waste, the detailed discussion of the results of this applied research and their conclusions. In brief, this chapter presents economic models based on multilinear regression and statistical inference methods for assessing the costs of nuclear incidents, providing an insight into the challenges and solutions specific to this field.

The sixth chapter entitled "**Insurance risk management - analysis of the evolution of the number of open files and the compensated value in Romania**" is based on the qualitative analysis, using statistical and econometric methods of time series (trend and seasonality) of secondary data related to Romania during the period 2011-2022.

Chapter seven of this PhD thesis focuses on **cyber risk management**, exploring the types of cyber security attacks, from phishing and malware to web attacks and insider threats. Aspects of cyber insurance policies and cyber risk models were specified, including models applied in practice such as the RMS cyber model and Aon's CyberMetrica. This chapter highlights the importance of adapting cyber security policies in the face of emerging threats.

In the eighth chapter referring to the "**Management of natural catastrophic risks in Romania**", an analysis of natural disasters from the perspective of the insurance system in Romania is provided. The main coverages through compulsory home policies for earthquake, flood and landslides, as well as financial recovery solutions in the event of a catastrophe are discussed. This chapter highlights the importance of compulsory home insurance (CHI) in the context of natural risks.

Conclusion

Insurance and reinsurance companies face climate risks on both the liability and asset sides of their balance sheets, adversely affecting long-term profitability and solvency. For liabilities, the major risk lies in the underestimation of risk premiums due to reliance on historical data or the use of incomplete or outdated, non-updated models. On the asset side, exposure derives from the impact of physical and transition risks on investment portfolios, including infrastructure and corporate bonds. To meet these challenges, the insurance industry must adopt advanced technologies and implement risk management policies that reflect current reality and future forecasts. Close collaboration between the public and private sectors will be essential to develop effective and sustainable solutions. Thus, insurers will be able not only to provide adequate protection to their customers, but also to maintain their financial stability in the face of increasingly complex climate risks.

It is important that risk models are constantly updated to include new climate findings and trends. Insurers also need to invest in ongoing staff training and develop partnerships with experts in climatology and technology. In this way, the industry will be better prepared to anticipate and respond promptly to changes, thereby minimizing the financial and social impact of natural disasters.

The present doctoral research mainly used statistical data, historical data, secondary data for applied research but, the statistical significance of the results of the various applied methods entitles us to use these results and thus, together with the vast professional experience in the field of insurance of the doctoral student (national experience but more chosen international, for various types of catastrophes/natural disasters or not) to propose as a solution for their prevention and for the insurance industry in Romania, in particular, a study related to the Catastrophe Damage that generates **for 300,000 damages produced by an earthquake in Romania** , this being one of the doctoral student's proposals, a proposal resulting from this doctoral research. This study is detailed in this chapter, by main components of such a study. In total, this project will require the training and credentialing of **approximately 5,348 specialists** to ensure adequate disaster availability.

Implementing a professional training and accreditation program, using advanced technology, and providing psychological and client support are essential for effective damage management following a major earthquake. By adopting these measures, Romania can ensure efficient and humane damage management, thus contributing to rapid recovery and supporting the affected communities.

At this moment, as a practical project, discussions have been started and there is acceptance in principle from the *Financial Studies Institute of Romania* (Annex no. 1), for the creation of a project for the development and implementation of a specialized course intended for the training and accreditation of auditors specialists in earthquake damage assessment. In the context of the increase in seismic risk in many regions of Romania, this course is essential for ensuring accurate and rapid damage assessments, thus contributing to efficient disaster management and strengthening the insurance sector.

As well as proposal/recommendation/concrete solutions, we include here other results published by the PhD student regarding the legal aspects of the insurance industry in the case of natural and/or human disasters, respectively:

1. Book at a recognized national publishing house in which the doctoral student was the coordinator: Păvălașcu, N. S. (coordinator) (2022). **Basic principles in the insurance claims adjusting activity**. *Institute of Financial Studies in Romania*, Ed. Mustang (code CNCS 327), Bucharest, 217 pages, ISBN 978-606-652-289-2, chap. 2 (25 pages), ch. 5.2 & 5.3. (8 p), ch. 7

(20 pag.).

The chapters/subchapters authored by the doctoral student contain aspects related to:

- the general principles of claims adjusting, cap. 2 (25 pag.),
- claims adjusting in professional liability insurance, cap. 5.2 & 5.3. (8 pag.) – the manufacturer's legal civil liability insurance for damages caused by defective products
- claims adjusting for the insurance of goods during transport, cap. 7 (20 pag.).

2. International Conference: Hodoș, R.F., **Păvălașcu, N. (2020).** *Insurance Mediation and Arbitration.* Conferința ACAMA (Arbitraj & mediere) 2020
<https://www.clubantreprenor.ro/wp-content/uploads/2020/10/acama2020-1.pdf>

3. Articol BDI: Hodoș, R.F., **Păvălașcu, N. (2019).** *Some aspects of arbitration as a way of settling insurance disputes.* **Review of Financial Studies**, vol. 4, issue 6, pp. 126- 133.
https://revista.isfin.ro/wp-content/uploads/2020/08/5.9_Raul-Hodos_EN-1-art-nr6.pdf,
indexată ERIH +

4. International Conference: **Păvălașcu, N. (2019).** **ACAMA - the feasible alternative for improving customer relations**, Conferința Europeană a Serviciilor Financiare (ECFS 2019), held by *Institutul de Studii Financiare din România*, 21-22 martie 2019,
<https://www.isf.ro/ro/conferinta-europeana-serviciilor-financiare-ecfs-2019>

5. articol neindexat (în presa de specialitate)¹: **Păvălașcu, N. (2018).** *What is the role of a loss adjuster in the case of insurance claims?*,