EU Supervisory
Digital Finance
Academy

Advanced courses for the Academic Cycle 2023-2024

Residential Training Weeks

Cyber Risk

Type of course: Residential

Duration: 3 days and half

Date: 29 January-1 February 2024

Cyber risk is a phenomenon characterised by multiple dimensions: in terms of scope, cyber risk concerns both financial entities as well as other types of entities; in terms of outreach, cyber risk has a global, EU, and national dimension, with continuous interlinkages between these levels due to the evolution of the cyber threat landscape and regulatory framework.

This course deals with cyber risk management, exploring different approaches and focusing on supervisory strategies to assess and mitigate cyber risk. In contrast to a number of EU-SDFA online modules which are specifically dedicated to the analysis of the DORA Regulation, this advanced residential training week exposes participants to the general principles for the management of cyber risks and underlying relevant regulations. However, and where appropriate, the course will include references to relevant concepts and principles enshrined in the DORA framework.

List of key topics

- Cyber threat landscape and outlook
- Developing and implementing a cyber resilience strategy for the financial sector
- ICT risk management
- ICT-related incident management, classification, and reporting
- Cyber testing
- Managing risks related to the use of third-party providers
- How to design public-private partnerships and building trust: information sharing
- Systemic cyber incidents and what approaches can be taken to address systemic risk
- Looking to the future, is innovative technology increasing cyber risk or decreasing it?

Learning outcomes

- Understand sources of cyber risk
- Understand ICT risk management principles
- Understand frameworks for cyber testing
- Compare different approaches to cyber resilience
- Identify, within different approaches, main principles for the management of ICT risks and ICT-related incidents
- Analyse and critically assess different approaches and rules on cyber risk management.

Important notice:
This advanced week has a regulatory focus, i.e., it does not cover cyber risk from an advanced technical perspective.

Pre-requisites:

- Essential: Adequate experience in financial sector regulation and supervision
- Recommended: Prior exposure to cyber risk would be an asset

SupTech I

Type of course: Residential

Duration: 3 days and half

Date: 19 – 22 February 2024

This course aims to provide an overview and understanding of common Machine Learning (ML) techniques, to understand the opportunities and limitations of these techniques and to be able to interact with the experts from ESAs, academia, and industry. Participants will work hands-on with ML/AI methods in Python and demystify the black boxes to continue learning by themselves.

The training week is structured to encompass a series of lectures and complementary tutorials focused on ML/AI techniques, ensuring that participants not only grasp the theoretical foundations of ML/AI techniques but also acquire practical skills through guided tutorials. Links to key regulatory frameworks are made in this course. This part of the training will delve into the implications of these advancements within the context of the financial industry and supervisory practices. This training week is designed for participants who already have some exposure to coding and are looking to enhance their practical knowledge of ML/AI techniques.

List of key topics

- Introduction to statistics for AI and ML
- Predictive models and linear regression
- Classification models and logistic regression
- Feature selection and regularization
- Tree models
- Unsupervised learning and clustering
- Finding clusters and neighbors
- Natural Language Processing (NLP)
- Python applications of the theoretical sessions
- High-level overview of related regulations: new EU rules on AI - proposal for a regulation on AI : regulatory and supervisor implications for the financial sector, including requirements on explainability
- NCAs use case of SupTech applications
- Supervisory dialogue with the industry on future market developments: Buy vs. Build SupTech solutions

Learning outcomes

- Understand and describe the most common machine learning techniques and models
- Understand differences between supervised and unsupervised models
- Understand and describe basic NLP applications
- Describe examples of applications relevant to supervisors
- Implement applications based on models in the scope of this training
- Evaluate the implemented ML models
- Identify the potential implications of the EU proposal for a regulation on AI for financial markets

Pre-requisites:

- Essential: Quantitative background - Economics, Finance or Computer Science or equivalent degree
- Essential: Prior coding experience, preferably with Python
- Recommended: Previous exposure to the design and/or use of SupTech application

Data-driven Business Models & Data Sharing in Finance

Type of course: Residential

Duration: 3 days and half

Date: 18 – 21 March 2024

The course will start with a focus on digital transformation and platform integration within the financial services sector. In-depth lectures will explore the emerging data-driven business models of FinTechs, BigTechs, and traditional financial intermediaries, assessing their alignment with existing regulatory structures and addressing issues related to customer protection.

The second segment of the course will focus on the regulatory landscape and the evolving industry demands in the realm of Open Finance. While PSD2 has set the stage for Open Banking by outlining payment data-sharing guidelines, the Commission has recently proposed a new framework for Financial Data Access which sets out clear rights and obligations to manage customer data sharing beyond payment accounts. Moreover, there is still a need for implementing a unified API standard and data-sharing protocols to fully unlock the potential of embedded finance. The course will navigate the technical complexities of Open Finance implementation across all financial sectors, addressing aspects such as data standardization, cross-border integrability, digital identity, and the role of non-financial data, considering the recent regulatory initiatives proposed at EU level.

List of key topics

- Data-driven business models
- Economics of Data Sharing: Incentives and Market Failures
- Customer protection and digitalisation
- The design of future Open Finance: Open Insurance, Open Banking and beyond - a cross sectoral overview
- The key technical challenges:
  - API and data standardisation and Cross border interoperability
  - The use of non-financial data
- Data and regulations
- The role of digital identity in Open Finance and the potential of the new EU digital identity

Learning outcomes

- Understand and analyse data-driven Business Models
- Recognise consumer protection issues related to the use of data and digital channels to provide financial services.
- Understand the operating principle of API technology
- Understand the technical aspects of data sharing implementation (Data standardisation, Cross border interoperability and digital identity)
- Understand the main scope and objectives of the regulatory proposals related to open finance and data sharing

Pre-requisites:

- Essential: Adequate experience in financial regulation and supervision
- Recommended: Prior exposure to API technology and/or data sharing policy

DLT/MiCAR

Type of course: Residential

Duration: 3 days and half

Date: 27-30 May 2024

This course will introduce participants to the blockchain technology, with a focus on its implications and relevance for the MiCAR framework. The course will analyse the specific regulatory aspects of MiCAR and the new supervisory tasks and challenges these requirements mean for NCAs. Staff from supervisory authorities already involved in supervision of crypto-asset providers in the context of existing national rules will share their experience.

This training week is tailored for participants possessing a foundational understanding or expertise in MiCAR, aiming to deepen their comprehension of blockchain technology and explore the implications of MiCAR in the supervision of this technology.

List of key topics

- Introduction: DLT and Blockchain
- Underlying technologies
- The Ethereum ecosystem
- Application on Ethereum blockchain
- Types of crypto-assets
- Overview of requirements for CASPs and issuers
- Business models and operations of CASPs and issuers
- Internal governance and risk management challenges for crypto-asset businesses
- Case studies
  - White papers
  - Authorisation and licensing challenges
- Supervisory challenges with respect to AML aspects
- Market monitoring overview

Learning outcomes

- Basic knowledge on the DLT technology
- Knowledge on some of the supervisory tasks and challenges brought by the new MiCAR rules.

Pre-requisites:

- Essential: Expertise on and/or previous general exposure to MiCAR, also through the participation to previous EU-SDFA Foundational Training Weeks and/or EU-SDFA Advanced Online Modules on MiCAR
- Recommended: Current or future involvement in regulatory and supervisory tasks related to the implementation of MiCA

DLT in the Financial Sector

Type of course: Residential

Duration: 3 days and half

Date: 3-6 June 2024

The aim of this Advanced Course is to provide a comprehensive understanding of blockchain and Distributed Ledger Technology (DLT), from theoretical foundations to practical applications, with a particular focus on Metamask and cryptocurrency wallets used to interact with the Ethereum blockchain. The DLT in the Financial Sector course introduces the fundamental concepts of blockchain technology and delves into the economic incentives driving its adoption. It covers essential technological aspects and examines the practical applications of blockchain through smart contracts. Participants will gain exposure to prominent use cases of DLT and blockchain, including cryptocurrencies, financial applications within Decentralized Finance (DeFi), and decentralized applications (dApps) in a broader context.

The course also includes an exploration of real-world case studies and industry perspectives, while addressing ongoing and future trends in the DLT field and the associated policy considerations. This training week is tailored for participants who possess a foundational understanding of blockchain and are seeking to acquire theoretical and practical knowledge in this technology

List of key topics

Lectures

- Blockchain and DLT basics
- Underlying technologies
- Intro to Ethereum
- DLT-based crypto-assets
- DLT – A view from Practitioners
- Intro to Decentralized Finance (DeFI) and examples of DeFI Applications
- Tokenization

Applied Sessions

- Etherum
- Case Studies
- Using Protocols on the Ethereum Blockchain
- Programming a Smart Contract on the Ethereum Blockchain

Learning outcomes

- Comprehend the development and core concepts behind blockchain and DLT, the principles of distributed systems and the motives for their applications.
- Learn basic cryptography, consensus mechanisms (e.g., proof of work, proof of stake), and their roles in DLT. Understanding the technical features of Ethereum, such as block time, block size, smart contracts, and decentralized applications (dApps).
- Gain practical experience in using tools and interpreting information on the Ethereum blockchain using Metamask. Developing introductory skills in creating, deploying, and monitoring smart contracts on the Ethereum platform.
- Explore and analyse various case studies of DLT applications in finance. Understanding the implications and potential of DLT in real-world scenarios, such as digital identity, property registry, decentralized exchanges, and more.

Pre-requisites:

- Essential: A bachelor's degree or higher in economics, finance, mathematics, engineering, or a similar discipline.
- Essential: Introductory knowledge of Blockchain and/or DeFi, including through the participation to one of the EU -SDFA Foundational Training Weeks.

SupTech II

Type of course: Residential

Duration: 3 days and half

Date: 10-13 June 2024

This course takes an Agile sprint approach where teams from participating NCAs encompassing different areas of competence come together to work on specific issues and technical solutions (e.g., IT, Business/Law Unit and SupTech division, in line with the NCAs organizational structure). Participants work intensively in cross-functional teams to create innovative solutions, often focusing on problem-solving and/or prototyping. Before the prototype phase, the course will cover advanced theoretical lectures and presentations on use cases in other SupTech projects. The goal is to encourage creativity, teamwork, and the development of functional prototypes, with opportunities for learning, networking and celebration of failures and successes. This training week is specifically designed for participants actively engaged in designing SupTech application proof-of-concepts or possessing robust coding experience. The program aims to advance both the theoretical understanding and practical skills of participants in the field of SupTech

List of key topics

- An overview of use cases of SupTech applications (EU or Non-EU NCAs)
- Advanced AI topics:
  - Deep learning
  - Large language models
  - Generative models
- Techniques other than AI/ML used in SupTech applications
- Identification of the organizational impact of SupTech solutions for supervisory authorities' practice
- Design proof-of-concept and prototyping of code
- SupTech projects in productive set-ups : technology, challenges and learnings
- Debugging and unit testing
- Potential topics for the sprint:
  - NLP for automatic reporting
  - Web scraping and social media analysis
- Forecasting tools – e.g. stress testing, credit risk analysis, green finance or a digital twin for physical climate risks

Learning outcomes

- Apply advanced AI and ML techniques in Python
- Recognize the organizational impact of SupTech applications
- Identify the resources to take the SupTech applications into the production phase
- Develop a SupTech application proof of concept.

Pre-requisites:

- Essential: General exposure to SupTech
- Essential: Advanced experience in coding (preferably Python or R) and/or close involvement in the development of a SupTech project
- Recommended: Prior exposure to the design of SupTech application proof-of-concepts
- Recommended: Prior exposure to NLP, tree models and cluster analysis

Advanced Online Modules

MiCAR

Type of course: Online

Duration: 10 hours

Dates: 22 January – 12 February; 26 February – 18 March; 3 June -24 June

This online module is designed to offer an overview of the MiCA Regulation (Markets in Crypto Assets Regulation). Participants will be equipped with a thorough introduction that enables them to not only comprehend but also navigate the multifaceted requirements and implications outlined in MiCA. Throughout this course, participants will delve into the main chapters of the regulation. Participants will attend live classes with engaging group exercises, fostering a dynamic learning experience.

List of key topics

- Subject matter, scope and definitions of MiCAR
- Scope and rules on Crypto-assets other than asset referenced tokens or e-money tokens
- Main features and rules on e-money tokens
- Main features and rules on asset-referenced tokens
- Types of services and key provisions of crypto-asset services providers
- Market abuse
- The supervisory architecture under MiCA and interplay with NCAs

Learning outcomes

- Describe and understand the requirements and practical implications of the MiCA Regulation
- Identify key supervisory issues, and mechanisms for co-ordination between different supervisors
- Understand the innovations and possible challenges arising from the MiCA Regulation
- Apply the rules introduced by the MiCA Regulation to case studies

Target audience:

- Participating NCAs' supervisory staff involved in the implementation of MiCAR at national level.

DORA

Type of course: Online

Duration: 10 hours

Dates: 22 January – 12 February; 26 February – 18 March; 3 June -24 June

This online module is designed to offer an overview of the DORA regulation. Participants will be equipped with a thorough introduction that enables them to not only comprehend but also navigate the multifaceted requirements and implications outlined in DORA. Throughout this course, participants will delve into the main chapters of the regulation. Participants will attend live classes with engaging group exercises, fostering a dynamic learning experience.

List of key topics

- Introduction, subject matter, scope and definitions of DORA
- ICT Risk Management framework
- ICT-related incident management classification and reporting
- Digital operational resilience testing
- Managing of ICT third-party risk - Key principles Introduction, subject matter, scope and definitions of DORA
- ICT Risk Management framework
- ICT-related incident management classification and reporting
- Digital operational resilience testing
- Managing of ICT third-party risk - Key principles

Learning outcomes

- Describe and understand requirements and practical implications of DORA in light of its main objectives
- Identify key supervisory issues, and mechanisms for coordination between different supervisors
- Summarise the main elements and possible challenges arising from DORA
- Apply the rules introduced by DORA to case studies

AI in the Financial Sector

Type of course: Online

Duration: 9 hours

Dates: 8-29 April 2024

This online course is tailored for a non-technical audience and explores AI's transformative impact on financial services, with a primary focus on real-world cases. The course will start by presenting foundational AI concepts and related trends in the financial sector, illustrating its applications through accessible use cases of methods such as clustering analysis, random forest, neural networks, and Natural Language Processing. This will enable to introduce the main characteristics of AI models, including Generative AI (e.g., Large Language Models (LLM)). Live classes will focus into sector-specific use cases from the financial industry, covering different types of companies (start-ups, big tech, and incumbent financial institutions).

The course will further address the critical aspects of governance and ethics in AI, against the background of the emerging regulatory framework in the area. Specific attention will be devoted to the supervisory implications of AI, providing insights on how supervisory authorities shall adapt to this technological evolution and navigate the challenges and opportunities presented by this rapidly advancing field.

List of key topics

- What is AI & ML, including generative AI (e.g. , LLM) – non-technical explanation
- In vitro show case of AI&ML applications
- Use cases of applications in the financial sectors by players (Big Tech; Startup; Incumbents)
- Supervisory implications of AI in the financial sectors
- Regulatory framework concerning AI
- Responsible AI
- Governance of AI

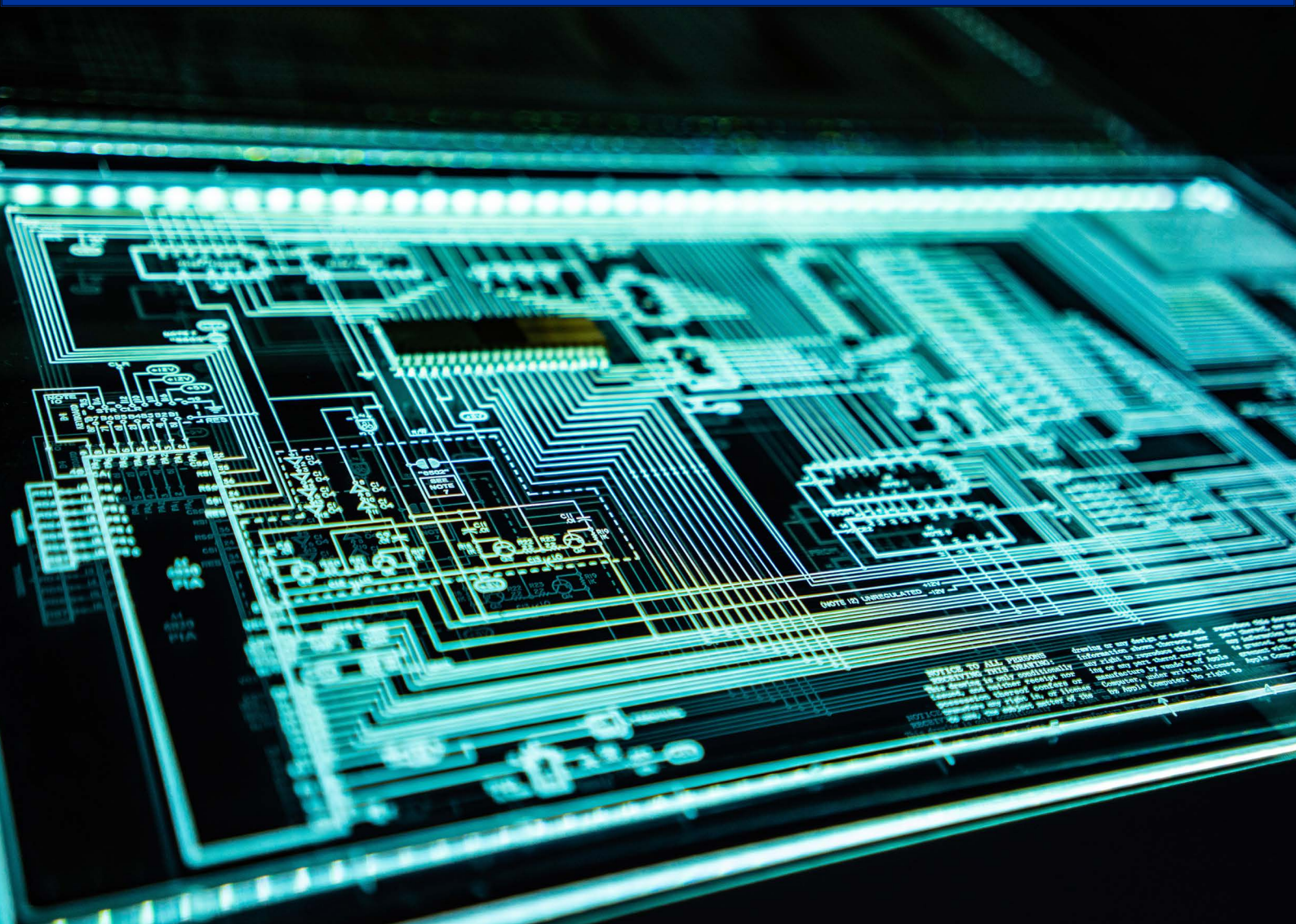
Learning outcomes

- Basic and non-technical knowledge on how AI & ML works
- Capacity to recognise how AI & ML applications are changing the provision of financial services

Target audience:

- This online module is designed for audience without technical or quantitative backgrounds who would like to learn the impact of AI and ML in the financial sector and the implications for supervisors.

Workshops



Executive Seminar Digital Finance Supervisory Implications

Type of course: Residential (Brussels)

Duration: 1.5 days

Dates: 10-11 April 2024

This Chatham House executive seminar aims to facilitate a high-level discussion of the common challenges brought by digital finance and its regulation to supervision, leveraging the on collective expertise and experiences of high-level managers from all participating NCAs.

By building upon the groundwork laid in the first year of the EU-SDFA, the seminar will be structured around three main building blocks: (1) reflecting on the legislative initiatives approved within the framework of the Digital Finance package and on their implications under a supervisory perspective, while considering also how the EU-SDFA supported NCAs in dealing with emerging challenges; (2) taking stock of the additional EU legislative proposals currently being negotiated and their potential supervisory implications, reflecting on how the Academy might also address the most pressing forthcoming needs; (3) fostering a discussion on the possible medium-term priority areas under both a regulatory and supervisory perspective, also in light of emerging, significant market trends

Blocks

- Digital Finance Package from Negotiation to Implementation
- Other recently proposed EU initiatives and their potential implications for supervision
- Possible policy implications:

Target audience:

- The seminar is addressed to participating NCAs' managers with expertise in designing, promoting, and/or implementing supervisory approaches towards digital-based financial products, services, and business models

Emerging Digital Finance Issues Workshop (EU-SDFA Lab in Digital Finance): Harnessing the power of the cloud for the supervisory good

Type of course: Residential (tbc)

Duration: 1.5 days

Dates: 1-2 July 2024

The take-up of cloud technologies by supervisory authorities can result in an unprecedented paradigm shift in their approach to data management, requiring the preparation of appropriate strategies to ensure a smooth transition, including projects to promote data-sharing under open sources approach across authorities. The workshop endeavours to delve into the challenges and opportunities associated with the adoption of cloud computing, especially regarding the collection, access, and sharing of data by (and among) NCAs and international organizations.

The workshop will revolve around two, thought-provoking questions: can supervisory authorities transition into open-source communities? Can NCAs evolve into data-driven organizations? The focal point of the discussion is the adept utilization of cloud technology for supervisory purposes, particularly concerning cross-border data and open sources. Participants' exchanges will focus on two dimensions: the primary barriers hindering the adoption of this technology; and, how cloud computing will impact organizational structures. To this end, the sessions will provide practical examples and use cases from NCAs, reflecting on encountered challenges and lessons learned.

In addition, the workshop will explore how to leverage cloud technology within the realm of open sources, showcasing applications like the Virtual Lab or the EU Digital Finance Platform Data Hub in the context of supervisory practices. Ultimately, the discussion will turn towards establishing governance structures for this evolving landscape of open source and data integration, fostering cross-border collaboration within this framework. By participating to the workshop, participants are expected to ultimately gather a comprehensive understanding of the challenges and opportunities behind the adoption of cloud strategy and data-driven supervisory practices.

Key topics

- Analyze benefits and drawbacks of cloud computing technology
- Analyze legal barriers to the adoption of cloud computing technology
- Identified the possible organizational impact of cloud computing technology
- Articulate the steps involved in the design and implementation of a cloud strategy
- Presenting the experience of NCAs that have adopted cloud computing technology
- Presenting the use case of data-sharing platforms based on cloud technology
- Discussing the governance structure of open-source projects implemented by NCAs

Target audience:

- The seminar is addressed to participating NCAs' representatives with hands-on experience and/or interest in the development of cloud and data strategies.

Policy Research Workshop on Digital Finance

Type of course: Residential (Florence)

Duration: 1.5 days

Dates: 16-17 September 2024

The Policy Research Workshop on Digital Finance serves as a platform for sharing and discussing cutting-edge developments in the expansive field of digital finance research. This includes exploring innovative advanced techniques in policy evaluation methods, as well as applying AI and ML to address existing gaps in the literature and empirical challenges.

During the workshop, researchers from NCAs and distinguished academics in the finance domain will present their work, employing approaches beyond traditional data analysis methods. This will allow participants to delve into the intricacies associated with digital finance research. The papers presented at the workshop, whether in progress or already published, will focus on quasi-experimental methods such as event studies, difference-in-differences, randomized experiments, regression discontinuity design models, and the application of techniques like NLP and cluster analysis. The workshop aims to foster an environment of collaboration and knowledge sharing among experts from different NCAs and academia. Participants will engage in discussions, share their experiences, and learn from each other's' perspectives.

Blocks

- Paper session
- Design future research questions

Target audience:

- The seminar is addressed to participating NCAs' staff engaged in policy-relevant research in the area of digital finance.

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