FINTECH RISK MANAGEMENT

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# Market Risk in Financial Robo-Advisory

FINancial supervision and TECHnology compliance
training program – SUPTECH WORKSHOP III

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# SupTech workshops

| Topics | Applications | Associated risks |
|---|---|---|
| Big Data | P2P finance | Credit risk<br>Fraud detection<br>Systemic risk |
| Artificial Intelligence | Robo-advisory<br>Asset management<br>Cognitive computing | Market risk<br>Compliance<br>Risk profile matching (MiFID)<br>Cyber and operational risks |
| Blockchain | Crypto-assets and exchanges | Market risk<br>Cyber and operational risks<br>ICO's fraud detection<br>Money laundering |

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# Robo Advisors (RAs)

Automated investment platform that uses quantitative algorithms to manage investors' portfolios and is accessible to clients online

Reasons for **rapid growth** of RAs:

— new generation of clients
  — well educated, receptive of digital technologies
  — prefer to have active and ongoing control over their investments
  — rely on the information from multiple sources rather than individual financial advisors

— the advantages of RAs over traditional financial advisors
  — much **lower costs** in comparison with traditional advisors
  — approximately the **same returns**
  — low or minimum investment entry
  — option to control, customize and construct portfolios from multiple devices
  — transparent workflow and monitoring systems
  — availability of advanced **quantitative methods of portfolio management and optimization**

— the large-scale financial processes (concentration of global wealth, adoption of FinTech in Asia, etc.)

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# Classification of Robo Advisors

1. Online access to traditional "manual" asset management services
   — **online questionnaires** and proposals

2. Automated portfolio management
   — entire **online investment/portfolio management**
   — selection of the instrument universe
   — automated portfolio optimization
   — periodic portfolio rebalancing
   — online performance reporting

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# Workflow of Robo Advisors

1. **Asset universe selection**
   - creating a representative set of instruments covering different classes and types
   - selecting low-cost and risk efficient instruments (selection criteria – expense ratio, total costs, liquidity, replication method, correlation)
   - → all RAs use **ETFs** (with minor exceptions)
   - tax-loss harvesting - offsets capital gains with capital losses to minimise tax payments

2. **Investor profile identification**
   - online questionnaires (risk tolerance, investment objectives and horizon) based on the information on age, income, savings and previous investment experience
   - inadequate recommendations? (incomplete assumption, incomplete information, inaccuracy of responses)

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# Workflow of Robo Advisors

**3.   Asset allocation / portfolio optimization**
— sample portfolios
— constant portfolio weights
— Modern Portfolio Theory approach
— modifications of Modern Portfolio Theory (e.g., VaR and CVaR)
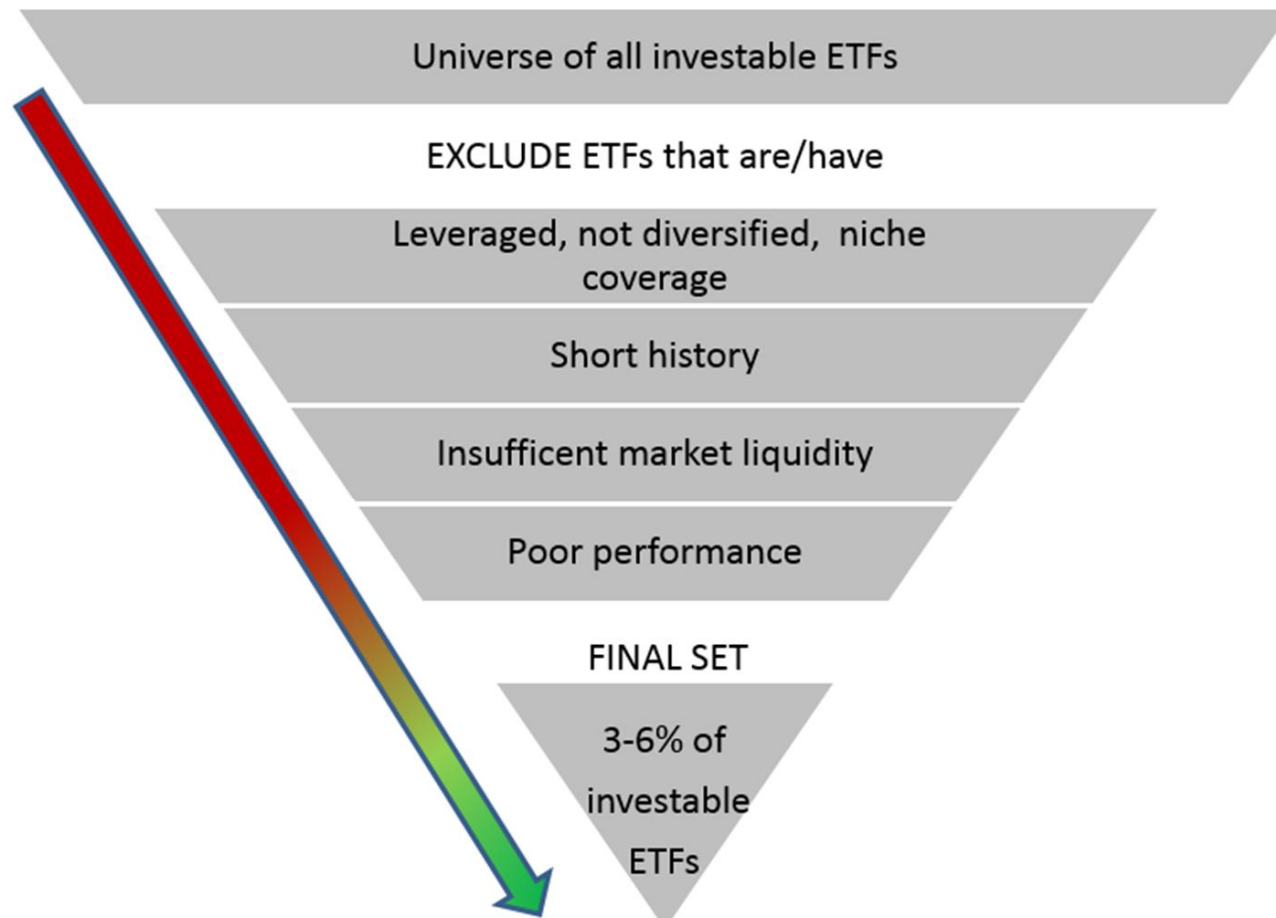— sensitivity analysis (stress testing)?

**4.   Monitoring and (daily) rebalancing**
— event driven (even calendar-driven)
— threshold-based (usually 3-5%drift from target)
— optimized dividend and cash-flow reinvestment
— clients changing their preferences?

**5.   Performance review and reporting**
— online only
— automatically by e-mail (monthly/quarterly)

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# RA selection of ETFs



Universe of all investable ETFs

EXCLUDE ETFs that are/have

Leveraged, not diversified, niche coverage

Short history

Insufficent market liquidity

Poor performance

FINAL SET

3-6% of investable ETFs

Source: Deutsche Bank Research

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# Supervision of RAs

— Disclosure of information for clients to clearly understand RA's investment practices and potential conflicts of interest

— Explanation of how RA handles operational and market risk both in normal times and in distressed market conditions

— Disclosure of information about operational aspects of RA services, i.e. regarding the assumptions and limitations of the optimization algorithm for portfolio allocation and rebalancing

— Ensuring that RA recommendations and strategies are suitable for their clients

— Example: *Wealthfront Investment Methodology White Paper*

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# Course "Artificial Intelligence in Finance" at MUNI

— Background Training in Modern Portfolio Theory

  — Statistical analysis of asset returns
  — Common portfolio optimization techniques
  — Network analysis application for asset selection and allocation
  — Neural networks
  — *Hands-on coding examples*

— 4 use-cases in robo-advisory technologies

— Background Training in Natural Language Processing

— Presentations of Czech Fin-Techs

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# IS MUNI – study materials

# R and R Studio - online

# Access to R Server

join at     https://uem1.euba.sk/rstudio/auth-sign-in

login:          **cnb##**   (numbers from 01 to 15)

password:   **fintech01**

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# Dataset

27 Vanguard ETFs

— 3 government bond ETFs (all US: long-term, intermediate term, short-term)

— 3 corporate bond ETFs (all US: long-term, intermediate term, short-term)

— 2 real estate ETFs (1 US, 1 international)

— 19 equity ETFs (FTSE Europe, FTSE Pacific, FTSE Emerging Markets, S&P500, US sectoral, US small-cap, mid-cap, growth, value)

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# Workshop evaluation

[https://www.fintech-ho2020.eu/free/app/evaluation-suptech-prague-3](https://www.fintech-ho2020.eu/free/app/evaluation-suptech-prague-3)

Please fill in the evaluation form:
- Role: National Supervisor
- Scale evaluations
- Comments

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