2022 REPORT
PROIECT CODE PN-III-P1-1.1-TE-2019-0554

ABSTRACT

Objectives presented in the research proposal for the **year 2022:**

I. Identifying the main drivers of crop insurances *(continued from 2021)*

Activity 3.1. Modelling the influence of specific factors over the development of crop insurances using the econometrics of qualitative variables

II. Structural analysis of the national insurance markets in emerging and developed countries from Europe

Activity 3.2. Defining and explaining the Insurance Structural Indexes (life/ non-life, insurance market/ capital market, insurance market / credit market)

Activity 3.3. Determining the Insurance Structural Indexes for European emerging and developed countries and the analysis of the spatial distribution

Activity 3.4. Using the Insurance Structural Indexes in regressions with spatial interactions for explaining the differences between the emerging and developed countries in Europe. Comparative analysis of the Insurance Structural Indexes at regional level and identifying possible contagion effects for financial behaviours.

III. Disemination of the results obtained in the academic field *(continued from 2020 and 2021)*

Activity 3.5. Formulating recommendations based on the conclusions of the empirical studies, monitoring, elaborating papers. Disemination of the results in the academic and professional environment.

A. Presenting a paper at the European Conference of Financiar Services – ECFS 2022, organized by the Institute of Financial Studies (ISF), Bucharest – online and onsite, 24 of March 2022.

B. Presenting a paper at the International Scientific Conference "Technology, Innovation and Stability: New Directions in Finance (TINFIN)", Online – Zagreb, 5th -6th of May, 2022.

C. Presenting paper at ICMEA 2022 Conference, Alba Iulia – online and onsite, 19th -20th of May 2022.

D. Presenting a paper at The 7th Business & Entrepreneurial Economics Conference – University of Zagreb, 3rd –5th of June 2022.

E. Presenting a paper at the Annual Scientific Conference of Romanian Economists from Abroad ERMAS 2022- 8th Edition, Faculty of Economic Sciences and Business Administration, „Babes-Bolyai" University of Cluj- Napoca, 27th -29th of July, 2022.

F. Publication of a paper in the WOS indexed journal, *European Journal of Health Economics*, quartila Q1 after IF (red zone), quartila Q2 after IF (yellow zone).

G. Submitting an article at the WOS indexed journal, *Empirical Economics*, quartila Q2 after IF (yellow zone) – status: Revise and Resubmit (1).

H. Reviews for the WOS indexed journal, *Economic modelling*, quartila Q1 after IF (red zone) – status: Revise and Resubmit (3).

I. Review for the WOS indexed journal, *Economic research*, quartila Q2 after IF (yellow zone) – status: Revise and Resubmit (2).

J. Submitting an article at the BDI indexed journal, *Revista de Studii si Cercetari Economice Virgil Madgearu* - status: Accepted.

L. Presenting a paper at Finance Com 2022, International Workshop, 11th Edition, University of Twente, Holland, 23rd -24th of August 2022.

M. Submitting an article in the WOS indexed journal *Socio-Economic Planning Sciences,* quartila Q2 after AIS (yellow zone).

TECHNICAL AND SCIENTIFIC DESCRIPTION
I) Research issues
Objective I (2022). *Activity 3.1.* **Modelling the influence of specific factors over the development of crop insurances using the econometrics of qualitative variables.**

In the year 2022, in the paper WHAT LEADS ROMANIAN FARMERS TO TAKE OUT CROP INSURANCE: A DISCRETE CHOICE MODEL APPROACH, we developed a methodology adequated for the database colected in the previous year, with the following scope: (1) analysing the farmer's behaviour to subscribe or not a crop insurance policy, (2) identifying the factors influencing the decision to chose a standard policy over an extended one.

The estimations were perfoemed in Stata 14, by applying the binary and multinomial logit, defining a distinct dependent variable. In the first model we defined a binary variable which is 0 if the farmer doesn't have crop insurance (58,7%) and 1 if the farmer has any type of crop insurance (41,3%).

In the multinomial logit model the dependent variable has three states: 1 if the farmer doesn't have crop insurance (58,7%), 2 if the farmer has a standard policy (26,8%) and 3 if the farmer has an extended policy (14,5%).

The explanatory variables were conceived to offer informations with a relevant impact over the buying decision. Thus, we considered several categories of predictors: farm characteristics, previous calamities, farmer's perception over insurance, risk perception and risk attitude, knowledge regarding the crop insurances and the socio-demographic factors.

Our results show that the farmers which mainly cultivate vegetables are more prone to conclude insurances, compared to other types of cultures. Even if those cultures are more risk vulnerable, the vegetables producers are interested only to cover the basic risks, without extended policies. Also, farmers with bigger farms and a higher cultivated surface, have a higher probability to insure against calamities, because their risk exposure is greater. Instead, neither the cultivated surface seems to be an incentive for chosing a certain type of policy (basic versus extended). The main explanation is the cost diference, income doesn't explain the decision to insure, but influences the type of policy.

Concerning the risk perception, the level of trust in insurances and the fear to lose the farm activity exert a positive impact over the decision to insure, but is not significant for the type of insurance. On the contrary, the perception regarding the value of the premium related to the covered risk negatively influences the type of policy. The higher the premiums are perceived, the less likely they are to take out the extended policy. This important result shows that farmers are perceiving the more expensive extended policies as unfounded.

Moreover, the perception of the financiar risk positively influences the decision to insure and the type of policy chosen. The higher the perceived risk, the higher the probability of taking out extended insurance. However, the farmer's willingness to take financial risks only explains the decision to insure.

A novel element on the agricultural insurance market is the knowledge index in this field. Our results show that the level of education is sufficient only to decide the subscription of a crop insurance. In order to chose between the insurance policies the client must have superior knowledge in insurance.

Objective II (2022). *Activitatea 3.2.* **Defining and explaining the** Insurance Structural Indexes (life/ non-life, insurance market/ capital market, insurance market / credit market)

The role of life insurances and the consumer's attitude regarding those products comes from the studies of Yaari (1964) and Yaari (1965). The optimality of protecting of a person, family, or household

against random risks through insurance policies is considered, both theoretically and empirically. However, economic optimality is not always preferred by the subjective consumer. For example, Lewis (1989) shows that the individual's trade-off between consumption, investment, and saving is decisively influenced by economic indicators (salary, income, etc.), socio-demographic indicators (age, gender, urban or rural environment, family structure) and indicators of human potential (general, fundamental, or professional education).

An increasingly important factor in the development of insurance, credit and stock market is the financial education of the population. This determinant is more and more relevant due to the increasing complexity of financial instruments (Makenzie, 2006). Most of these instruments involve contracts with complex legal terms, which are largely avoided by people with limited financial education. Of course, besides financial literacy, general education can also be a driver of financial products demand, used mainly in macroeconomic studies (Hammond et al., 1967; Schlesinger, 1981; Gandolfi and Miners, 1996).

The analysis of the drivers of the capital and credit market development is more classic. Studies on individual behaviour are not as present as in the case of life or non-life insurance. The approaches are macroeconomic and the factors mentioned the most frequently are economic development, income distribution, cultural values, and financial or general education. Niblock et al. (2014) investigate the biunivocal causalities between economic development and the characteristics of stock exchanges in Southeastern Asian countries. The authors point out that there are massive political incentives for the development of national stock exchanges in those states.

The credit market has been studied mainly in correlation with income inequality, both as a theoretical mechanism, in the Schumpeterian view Messori (2014), and empirically, using panel data econometrics Hoi and Hoi (2016). A more complex approach is that of dos Santos (2014) highlighting the relationship between credit allocation and income distribution in a broader context of the capital circuit in the economy. Effects of population earning structures have also been highlighted in European countries (Baiardi and Morana, 2018; Destek et al., 2020).

The literature is abundant in investigating the determinants of the development of life and non-life insurance, capital and credit markets. However, there is a lack of emphasis on the structural relationships of these components and mostly which are the factors explaining these structures. The motivation of our study is to fill this gap, so we define three structural indicators of insurance. The first is an indicator of internal structure, respectively, the share of life insurance in the total insurance market. The other two structural indicators develop the relations of insurance with the capital market and the credit market.

Objective II (2022). *Activity 3.3.* **Determining the Structural Indexes of Insurance for developed and emerging European countries and the analysis of the spatial distribution.**

Our study has the following two main objectives: to highlight the causal relationships between the structural indexes of insurance and the main economic, institutional, and cultural determinants and to identify some possible behavioural patterns of the structural insurance indexes and emphasising their geographical distribution through hierarchichal clusterization, for European countries.

The dependent variables, measured as structural insurance indexes, are our own constructs, using data from international sources. The economic, institutional and cultural determinants are directly taken from those sources, the logarithm being applied if necessary. We determined the following indexes:

- **LIN** (Life Insurance Index). The percentage of life insurance premiums in the total premiums for all insurance types.

- **ISMI** (Insurance/Stock Market Index). Defined as the ratio between TOTAL_INSUR and MARKET_CAP (the values are multiplied by 100).

- **ICMI** (Insurance/Credit Market Index). Defined as the ratio between TOTAL_INSUR and CREDIT_MARKET (the values are multiplied by 100).

For analyzing the spatial distribution we graphically visualized the ***distribution of the indexes LIN, ISMI and ICMI.*** The second step was to use the hierarchical clusterisation which groups all the countries from the sample according to the three indexes of insurance structure and their determinants. For example, the distribution of the ICMI indicator is more consistent in terms of the geographical grouping of countries. Overall, much of the last quartile interval is occupied by Eastern European countries.
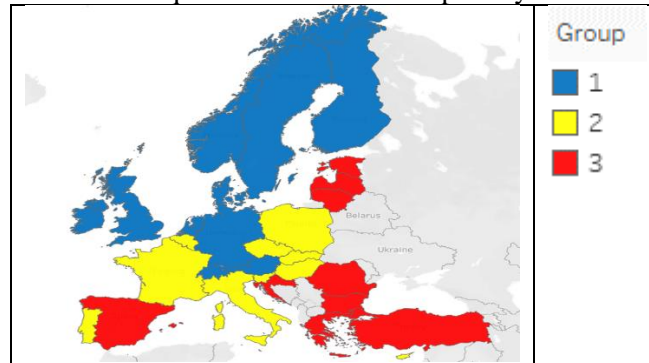
We can notice from the beginning that there is no strict hierarchy of the three groups obtained. The third group (the red one) has the lowest values of the three insurance structure indices. Group 1 (blue) dominates the ranking for LIN and ICMI, but the second group (yellow) leads for ISMI.

Objective II (2022). *Activity 3.4.* **Using the Structural Indexes in regressions with spatial interactions for explaining the diferences between the emerging and developed countries from Europe.**

Available data impose the use of panel-data regressions. The observations include 31 European countries, within the period 2004-2019.

The explanatory variables have different significance on the three indices of the insurance structure. *Economic development*, estimated by lnGDPCAP, has *no effect on LIN*. Although the cited literature highlights the effect of wealth on the growth of insurance markets, it acts similarly on the life and non-life insurance segment, respectively. Instead, *we notice the positive effect on ISMI*. This result is explained by the desire and ability to focus more on the quality of life of the population of more developed countries. In societies exceeding a certain level of development, citizens have the necessary resources to prioritize quality of life, reduced working hours, and ensuring sustainable financial and future health. Income inequality has no significant effects on any of the three structural indices of insurance. *Institutional quality has positive* effects on *LIN* and negative effects on ISMI. *Cultural factors differently influence LIN and ICMI*, but are not significant for ISMI.

The main contribution of our study is the identification of some determinants of the internal structure of the insurance market (life / total insurance) and of the relations between insurance and the credit and the capital market. We have identified several economic, institutional, and cultural factors with significant influence on the financial structure. Moreover, we have shown the differentiated effect of some factors over the structural indices. For example, economic development encourages insurance in relation to the capital market, but rather discourages it in relation to lending. The same type of results applies to cultural values. Also, our results based on hierarchical clustering show significant territorial groupings of countries' behaviours in relation to the mechanisms of interaction between the insurance structure and the identified determinants.
II) Disemination of the results – obiective III.

A. Presenting the article FACTORS ASSOCIATED WITH THE PURCHASE OF CROP INSURANCE IN ROMANIA, Authors: Dragoş Simona Laura, Dragoş Cristian Mihai, Mureşan Gabriela Mihaela, Mare Codruţa, Purcel Alexandra Anca, at the European Conference of Financial Services – ECFS 2022, organized by **Institute of Financial Studies (ISF),** Bucharest, 24 of March 2022,

https://www.isf.ro/sites/default/files/inline-files/BOOK%20OF%20ABSTRACTS%204.pdf – *Objective I* and *III*

B. Presenting the article MACHINE LEARNING TECHNIQUES FOR PREDICTING ROMANIAN FARMER'S PURCHASE OF CROP INSURANCE, Authors: Manate Daniela, Mare Codruţa, Dragoş Simona Laura, Dragos Cristian Mihai, Mureşan Gabriela Mihaela, Purcel Alexandra Anca, at the International Scientific Conference "Technology, Innovation and Stability: New Directions in Finance (TINFIN)", Online –Zagreb , 5-6 of May, 2022, https://drive.google.com/file/d/1veGAilPfeFOV-YqOy7W1kxkHxe28YzLe/view – *Objective I and III*

C. Presenting the article MACROECONOMIC DETERMINANTS OF THE RELATIVE DEVELOPMENT OF THE INSURANCE MARKET IN RELATION TO THE CREDIT MARKET AND THE STOCK MARKET IN EUROPE, Authors: Dragoş Simona Laura, Dragoş Cristian Mihai, Mureşan Gabriela Mihaela, Mare Codruţa, Purcel Alexandra Anca, la ICMEA, Online – Universitatea 1 Decembrie Alba Iulia, 19-20 of May 2022, http://dime.uab.ro/sites/icmea2020/wp-content/uploads/sites/12/2022/05/Agenda-conferinta-ICMEA-update-sigle-17.05.2022-.pdf – *Objective II and III*

D. Presenting the article DETERMINANTS OF CROP INSURANCE IN ROMANIA, Authors: Mare Codruţa, Purcel Alexandra Anca, Mureşan Gabriela Mihaela, Dragoş Cristian Mihai, Dragoş Simona Laura, at The 7th Business & Entrepreneurial Economics Conference – University of Zagreb, 3rd –5th of June 2022 – *Objective I and III*

E. Presenting the article VOLUNTARY HEALTH INSURANCE AND OUT-OF-POCKET PAYMENTS IN EUROPEAN OECD COUNTRIES, Authors: Purcel Alexandra Anca, Dragoş Cristian Mihai, Mare Codruţa, Dragoş Simona Laura, at the Scientific Conference of Romanian Economists from Abroad ERMAS 2022- 8th edition, Faculty of Economics and Business Administration, „Babes Bolyai" University from Cluj-Napoca, 27-29 of July, 2022, https://econ.ubbcluj.ro/ermas2022/20220720_ERMAS%202022%20Program%20EN%20Structure%20Detailed%20Draft.pdf – *Objective III*

F. Publishing the article DOES VOLUNTARY HEALTH INSURANCE IMPROVE HEALTH AND LONGEVITY? EVIDENCE FROM EUROPEAN OECD COUNTRIES, Authors: Dragoş Simona Laura, Mare Codruţa**,** Dragoş Cristian Mihai**,** Mureşan Gabriela Mihaela**,** Purcel Alexandra Anca, in the WOS indexed journal **European Journal of Health Economics**, quartile Q1- IF (red zone), Q2 - AIS (yellow zone), https://link.springer.com/article/10.1007/s10198-022-01439-9 *- Objective III*

G. Submitting the article SPATIAL PROCESSES IN THE EUROPEAN MOTOR INSURANCE, Authors**:** Mare Codruţa, Dragoş Simona Laura, Mureşan Gabriela Mihaela, in the WOS indexed journal **Empirical Economics** - status: Revise and Resubmit - *Objective III*

J. Submitting the article ECONOMIC, INSTITUTIONAL, AND CULTURAL FACTORS FAVOURING THE INSURANCE MARKET VERSUS THE CREDIT AND STOCK MARKET, Authors: Dragoş Cristian Mihai, Dragoş Simona Laura, Mare Codruţa, Mureşan Gabriela Mihaela, Purcel Alexandra Anca, at the BDI indexed journal, *Revista de Studii si Cercetari Economice Virgil Madgearu* - status: Accepted, *Objective II and III.*

K. Updating the web site of the project: http://insurstruct.granturi.ubbcluj.ro containing general informations about the project, the proposed objectives, and the results obtained within the period September 2020 – August 2022. Drawing the final report of the project. *- Objective III*

L. Presenting the article MACHINE LEARNING ALGORITHMS TO PREDICT CROP INSURANCE PURCHASE – CASE STUDY ON ROMANIAN FARMERS, Authors: Manate Daniela, Mare Codruța, Dragoș Simona Laura, Dragos Cristian Mihai, Mureşan Gabriela Mihaela, Purcel Alexandra Anca, at Finance Com 2022, International Workshop, 11th edition , University of Twente, Olanda, 23-24rd of August 2022, https://www.financecom2022.nl/schedule/, - *Objective I and III*.

M. Submitting the article WHAT LEADS ROMANIAN FARMERS TO TAKE OUT CROP INSURANCE: A DISCRETE CHOICE MODEL APPROACH, Authors: Dragos Cristian Mihai, Dragoş Simona Laura, Mare Codruța, Mureşan Gabriela Mihaela, Purcel Alexandra Anca, at the WOS indexed journal **Socio-Economic Planning Sciences**, quartile Q1 - IF (red zone) – *Objective I and III*.

Conclusions

For the third stage of the project reporting, all the assumed objectives were realized integrally, the budgetary expenses being made in a justified manner

The project management was ensured by the project director who also took care of the preparation of the monthly financial-accounting supporting documents and their upload on the platform, as well as the preparation of the scientific and technical report.

Project director,
Professor PhD. Simona Laura DRAGOS