



A FINancial supervision and TECHnology compliance training programme



Finanssiteknologiahankkeen loppuseminaari

Lasse Koskinen

professori, vakuutustiede (kauppatieteet)

Johtamisen ja talouden tiedekunta

Tampereen yliopisto

19.5.2021

Vakuutustiede – Vakuutuksen ja riskienhallinnan opintosuunta. Noin 20 kandia ja maisteria vuodessa

Journal of Risk and Insurance: (1) **industrial organization of insurance markets;** (2) **management of risks in the private and public sectors;** (3) insurance finance, financial pricing, financial management; (4) **economics of employee benefits, pension plans, and social insurance;** (5) utility theory, demand for insurance, moral hazard, and adverse selection; (6) **insurance regulation;** (7) actuarial and statistical methodology; and (8) economics of insurance institutions.

Current topics: Health Insurance, Behavioral Research in Risk and Insurance; Quantitative Risk Management, **Big-Data Techniques, Digitalization, and Insure-Tech**

Lisäksi monia **Suomispesifejä** asioita kuten lainsäädäntö.

Motivation

- There is a need to improve the **competitiveness of the fintech sector**
- A framework that can help both fintechs and supervisors:
 - Fintech firms need advice on how to identify opportunities for innovation procurements, for example in advanced **regulatory technology (RegTech)** solutions;
 - The supervisory bodies' ability to monitor innovative financial products proposed by fintechs is limited, and advanced **supervisory technology (SupTech)** solutions are required.
- A crucial step in transforming compliance and supervision is to develop **uniform and technology-driven risk management tools**
- A framework that can help both fintechs and supervisors

Consortium

- **Fintechs and fintech hubs**, who have detailed understanding of business models based on financial technologies;
- **Regulators and supervisors**, who have detailed understanding of the regulations and risks that concern financial technologies;
- **Universities and research centers**, which have detailed understanding of the risk management models that can be applied to financial technologies.
 - Coordinator: University of Pavia; Prof. Paolo Giudici
 - Humbolt University, Berlin: Professor Wolfgang Härdle
 - City College, London: Professor Thomaso Aste

FINTECH HO2020

- **Workshops**, where research and developments in fintech risk management are discussed. Each workshop is built using previous research. 1) **Big Data Analysis**; 2) **AI, Market Risk, and Robot advisory**, 3) **Blockchain and Crypto Currencies**
- **Training sessions for 29 supervisors**. Each session uses **common slides** plus local material. Common Case studies – material based on **open code + open data + theory**
- **Codin sessions** carried out at centralized European level
- **Validation session** by a group of European banks etc

Project <https://fintech-ho2020.eu/about/>

- Events

- 60 + SupTech Events; 12 + International Events
- 10+ expert advisors; 1700+ Event attendees

- Tampere organized

- 6 day on-site training in Stockholm and Helsinki (2019)
- 3 half-day off-site session in 2021
- Training group
 - Insurance Science: Arto Luoma, Antti Talonen, Jarna Pasanen, Timo Rintamäki, Mikko Riikkinen
 - Other:
 - Juho Kannianen, prof. Financial Engineering
 - Tapio Nummi, research director, Statistics
 - Heikki Huttunen, professor, AI

International research

Materials:

- https://github.com/danpele/FINTECH_HO_2020/tree/main/3.%20Use%20Cases
 - Some Use Cases
- <https://fintech-ho2020.eu/podcast/> Podcasts
- Related journal: *Frontiers in Artificial Intelligence*

Results:

- *Network information => Models; Measures and Graphics*
- *Substance information => Finance & BDA & AI & Blockchain*
- *Importance of proper statistical modelling*

EXAMPLES

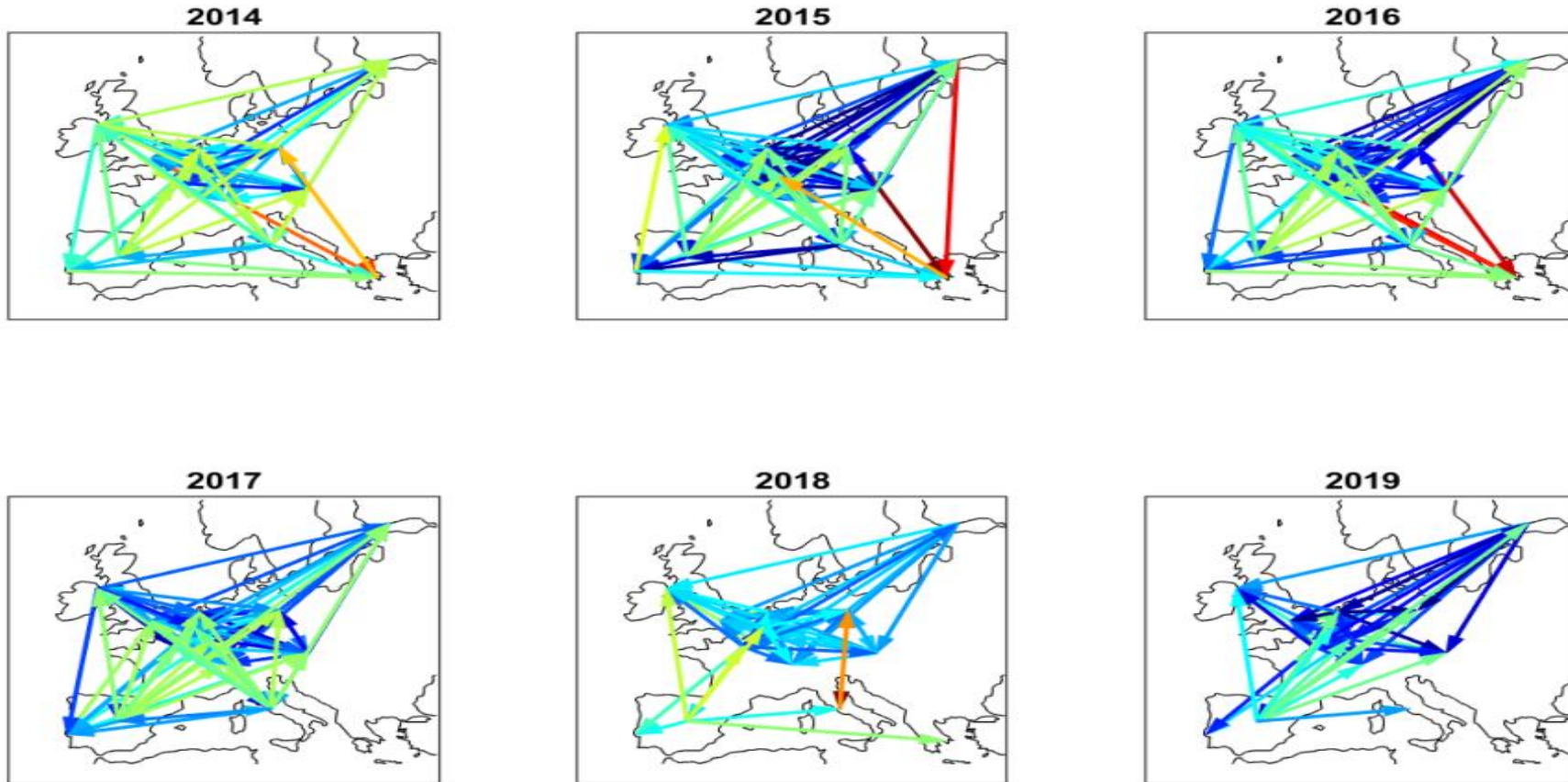
Use Case X: **A Statistical Classification of Cryptocurrencies**

- This use case provides insights for the separation of cryptocurrencies from other assets. The main result is the complete separation of cryptocurrencies from the other asset types, using the Maximum Variance Components Split method. Additionally, we show that cryptocurrencies tend to exhibit similar characteristics over time and become more distinguished from other asset classes. **Humboldt Universität zu Berlin, Bucharest University of Economic Studies and University of Cyprus**

Use C. Y: **Cyber risk management with rank-based models and explainable AI**

- In a world that is increasingly connected on-line, cyber risks become critical. However, to date, there are no risk models for ordinal cyber data. We fill the gap, proposing a rank-based statistical model aimed at predicting the severity levels of cyber risks. The application of our approach to a real-world case shows that the proposed models are, while statistically sound, simple to implement and interpret. **University of Pavia**

Example. European bond yields correlation



Finnish results and influence

- Training sessions. Critical topics
 - Blurring concepts: What is financial contract?
 - Chains of legal contracts and their risks
 - Similarities: Internal model ~ Fintech system => helps supervisors
- Research
 - RiskDemo - R-package (Insurance Science/Arto Luoma)
 - <https://CRAN.R-project.org/package=RcmdrPlugin.RiskDemo>
 - Insurance related risks demonstration software (Demography; Investments; Risk Theory);
 - Corona Model Included
 - Janne Salonen (et al.): <https://www.etk.fi/en/yhteystieto/janne-salonen/>
 - How to use statistical methods in pension model (and its simulation results) evaluation and validation
 - Mikko Riikkinen (et al.): Fintech Phenomena
 - Antti Talonen (et al.): Incentive based insurance

General level challenges

Reliability and Interpretation?

- Deep Neural Networks
- Complex Models (many faces: dimensions, parameters, structure, etc,)

Accuracy of predictions?

- Accuracy description of data does not mean accurate prediction
- Often statistical (probabilistic) model needed

Good regulation?

- Consumer protection <> Innovative products <> Fair playing field > Cost of Regulation
- How to regulate Cryptocurrencies?
- Inter-disciplinary expertise need
 - IT; Law; Statistics; Economics; Management Science; Behavioral Science etc.

Thank you!

- Financial Supervisors in Helsinki and Stockholm
- Training Team and researchers!
- Special thanks to Antti Talonen (involment in the begining)
- Adminstrative staff
- EU consortium and partners



- This project has received funding from the European Union's Horizon 2020 research and Innovation programme under grant agreement No 825215.
- The content reflects only the author's view and that the Commission is not responsible for any use that may be made of the information it contains.