Research Frontiers and Paper Workshop

Theme IV: Policy and Future

Research Question: What are the most promising research directions in digital finance, and how can PhD students contribute?

PhD Seminar in Digital Finance

Emerging Research Topics (2024-2025)

Technology Frontier

1. **LLMs in Finance**
   - Sentiment analysis at scale
   - Document understanding
   - Chatbot advisory
2. **Quantum Computing**
   - Cryptographic threats
   - Portfolio optimization
   - Risk simulation
3. **Embedded Finance**
   - BaaS (Banking as a Service)
   - Buy-now-pay-later
   - Platform bundling

Economic Questions

1. **Digital Currency Competition**
   - CBDC vs. stablecoins vs. cash
   - Currency substitution
   - Monetary policy transmission
2. **AI and Employment**
   - Automation in finance
   - Skill premium changes
   - Advisory model shifts
3. **Data Markets**
   - Alternative data pricing
   - Data as barrier to entry
   - Privacy regulation effects

Frontier topics offer high risk/high reward for early-career researchers

LLMs in Finance: Research Opportunities

Current Applications

1. **Sentiment Analysis**
   - News, earnings calls, social media
   - Lopez-Lira & Tang (2023): GPT sentiment
2. **Document Processing**
   - 10-K/10-Q analysis
   - Regulatory filing extraction
3. **Conversational Finance**
   - Customer service bots
   - Advisory chatbots

Research Questions

- What information do LLMs extract that traditional NLP misses?
- How robust are LLM predictions to prompt engineering?
- Can LLMs replace human analysts?
- What are the risks of LLM-driven herding?

Methodological Challenges

- Data contamination
- Reproducibility (API changes)
- Benchmark selection
- Causal inference with LLM outputs

LLM finance research is nascent; methodological rigor will separate good from bad papers

Quantum Computing: Implications for Finance

Cryptographic Threats

Shor's Algorithm

Breaks RSA, ECDSA in polynomial time.
Timeline estimates:

- Optimistic: 2030s
- Conservative: 2040s
- Harvest-now-decrypt-later: Now

At-Risk Systems

- Blockchain signatures
- TLS/HTTPS
- Digital identity
- Smart contracts

Post-Quantum Cryptography

NIST standards (2024):

- CRYSTALS-Kyber (key exchange)
- CRYSTALS-Dilithium (signatures)
- SPHINCS+ (hash-based)

Research Questions

- Migration cost for financial systems?
- Blockchain post-quantum transition?
- Regulatory timeline requirements?

Finance-Specific

Long-lived instruments (mortgages, bonds) most vulnerable.

NIST post-quantum standards finalized July 2024 – migration begins now

Paper Workshop: Expectations and Format

Presentation Requirements

1. **Duration**: 20 minutes + 10 Q&A
2. **Structure**:
   - Motivation (why care?)
   - Research question
   - Methodology
   - (Preliminary) results
   - Next steps
3. **Slides**: Max 12, research style

Evaluation Criteria

- Question clarity
- Methodology appropriateness
- Feasibility
- Contribution potential

Discussant Role

Each presentation has assigned discussant.

Discussant Duties

1. 5-minute structured comments
2. Summarize contribution
3. Identify strengths
4. Suggest improvements
5. Pose 2-3 questions

Feedback Norms

- Constructive tone
- Specific suggestions
- Acknowledge constraints
- Focus on research design

Workshop mimics conference experience; learn by presenting and discussing

What Makes Research Publishable?

Finance Journal Criteria

1. **Novel contribution**
   - New fact, method, or insight
   - Incremental vs. fundamental
2. **Identification**
   - Causal claims require strategy
   - RCT, IV, diff-in-diff, RDD
3. **Economic significance**
   - Statistical $\neq$ economic
   - Magnitudes matter

Digital Finance Advantages

- Rich data (on-chain, APIs)
- Natural experiments (regulation)
- Rapid evolution (novelty)
- Policy relevance

Common Pitfalls

- Description without insight
- Correlation as causation
- Overfitting / data snooping
- Regulatory arbitrage (ethics)

Target Journals
RFS, JFE, JF, Management Science, JFQA

Top-5 finance journals increasingly publish digital finance papers

Data Sources for Digital Finance Research

Traditional Finance Data

Source	Coverage
WRDS	CRSP, Compustat
Bloomberg	Market data
Refinitiv	News, fundamentals
FRED	Macro data

Fintech-Specific

- CB Insights: Funding data
- PitchBook: Valuations
- Crunchbase: Startups

Blockchain Data

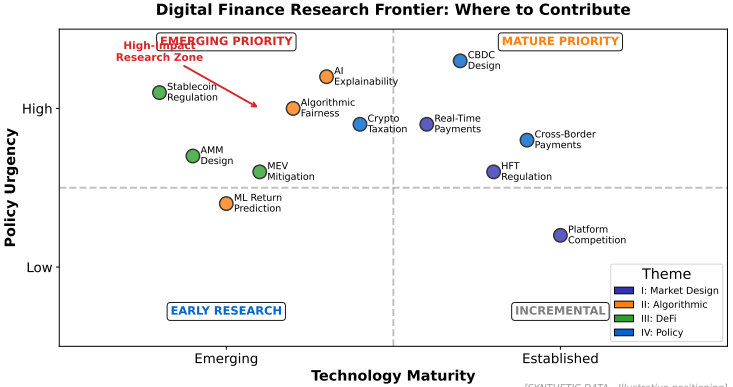
Source	Use
Dune Analytics	On-chain queries
Flipside	DeFi data
Glassnode	Bitcoin metrics
Etherscan	Ethereum explorer
The Graph	Protocol data

Regulatory Data

- ESMA registers (MiCA)
- CFPB complaints
- FCA sandbox outcomes

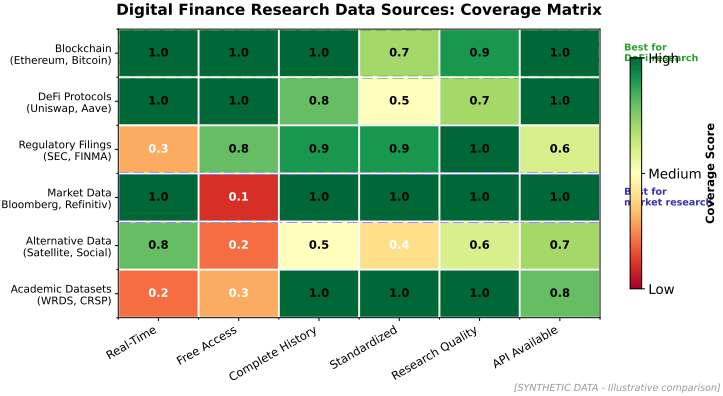
Blockchain provides uniquely transparent financial data – major research advantage

Research Frontier: Technology vs Policy Urgency



High-urgency, moderate-maturity topics offer best publication opportunities for PhD students.

Data Sources: Coverage Matrix for Digital Finance Research



Blockchain data is real-time and free; regulatory data has highest research credibility.

Course Synthesis: Connecting the Themes

Four Themes, One Field

Theme I: Markets	**Theme II: Algorithms**	**Theme III: DeFi**
Platform economics	ML prediction limits	Consensus mechanisms
Microstructure	Fairness trade-offs	AMM/lending design
Payment infrastructure	Model risk	Stablecoin stability
Theme IV: Policy		
Regulation (MiCA, AI Act) + Inclusion + Research frontiers		

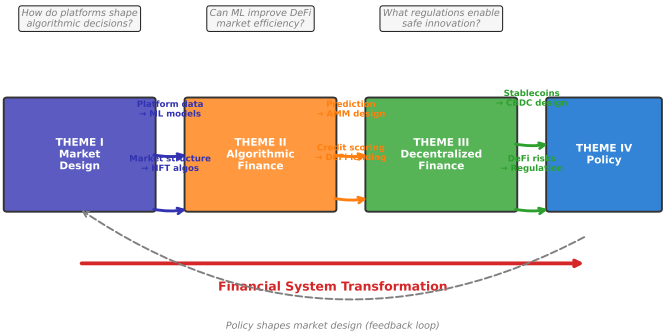
Cross-Cutting Questions

- How does technology change the economics of financial intermediation?
- What are the welfare effects of digital finance innovation?
- How should regulators balance innovation and stability?

Strong PhD research often connects multiple themes

Course Synthesis: Cross-Theme Research Connections

Cross-Theme Research Connections: A Systems View



[Conceptual framework - Course synthesis]

Research connecting multiple themes (e.g., DeFi regulation, AI fairness in credit) is especially valuable.

Career Paths in Digital Finance

Academic Track

- Finance/Economics departments
- Business school finance groups
- Information systems
- Law schools (fintech regulation)

Skills Valued

- Causal inference
- Structural modeling
- Blockchain/DeFi expertise
- Policy translation

Industry/Policy Track

- Central banks (research units)
- Regulators (BIS, IMF, FSB)
- Tech companies (research)
- Consulting (fintech practice)
- Fintech firms (quant roles)

PhD Value-Add

- Rigorous problem framing
- Identification skills
- Writing/communication
- Research network

Digital finance PhDs have strong placement in both academia and industry

Final Thoughts and Resources

Key Takeaways

1. Digital finance is *finance* + technology
2. Economic principles still apply
3. Identification matters more than novelty
4. Policy relevance is a feature
5. Data abundance is an opportunity

Advice

- Start with a question, not a dataset
- Build expertise in one area
- Present early and often
- Collaborate across disciplines

Resources

Conferences

- AFA/WFA fintech sessions
- NBER Digital Economics
- FC (Financial Cryptography)
- TokenomicsX

Working Paper Series

- SSRN: FEN, Fintech
- BIS Working Papers
- NBER Working Papers

Community

- Twitter/X finance community
- Seminar series (virtual)

Thank you for your engagement. Good luck with your research!