Financial Markets and Institutions

Module 4: Traditional Digital Finance — Lesson 37

Digital Finance

December 7, 2025

- Understand the structure of modern financial markets
- Identify key market participants: buy-side, sell-side, intermediaries
- Recognize roles of exchanges, clearinghouses, and regulators
- Comprehend market infrastructure and trading venues

Financial Markets Landscape

Primary Markets
- New securities issued
- IPOs and bond issuances
- Direct capital raising
- Underwriters coordinate

Secondary Markets
- Existing securities trade
- Provides liquidity
- Price discovery mechanism
- Exchanges and OTC

Market Categories: Equities, Fixed Income, Derivatives, FX, Commodities

Buy-Side Institutions
- Asset managers
- Pension funds
- Insurance companies
- Hedge funds
- Sovereign wealth funds
- *Manage assets for clients*

Sell-Side Institutions
- Investment banks
- Broker-dealers
- Market makers
- Prime brokers
- Research providers
- *Facilitate transactions*

Asset Managers

- Mutual funds
- ETF providers
- Active management
- Passive indexing
- AUM: BlackRock $10T+

Hedge Funds

- Alternative strategies
- Long/short equity
- Quantitative trading
- Event-driven
- Global macro

Pension Funds: $50+ trillion globally (2024), long-term horizon

Investment Banking

- Underwriting services
- M&A advisory
- Capital markets
- Syndication
- IPO management

Broker-Dealer Functions

- Execute client orders
- Market making
- Liquidity provision
- Prime brokerage
- Securities lending

Top Firms: Goldman Sachs, Morgan Stanley, JP Morgan, Citi

Market Makers and Liquidity Providers

Role: Continuous bid-ask quotes, facilitate trading

Functions

- Provide two-sided quotes
- Reduce bid-ask spreads
- Absorb temporary imbalances
- Earn spread revenue

Examples

- Citadel Securities
- Virtu Financial
- Jane Street
- Flow Traders

Technology: High-frequency trading, co-location, low latency

Major Exchanges
- NYSE (New York)
- NASDAQ (US)
- LSE (London)
- Euronext (Europe)
- Tokyo Stock Exchange
- Shanghai Stock Exchange

Functions
- Order matching
- Price discovery
- Listing standards
- Market surveillance
- Data dissemination

Trading Hours: NYSE 9:30-16:00 EST, after-hours 4:00-20:00

Dark Pools

- Private exchanges
- No pre-trade transparency
- Large block trades
- Reduced market impact
- 15-20% US equity volume

Electronic Communication Networks

- Automated matching
- Direct market access
- Lower fees
- INET, Arca, BATS

Fragmentation: US equities trade across 16+ exchanges, 40+ dark pools

Central Counterparties (CCPs)

Role: Become buyer to every seller, seller to every buyer

Functions

- Novation of trades
- Multilateral netting
- Margin collection
- Default management
- Risk mutualization

Major CCPs

- LCH (London)
- CME Clearing
- Eurex Clearing
- ICE Clear
- OCC (options)

Post-Crisis: Dodd-Frank/EMIR mandate clearing of standardized derivatives

Trade Lifecycle: Execution → Clearing → Settlement

Clearing (T+0 to T+1)

- Trade confirmation
- Novation to CCP
- Margin calculation
- Netting process

Settlement (T+1 to T+2)

- Securities delivery
- Cash payment
- CSD involvement
- DVP mechanism

T+1 Migration: US moved from T+2 to T+1 in May 2024, EU in 2027

Central Securities Depositories (CSDs)

Functions

- Immobilize securities
- Electronic book-entry
- Settlement finality
- Corporate actions
- Securities lending

Major CSDs

- DTCC (US)
- Euroclear (Europe)
- Clearstream (Europe)
- JASDEC (Japan)

DTCC: Settles $2.5 quadrillion annually, 100M+ transactions/day

Financial Regulators

United States

- SEC: Securities markets
- CFTC: Derivatives
- Federal Reserve: Banks
- FINRA: Self-regulatory
- OCC: National banks

Global Coordination: IOSCO, FSB, Basel Committee

Europe

- ESMA: Pan-European
- EBA: Banking
- FCA: UK markets
- BaFin: Germany
- AMF: France

Market Structure Rules
- MiFID II (Europe)
- Reg NMS (US)
- Best execution
- Transparency requirements
- Pre/post-trade reporting

Prudential Regulation
- Basel III capital
- Dodd-Frank stress tests
- EMIR derivatives
- SFTR securities financing
- Volcker Rule

Market Abuse: MAR (Europe), Reg M (US), insider trading prohibitions

Monitoring: Real-time surveillance, pattern detection, anomaly alerts

Surveillance Activities

- Insider trading detection
- Market manipulation
- Spoofing and layering
- Front-running
- Wash trading

Enforcement Tools

- Fines and penalties
- Trading suspensions
- License revocation
- Criminal prosecution
- Disgorgement

Technology: AI/ML for pattern recognition, NLP for communications

Data Types
- Level 1: Best bid/ask
- Level 2: Order book depth
- Level 3: Full order book
- Trade tape
- Reference data

Distribution
- Direct exchange feeds
- Consolidated tape
- Vendor platforms
- Low-latency feeds
- Cloud delivery

Latency: Co-location < 1ms, microwave 8ms NY-Chicago, fiber 13ms

Trading Technology Stack

Ecosystem: Order management, execution, risk, compliance, reporting

Front Office

- Order management (OMS)
- Execution management (EMS)
- Algorithmic trading
- Risk analytics

Infrastructure

- FIX protocol
- Market data handlers
- Smart order routing
- Co-location services

Vendors: Bloomberg EMSX, Charles River, Fidessa, FlexTrade

Summary

- Financial markets connect capital suppliers and users via intermediaries
- Buy-side manages assets; sell-side facilitates transactions
- Exchanges provide transparent price discovery; dark pools reduce impact
- CCPs mitigate counterparty risk through novation and netting
- CSDs enable efficient settlement via immobilization and book-entry
- Regulators ensure market integrity, transparency, and investor protection
- Technology infrastructure spans data feeds, trading systems, and connectivity

Further Reading

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- Madhavan, A. (2000). Market microstructure: A survey. *Journal of Financial Markets*, 3(3), 205-258.
- SEC Market Structure Concept Release (2010)
- MiFID II/MiFIR Technical Standards (ESMA)