



Framework

1. Bitcoin: Economics, Technology, and Governance
2. Market and Funding Liquidity—
An Overview
3. Market Liquidity – Resilient or
Fleeting?
4. Algorithmic Trading Briefing
Note
5. Hanging up the phone—
electronic trading in fixed income
markets and its implications
6. How have central banks
implemented negative policy
rates?
7. Corporate Debt in Emerging
Economies: A Threat to Financial
Stability?



Brief

- Bitcoin is built on a transaction log that is distributed across a network of participating computers. It includes mechanisms to reward honest participation, to bootstrap acceptance by early adopters, and to guard against concentrations of power.



Brief

- An online communication protocol that facilitates the use of a virtual currency.
- Built on a transaction log that is distributed across a network of participating computers.
- A virtual currency with potential to disrupt existing payment systems.
- To reward honest participation.
- Bootstrap acceptance by early adopters.
- Guard against concentrations of power.
- More flexible.
- More private.
- Less amenable to regulatory oversight.

Bitcoin Design Principles

- Bitcoin can be understood as the first widely adopted mechanism to provide absolute scarcity of a money supply. By design, Bitcoin lacks a centralized authority to distribute coins or to track who holds which coins.
- Bitcoin issues new currency to private parties at a controlled pace in order to provide an incentive for those parties to maintain its bookkeeping system.

Enabling Technologies and Processes

- Bitcoin provides access to the “block chain” data structure that verifies all past Bitcoin activity.
- Each individual bitcoin can readily be traced back through all transactions in which it was used, and thus to the start of its circulation. All Bitcoin transactions are readable by everyone.
- Every new transaction that is published to the Bitcoin network is periodically grouped together in a “block” of recent transactions. To make sure no unauthorized transactions have been inserted, the block itself is compared to the most recently published block—yielding a linked sequence of blocks, or “block chain.” A new block is added to the chain roughly every ten minutes.

Enabling Technologies and Processes

- To encourage users to assist, the Bitcoin system periodically awards newly minted bitcoins to the user who solves a mathematical puzzle that is based on the pre-existing contents of the block.
- The miners who verify the block chain are rewarded with bitcoins.
- When listing a transaction, the buyer and seller can also offer to pay a “transaction fee,” which is a bonus payment to whatever miner solves the puzzle that verifies the transaction.

Enabling Technologies and Processes

- Bitcoin imposes no obligation for a financial institution, payment processor, or other intermediary to verify a user's identity.
- Bitcoin imposes no prohibition on sales of particular items.
- Bitcoin payments are irreversible in that the protocol provides no way for a payer to reverse an accidental or unwanted purchase.

Centralization and Decentralization

- Bitcoin avoids concentrations of power that could let a single person or organization take control.
- Currency exchanges allow users to trade bitcoins for traditional currencies or other virtual currencies.
- Bitcoin wallets are data files that include Bitcoin accounts, recorded transactions, and private keys necessary to spend or transfer the stored value.

Centralization and Decentralization

- Anyone who knows the identity of any user from any transaction—perhaps the mailing address used for delivery of purchased goods, or the bank account used to purchase bitcoins—can track that user’s other transactions made with the same pseudonym.
- To preserve privacy against this tactic, mixers let users pool sets of transactions in unpredictable combinations, thus preventing tracking across transactions.

Centralization and Decentralization

- Miners work independently, but upon winning a miner shares earnings with others in the pool.
- An attacker who holds a majority of Bitcoin's computational resources can alter some of the system's records, including inserting false transactions and rejecting actual transactions.

Uses of Bitcoin

➤ **Silk Road and Other Illicit Activities**

- online sale of narcotics
- escrow services

➤ **Consumer Payments**

- Merchants appear particularly pleased because Bitcoin payment processing is strikingly low-cost for them.
- It is less clear that consumers benefit from paying by Bitcoin.
- Other users appear to be buying bitcoins not to use them but to hold them in appreciation.

Uses of Bitcoin

- It might seem natural for consumers to use Bitcoin for international remittances.
- Some computer scientists and entrepreneurs report excitement at Bitcoin not for its role in facilitating payments, but for its ability to create a decentralized record of almost anything.
- However, none of these startups has attracted large-scale use to date.

Risks in Bitcoin

- Market risk via fluctuation in the exchange rate between bitcoin and other currencies.
- Shallow markets problem: a person seeking to trade a large amount of bitcoin typically cannot do so quickly without affecting the market price.
- Counterparty risk
- Transaction risk
- Operational risk
- Privacy risks
- Legal and regulatory risks

Regulating Virtual Currencies

- Bitcoin receives regulatory scrutiny for three classes of criminal concerns: Bitcoin-specific crime, money laundering, and Bitcoin-facilitated crime.
- A related justification for regulatory action is the need for consumer protection.
- A key challenge for prospective regulators is where to impose constraints.
- Transfers through currency exchanges are also within regulators' grasp.
- While Bitcoin now appears to be subject to regulatory oversight, the authority of regulators faces certain limits.

Bitcoin as a Social Science Laboratory

- **Bitcoin as a Financial Asset**
- **Incentive-compatibility in Bitcoin Protocols**
- **Privacy and Anonymity**
- **Monetary Policy**
 - the fixed slow growth rate of Bitcoin creates the possibility of deflation if Bitcoin was to be used widely.
 - It remains unclear whether decentralized cryptographic currencies can be designed with monetary policies.

Looking Ahead

- Bitcoin may be able to accommodate a community of experimentation built on its foundations. Mixers already close the most obvious privacy shortcomings in Bitcoin's early design, while pools help reduce risk for miners, and wallets address some of consumers' usability and security concerns.
- Other aspects of Bitcoin architecture are largely locked in place through its protocol design.



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Types

- **Two distinct types of liquidity:**
 - market liquidity
 - funding liquidity
- **During a financial crisis. If funding liquidity declines because of market stress, for example, this may cause intermediaries to become less willing to provide market liquidity.**
- **Declines in market liquidity, in turn, may further impair funding liquidity, creating a negative feedback dynamic.**

Market Facts

- Quoted bid-ask spreads in the inter-dealer market have remained stable since 2010.
- Order book depth does not appear low by historical standards.
- For the corporate bond market, some evidence even suggests improving market liquidity.
- Large blocks of securities are now harder to buy and sell without generating significant movements in prices.
- Greater activity and liquidity in those bonds that were issued more recently, larger in size or brought to market by larger issuers.

Market Facts

- Supplementary leverage ratio (SLR): The SLR limits the leverage of dealer balance sheets.
- The SLR is much tougher on low-risk assets as compared to the risk-based capital measures that it complements.
- This makes the economics of repo-financing much less attractive.
- We observe significant declines in the quantity of repo financing by dealers.
- We do not observe marked declines in dealer holdings of Treasuries.

Market Facts

- In the U.S. Treasury market, high-frequency trading firms have seized a large proportion.
- In the credit market, a rapidly rising share of corporate bonds outstanding is now held by mutual funds. Mutual funds are not natural providers of intraday liquidity, their rapid growth may have contributed to the decline in secondary market trading activity. Fixed-income market liquidity may also be declining for cyclical reasons.

Facts during Crisis

- During the financial crisis the demise of several major financial institutions resulted from their inability to finance their long-dated illiquid assets.
- Deterioration in funding liquidity also increased the degree of systemic stress as firms were forced to sell assets, which depressed their prices.
- The drop in the availability of dealer-funded repo financing also appears to have led to less efficient arbitrage between closely related asset pairs.

Capital requirements

- **Stronger capital requirements reduce firms' vulnerability to runs. This suggests that funding liquidity risk can be addressed in many different ways.**
 - capital requirements can be bolstered to reduce the risk that a firm will become insolvent.
 - improved reporting and transparency can reduce the degree of uncertainty about whether a firm is solvent.
 - liquidity requirements can be increased to reduce the risk that the firm will have to engage in a fire sale of assets that might deplete its capital.

Capital requirements

- Capital requirements have been increased.
- There is much better reporting about how firms will do under significant stress tests.
- Liquidity requirements – such as the liquidity coverage ratio – provide a buffer that allows management more time to respond to problems.
- If necessary, the central bank can act as the lender-of-last-resort.

The Fed providing liquidity

- The Federal Reserve has a very limited ability to provide funding to a securities firm.
- If a securities firm were to lose access to funding the remaining options available would be finding a means of replenishing the firm's capital, selling assets, or selling all or part of the securities firm's operations.
- If all of the requirements are met, the central bank could provide liquidity support.



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Market Liquidity—Concepts and Drivers

➤ Concept and Measurement

- Market liquidity is the ability to rapidly execute sizable securities transactions at a low cost and with a limited price impact.
- Funding liquidity: the ability by market participants to obtain funding at acceptable conditions.
- Monetary liquidity: typically used in relation to monetary aggregates.
- Low levels of liquidity may foretell low resistance to shocks. But measures of the level in normal times may be insufficient to assess the risk that a shock will produce if liquidity “freezes.”

Market Liquidity—Concepts and Drivers

➤ Concept and Measurement

- High funding liquidity can lead financial institutions to take on excessive leverage, which can be detrimental to financial stability.
- In situations of stress, direct intervention may be needed.
- Some measures, such as imputed “round-trip costs,” effective spreads (actual or estimated), and Amihud’s (2002) price impact measure capture the cost dimension. Others, such as quote depth or dealer depth, capture the quantity dimension.

Market Liquidity—Concepts and Drivers

➤ General Drivers of Market Liquidity Levels

- The risk appetite, funding constraints, and market risks faced by financial intermediaries.
- Search costs, which influence the speed with which buyers and sellers can find each other.
- Investor characteristics and behavior reflecting different mandates, constraints, and access to information.

Market Liquidity—Concepts and Drivers

➤ General Drivers of Market Liquidity Levels

- Tighter funding constraints for trading—induced by changes in regulations and in business models—have arguably lowered dealers’ risk-taking capacity or willingness to make markets and reduced banks’ proprietary trading activities.
- New trade transparency requirements probably reduced search costs, whereas the EU’s ban on uncovered sovereign credit default swap (CDS) positions had the opposite effect.

Market Liquidity—Concepts and Drivers

➤ General Drivers of Market Liquidity Levels

- The growth of electronic trading platforms should have, in principle, reduced search costs. But the implications of the associated advance of auto-mated trades (algorithmic trading) are unclear.
- Central banks' large-scale purchases of securities under unconventional monetary policy are likely to have affected market liquidity.

◆ Market Liquidity—Concepts and Drivers

➤ Risk that liquidity might suddenly disappear

- The growing role in bond markets of mutual funds that offer daily redemptions to retail investors.
- This buildup of liquidity risk in the asset management industry was likely encouraged by accommodative monetary policy and the ensuing search for yield .
- The growth of index investors and the more widespread use of benchmarks are likely to have increased commonality in liquidity and thereby systemic liquidity risk.
- Hedge funds are said to have become more similar to mutual funds in their behavior.

Market Liquidity—Trends

- Among major bond markets, only the U.S. Treasury market appears at first glance to have recently suffered a deterioration of liquidity. Nevertheless, that market remains highly liquid compared with most other large markets.
- In the bond markets of the United States, Europe, and emerging market economies, imputed round-trip costs (or similar metrics of liquidity) are generally below their 2007 levels.
- The level and resilience of market liquidity for higher- grade corporate bonds appears to be becoming increasingly stronger than that for lower grades.

Changes in Drivers of Market Liquidity

➤ Event Studies of Market-Making and Funding Constraints

- Evidence of reduced market making

- ✓ Dealer banks in advanced economies show signs of being less active market makers in fixed-income securities. In several advanced economies, bank holdings of corporate debt have declined. The evidence on sovereign bonds is more mixed.

Changes in Drivers of Market Liquidity

➤ Event Studies of Market-Making and Funding Constraints

- Monetary policy and market making

- ✓ One way central banks can relax market makers' funding constraints for certain securities and thereby improve the market liquidity of those assets is to include the instruments in the list of eligible collateral for repurchase operations.
- ✓ When a bond is included in the ECB's list of eligible collateral for credit operations, the liquidity of the security improves.

Changes in Drivers of Market Liquidity

➤ Event Studies of Search Costs

● Impact of trade transparency

- ✓ Greater trade transparency should improve market liquidity because it increases competition.
- ✓ Increased transparency may erode the willingness of market makers to carry large inventories because it hampers their ability to unwind large positions.
- ✓ For corporate bonds traded in the United States, enhanced transparency has had a positive impact on liquidity.

Changes in Drivers of Market Liquidity

➤ Event Studies of Search Costs

● Impact of the EU ban on uncovered credit default swaps

- ✓ The EU's ban on indirect short selling of sovereign debt via uncovered sovereign credit default swaps (SCDS) reduced the liquidity of those assets.
- ✓ The EU's ban also reduced liquidity in the European sovereign bond market.

Changes in Drivers of Market Liquidity

➤ Event Studies of Search Costs

- Monetary policy and scarcity effects

- ✓ Quantitative easing in the United States at first improved liquidity in the market for mortgage-backed securities (MBS), but then degraded it.

Changes in Drivers of Market Liquidity

➤ Event Studies of Search Costs

● Investor base

- ✓ The decline in the heterogeneity of the investor base may have contributed to a deterioration in liquidity.
- ✓ Banks would have to decide for themselves whether a security is investment grade rather than use credit agency ratings. Because U.S. commercial banks are prohibited from investing in below-investment-grade bonds, the rule narrowed the investor base for bonds at the low end of the rating agencies' investment grade.

Liquidity Resilience, Liquidity Freezes, and Spillovers

➤ Liquidity Regimes and Resilience

- A lower presence of market makers, a broader range of smaller and more risky bonds, large mutual fund holdings, and concentrated holdings by institutional investors are all associated with higher vulnerability of liquidity to external shocks.
- Higher leverage at financial firms and their greater use of short-term funding are typically associated with higher liquidity risk.

Liquidity Resilience, Liquidity Freezes, and Spillovers

➤ Liquidity Regimes and Resilience

- Market liquidity tends to abruptly switch between different states.
- A regime-switching model is used in which liquidity may take on two or more regimes.
- High-yield bonds seem to be especially sensitive to business conditions and credit market developments, whereas unconventional monetary policy only affects the liquidity of investment-grade bonds.

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