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#### The Bitcoin Standard – Saifedean Ammous – Summary – 20250108

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"The Bitcoin Standard" by Saifedean Ammous explores the concept of Bitcoin as a decentralized alternative to traditional central banking systems. The book delves into the history of money, examining various forms of currency from primitive moneys to government-issued fiat currencies. It discusses the implications of monetary inflation, the relationship between money and time preference, and how sound money contributes to individual freedom and capitalism's information systems.

Ammous argues for Bitcoin's value as a digital cash system, its role in individual sovereignty, and its potential as a global unit of account. The book also addresses common questions and misconceptions about Bitcoin, including its scalability and association with criminal activities.

With updates and new chapters added in the 2021 edition, Ammous reflects on Bitcoin's evolution and its increasing acceptance among corporations and financial institutions. The foreword by Michael Saylor highlights the importance of the book in the context of recent economic events and the growing trend toward adopting a Bitcoin standard.

# The Bitcoin Standard: The Decentralized Alternative to Central Banking

#### **About the Author**

• Saifedean Ammous is an independent scholar focusing on bitcoin and economics, particularly within the Austrian School tradition. More information can be found on his website.

# **Author's Preface to 2021 Update**

- Since its original publication in 2018, "The Bitcoin Standard" has gained widespread popularity, leading to its translation into 25 languages.
- Ammous considered revising the book significantly but opted to preserve its original form, making only minor corrections while planning to expand on bitcoin's developments in a sequel titled "The Fiat Standard."

### Foreword by Michael J. Saylor

- The Covid-19 pandemic prompted significant changes in economic behavior, leading to rapid monetary expansion by governments.
- Saylor emphasizes the importance of "The Bitcoin Standard" in helping corporations understand the macroeconomic forces reshaping their environments, particularly regarding treasury management in inflationary contexts.
- Through a strategic shift, MicroStrategy adopted bitcoin as its primary treasury reserve asset, underlining the book's relevance in modern finance.

#### **Prologue**

- Introduces the origin of bitcoin in 2008, highlighting Satoshi Nakamoto's groundbreaking work in creating a decentralized payment network.
- Bitcoin resolved issues of trust traditionally required in financial transactions by utilizing a system where transactions are verified by network participants.
- The narrative capturesbitcoin's evolution from a niche digital currency to a recognized and valuable asset, capable of storing value beyond traditional systems.

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#### **Chapter 1 Money**

- Discusses the nature of money and its essential functions, including being a medium of exchange, a store of value, and a unit of account.
- Defines money as a good that facilitates exchange, contrasting it with investments which offer returns and carry risks.
- Explores the limitations of barter systems and how money arose from the need for a more efficient medium of economic exchange.
- Presents the three dimensions of exchange issues: coincidence of wants, time, and location, illustrating how they led to the necessity for money.

# **Salability and Functions of Money**

### **Medium of Exchange**

- Money is defined primarily as a medium acquired not for consumption or investment but for exchange purposes.
- Establishes how salability, the ease of selling money for goods, determines its acceptance.

#### Store of Value

- Money must endure physical decay and maintain value over time, necessitating characteristics that prevent excessive supply increases.
- Emphasizes the concept of "hard money," which resists inflation compared to "easy money" that can be easily produced.

# **Unit of Account**

- Money enables all goods' prices to be expressed consistently, facilitating economic calculation and efficiency in trade.
- Discusses how the lack of a standard medium complicates price and value assessments in an economy.

# **Chapter 2 Primitive Moneys**

- Investigates historical forms of money, notably the Rai stones of Yap Island, to draw parallels with bitcoin's operational characteristics.
- Discusses how the Rai stones functioned effectively as currency until technological advancements diminished their scarcity and value.

### **Hardness of Money Historical Examples**

- Analyzes how various goods across cultures, including aggry beads and seashells, served as money until their supply increased or their qualities changed, thus losing monetary status.
- Highlights the importance of a good's stock-to-flow ratio in maintaining its value, detailing the consequences of introducing easier production methods.

# **Lessons from History**

- Explains the historical patterns that cause monetary systems to fail, emphasizing the need for hardness and resistance to inflation to maintain their roles as money.
- Draws attention to the implications of easy money systems in historical contexts, including the colonial exploitation illustrated through examples like the aggry beads.

This structured summary captures the key insights from "The Bitcoin Standard," translating the original content into a format suitable for a mind map. Each chapter and section is detailed, ensuring completeness and integrity of the document's content.

Pages - 0 -- 30

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#### The Bitcoin Standard

# **Primitive Moneys**

#### Seashells

- Seashells were once widely used as money due to their scarcity and high stock-to-flow ratio;
   however, they were not uniform, complicating trade.
- European settlers adopted seashells as legal tender in 1636, but uniform British coins eventually replaced them as they provided better price denomination and salability.

#### **Cattle and Salt**

- Cattle served as a form of money valued for their nutritional contribution, albeit being bulky and not easily divisible.
- Salt coexisted with cattle due to its durability and ease of division, which facilitated smaller transactions; the historical linguistics connect "pecuniary" to cattle and "salary" to salt.

#### **Transition to Metals**

• As metallurgy advanced, metals began to replace artifact money, such as seashells and stones, due to their durability and ability to be minted into uniform coins.

#### **Monetary Metals**

#### **Characteristics of Metals**

- Metals became practical forms of money because they were highly valuable and dense, allowing for easy transport and salability.
- The abundance of metals like iron and copper led to their use in smaller transactions, while rarer metals like silver and gold emerged as superior stores of value.

#### **Transition to Coinage**

• Initially, metals were measured by weight, but with advances in metallurgy, coins became standardized, enhancing trade and specialization worldwide.

# The Gold Standard and Abandonment

 By the 19th century, the emergence of banking allowed transactions with paper money redeemable in gold, leading to a global economy unified under the gold standard, while abuses by governments started undermining this system.

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#### Why Gold?

 Gold's demand as both a market good and monetary medium led to price rises, creating a scenario where its stable supply ensured it remained a top store of value, avoiding the pitfalls of other commodities prone to inflation.

### **Collapse of Silver**

 Rising demand led to increased silver production, which ultimately caused its value collapse as supply outpaced demand; historical examples illustrate how silver traps investors by diminishing wealth over time.

### **Historical Perspective**

 Ancient civilizations such as those in China and Rome utilized various metals for trade, with the reign of leaders like King Croesus marking key developments in the history of coinage and trade.

# Roman Golden Age and Decline

- The denarius and aureus coins facilitated trade in the Roman Republic; however, coin clipping under emperors, notably Nero, led to economic instability.
- Price controls attempted to disguise inflation but ultimately resulted in economic decay, with social consequences leading to the collapse of the Roman economic system.

# **Byzantium and the Bezant**

• Emperor Constantine successfully stabilized currency through the solidus, which became widely adopted and recognized as the bezant, promoting long-term economic stability in the Eastern Roman Empire.

# The Renaissance

• The fall of sound money led to the rise of feudalism; however, the discovery of sound monetary practices in city-states like Florence initiated a resurgence of trade and prosperity in Europe.

# **Transport and the Shift to Paper Currency**

• Technological advancements like the telegraph allowed for easier transfers of value, paving the way for the transition from coins to bills, checks, and ultimately, fully fiat currencies.

#### The Gold Standard and Its Fall

 The gold standard era was marked by global prosperity and capital accumulation until World War I, when governments turned to inflationary practices, leading to the end of the gold standard globally.

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# **Government Money**

# **Transition to Fiat Currency**

 World War I marked the beginning of irredeemable government money, leading to rapid issuance and inflation, and ultimately diminishing the value of currencies as they lacked the backing of gold.

# **Historical Examples of Fiat Money**

 Historical instances, such as the Song Dynasty's fiat currency, show that without redeemability, fiat systems tend to collapse under their own unsustainable expansion, resulting in dire social consequences.

# **Conclusion: Lessons from Monetary History**

The evolution of money, from commodities to fiat, illustrates the importance of sound currency for economic stability; a lesson underscored by the historical failure of government-controlled money systems.

Pages - 31 - 60

https://texasjournal.com/register/

### **Government Money**

# Major national exchange rates vs. Swiss Franc during WWI

# **Analysis of Soldier's Experience**

- The statements indicate that soldiers from opposing sides saw no reason to fight during WWI and could engage better through peaceful means such as football.
- This illustrates the futility of the conflict, questioning the rationale behind national rivalries that led to continued bloodshed.

### **Economic Impact of WWI**

### **Currency Decline**

- Post-war, major European currencies devalued significantly against the Swiss Franc, with the strongest being the U.S. dollar at a mere 4.49% decline, while German and Austrian currencies fell by over 68%.
- The weakening of currencies was symptomatic of a broader economic crisis resulting from wartime inflation and financial mismanagement.

### **Territorial Adjustments**

- Geographic changes post-war led to minimal territorial gains, with significant restructuring of empires like Austro-Hungary.
- Many monarchies were replaced by republics, but the social and economic devastation experienced by populations far outweighed these political shifts.

# **Transition from Gold Standard Suspension of Gold Standard**

- Following the war, countries grappled with the loss of faith in their currencies, leading to discussions on whether to return to a gold standard.
- The challenges included acknowledging past currency devaluations and the risks of gold flight due to reduced confidence in paper currencies.

#### **National Monetary Control**

- With the move towards monetary nationalism, the control over money supply shifted to governments, with fiscal policies no longer reflecting market dynamics.
- This shift favored central planning dictated by government capabilities rather than market demand.

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#### The Interwar Era

### **Treatment of Monetary Policy**

# **Treaty of Genoa**

- The signatory countries recognized the U.S. dollar and British pound as reserve currencies, moving away from the gold standard.
- Inflationary policies were favored as an answer to economic woes post WWI, despite previous commitments to stable gold-backed currencies.

### **Economic Consequences of Inflation**

• Inflationary measures created bubbles in stock and real estate in the U.S., eventually leading to severe economic collapse signaled by the 1929 stock market crash.

### **Causes of the Great Depression**

### **Government Responses**

- President Hoover exacerbated the situation by enforcing policies to maintain high wages while trying to control prices in an economic downturn.
- The focus shifted to government intervention, which instead of alleviating the recession contributed to prolonged economic distress, leading to policies by FDR that further entrenched governmental control over the economy.

## **Post-War and Bretton Woods**

#### **Economic Recovery Post-WWII**

# **Unexpected Economic Boom**

 Contrary to Keynesian predictions, the end of WWII did not result in mass unemployment; instead, American production skyrocketed as price controls were lifted and social planning receded.

#### **Establishment of Bretton Woods**

- The U.S. emerged from WWII with a dominant position, establishing a new global monetary order with the dollar as the primary reserve currency.
- The Bretton Woods Conference tried to replicate the gold standard's stability but ultimately led to centralized monetary management that created its own set of economic distortions.

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#### **Consequences of Floating Currencies**

#### **Imbalance and Pressure on Currencies**

• The system of fixed exchange rates became unmanageable under government inflationary policies, creating recurring financial crises.

#### **Centralized Trade Organization Efforts**

 Global trade efforts under institutions like GATT reflected an attempt to manage trade relations centrally, compensating for the volatility created by fiat currency systems.

### **Government Money's Track Record**

### **Inflation and Hyperinflation**

#### **Case Studies**

 Historical instances, such as Venezuela, represent severe economic collapse due to hyperinflation—a common outcome where government money management fails.

# **Factors Leading to Hyperinflation**

 Government money's ease of expansion and manipulation results in losing its value compared to commodities, which historically neither gold nor silver experience.

# **Final Resolution on Currency Control**

### **Dynamics of Sound Money**

• The rise of government money has increasingly relied on coercion to maintain its use, with less emphasis on achieving economic stability through market mechanisms.

#### **Gold's Continuing Role**

 Despite the abandonment of gold standards, central bank reserves indicate a persistent value in gold, hinting at the limitations of government-controlled money.

# **Modern Implications of Monetary Policy**

#### **Rise of Bitcoin**

Bitcoin's emergence presents a potential shift away from government-controlled money,
 offering a decentralized alternative that meets the needs outlined by classical economic theory.

# **Evolution of Monetary Economics**

 The intersection of technology and economics indicates a future where individuals may choose sound money free from coercive governmental control, reflecting the principles that the market decides the best medium of exchange.

# **Conclusion on Currency and Policy**

### **Sound Money Theory**

 It is defined through characteristics including salability, resistance to manipulation, and the ability to maintain value, facilitating better economic planning and individual freedoms over time.

# **Critical Understanding of Time Preference**

Time preference theory highlights the necessity for sound money as it allows individuals to plan for the future, essential for the formation of civilized societies based on cooperation and productivity.

Pages - 61 -- 90

### **Money and Time Preference**

# **Understanding Time Preference**

#### **Investment and Capital Goods**

- Lower time preference enables individuals to engage in long-term investments, fostering the creation of capital goods rather than immediate consumption.
- The difference between humans and animals is illustrated through tool development, where humans invest time in crafting tools to enhance hunting efficiency, reflecting the essence of investment.

# The Role of Time Preference in Productivity

- Individuals with lower time preference, like Linda, can invest in improving productivity (e.g., building tools), leading to increased outputs compared to higher time preference individuals (e.g., Harry).
- Over generations, this results in significant productivity differences, showcasing that lower time
  preference supports continuous improvement in living standards and technological
  advancement.

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#### The Significance of the Stanford Marshmallow Experiment

# **Delayed Gratification**

- The famous experiment by Walter Mischel highlights how children with lower time preferences tend to achieve better academic and life outcomes.
- This correlation emphasizes the role of self-control in economic decisions and overall life success.

### **Economic Decision-Making**

• Individuals frequently make decisions impacting their future selves, such as saving instead of spending, demonstrating how time preferences guide these critical trade-offs.

# **Factors Influencing Time Preference**

# **Security and Stability**

- A secure environment leads to lower time preference, while those in unstable conditions prioritize immediate gratification due to the uncertainty of the future.
- The role of property security and tax rates also contributes to individuals' time preferences, impacting savings and investment behaviors.

#### **Future Value of Money**

 The expected future value of currency influences time preference, with sound money encouraging long-term thinking and investment compared to depreciating currencies that promote immediate spending.

# The Impact of Unsound Monetary Systems

#### **Decreasing Saving Rates**

- Unsound monetary systems, characterized by inflation, decrease incentives to save, leading to lower capital accumulation and higher indebtedness among individuals.
- Countries with sound money, like Switzerland, tend to have higher saving rates and financial stability compared to those influenced by government-controlled currency systems.

# **Economic Consequences**

- The shift from sound money to government-issued money leads to generational wealth erosion, as contemporary society consumes capital rather than building upon it.
- This trend parallels historical economic declines, emphasizing the importance of sound monetary policy for sustainability.

### **Innovations Fostered by Sound Money**

# "Zero to One" vs. "One to Many"

- Sound money facilitates substantial, long-term innovations, exemplified by technological advancements in the late nineteenth century as compared to the subsequent scaling efforts seen in the twentieth century.
- A mixture of historical inventions and contributions highlights how a culture of saving and delayed gratification spurred transformative breakthroughs.

# **Artistic Flourishing and Cultural Value**

# The Renaissance and Sound Money

- The arts flourished under sound money, with long-term investment allowing for significant cultural contributions, contrasting modern art's often transient nature.
- Historical patrons prioritized enduring quality in art, whereas contemporary funding mechanisms often lead to ephemeral works driven by political agendas.

#### The Decline of Artistic Merit

• Modern art is critiqued for lacking the depth and effort of historical masterpieces, as governmental funding models diminish artistic standards and long-term dedication.

The erosion of familial and societal values correlates with economic policies that undermine individual investment in both personal and cultural legacies.

Pages - 91 - 120

# **Chapter 6: Capitalism's Information System**

#### Money as a Medium of Information

# **Functions of Money**

- Money serves as a medium of exchange, enabling economic actors to participate in planning and calculation.
- It acts as a unit of account, providing a fixed frame of reference for valuing different objects, which is crucial as production scales up.

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#### Friedrich Hayek's Insights

- Hayek's paper, "The Use of Knowledge in Society," emphasizes that economic knowledge is not concentrated but distributed among individuals.
- Prices emerge as signals that communicate this dispersed knowledge, allowing individuals to make informed decisions without needing complete information about the market.

# **Price Signals and Economic Coordination**

#### The Role of Prices

- Prices are knowledge that represent the distillation of market conditions, enabling coordination between supply and demand without central authority.
- An example is the 2010 Chile earthquake that disrupted copper supply, causing prices to rise and leading to adjustments in production and consumption.

# **Central Planning vs. Price Systems**

- If central planners tried to manage production without prices, the results would be inefficiency and failure due to their inability to access the necessary decentralized knowledge.
- A market free of price controls is essential for economic activity to thrive and to allocate resources effectively based on individual preferences and valuations.

### **Capital Accumulation and Socialist Failure**

## **Mises on Socialism**

- Mises argued that socialism fails not due to motivation issues, but because it lacks a price mechanism to facilitate economic calculation in the allocation of capital goods.
- Without a market for capital where independent actors can bid, determining the productive allocations of resources is impossible.

# **Consequences of Central Planning**

- Central planning eliminates the emergent nature of prices needed for coordinating complex production structures, leading to malinvestments and economic disruption.
- The absence of prices in socialism complicates decision-making on how much of each capital good to produce, ultimately causing systemic failures.

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#### **Modern Capital Markets and Their Flaws**

### **Structure of Capital Markets**

- In modern economies, capital is allocated through a centrally controlled market with manipulated interest rates due to central bank interventions.
- This leads to distorted supply and demand dynamics, causing economic cycles characterized by boom and bust.

### The Dangers of Monetary Policy

 Central banks manipulate interest rates, leading to bubbles when the demand for borrowed capital exceeds the available savings, culminating in recessions due to malinvestments that cannot be completed.

# **Business Cycles Under Central Banking**

#### **Causes of Economic Crises**

• Recessions are a natural outcome of manipulated interest rates and expansive monetary policy, which misleads investors into overestimating available capital.

#### **Misconceptions About Economic Failures**

• Contrary to popular belief, economic downturns stem from the manipulation of money supply rather than inherent issues within capitalist markets or "animal spirits."

# **Sound Money Principles**

# The Importance of Stable Currency

Sound money allows for consistent trade and investment decisions. Historical examples
demonstrate that countries with stable currencies and limited government intervention see
lower unemployment and stronger economies.

## The Gold Standard Era

 Venezuela's and Switzerland's economic histories illustrate how adherence to sound monetary principles enables economic resilience compared to regions reliant on government-induced instability.

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#### **Conclusion on Currency Management**

### **Currency Wars and Global Trade**

- Floating exchange rates create instability, leading countries to devalue currencies in a detrimental race to increase exports.
- Instead of fostering genuine economic growth, this behavior leads to inefficiencies and wealth destruction in the domestic economy.

# **Recommendations for Future Systems**

A return to sound money would allow for accurate price signals, enabling producers and consumers to operate efficiently without interference from central banks, stabilizing both domestic and international trade.

#### THE BITCOIN STANDARD

# **Should Government Manage the Money Supply?**

# The Fundamental Scam of Modernity

- The belief that government needs to manage the money supply lacks real-world evidence and has led to repeated economic disasters, making it a core issue in modern economics.
- Attempts to manage the money supply are likened to addictive drugs, providing initial euphoria followed by severe downsides.

# The State Theory of Money

### **Keynesians and Marxist Economists**

- Both schools argue that money is whatever the state defines it as, leading to tendencies for governments to print money as a means to achieve policy ends.
- Historical use of gold as currency predates government interventions, contradicting the state theory of money.

# **Mainstream Economic Schools**

#### **Keynesians vs. Monetarists**

- While differing in methodology, both schools agree that governments must expand the money supply regularly.
- Keynesians blame recessions on low spending and advocate for increased government spending, while Monetarists focus more on avoiding deflation.

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#### The Flaw of Keynesian Economics

- Keynes' theory promotes government intervention without addressing foundational economic principles, leading to misinterpretations of causality in economic downturns.
- Keynesians focus on immediate consumption and deny the long-term consequences of money supply expansion, further complicating economic realities.

# **Sound Money and Individual Freedom**

#### The Austrian School of Economics

### **Origins of Money**

- Money is a market phenomenon emerging from the most marketable commodity, with soundness relying on the absence of government control.
- The Austrian perspective emphasizes purchasing power rather than the mere quantity of money available in the economy.

# **Long-Term Economic Implications**

# **Fixed Money Supply**

- A stable money supply encourages savings and investments, leading to long-term economic growth, while fluctuating supplies create cycles of boom and bust.
- Lower time preferences arise in societies with a sound currency, promoting future-oriented behaviors.

# **Unsound Money and War**

- Unsound money contributes to international trade barriers, allowing governments to finance wars through currency creation rather than taxation.
- This approach instills a culture of low time preference where individuals are less cooperative and more prone to conflict.

#### **Limited versus Omnipotent Government**

#### The Shift in Government Role

- The shift from classical liberalism to modern liberality allows governments to indulge citizens' desires while avoiding responsibility for economic consequences.
- Historically, sound money constrained government actions, leading to a more accountable form of governance.

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# The Dangers of Unsound Money

- Unsound money permits government overreach and evasion of accountability, enabling the financing of populist initiatives without upfront costs.
- By creating an illusion of free resources, governments can sustain unhealthy spending patterns, leading to consequences faced by citizens later on.

#### The Bezzle

#### **Economic Misallocation**

- Unsound money incentivizes the production of unnecessary money rather than valuable goods, leading to unproductive investments and economic stagnation.
- Inflationary credit creation distorts market signals, supporting failed businesses while manufacturing a facade of prosperity.

# The Role of Government and Academic Institutions

- Government funding in academia perpetuates erroneous economic models and biases, maintaining a status quo that does not reflect market realities.
- Institutions prioritize alignment with government agendas over genuine academic inquiry, hindering critical understanding of economic principles.

# The Future of Industry and Society

- A return to sound money could combat the distortions of current economic systems, prioritizing productivity, accountability, and societal welfare.
- As government influence wanes, industries would shift focus from surviving through political favoritism to offering genuine value in the market.

# Conclusion

Understanding the implications of sound versus unsound money is vital for shaping a future that values individual freedom, economic responsibility, and sustainable growth.

Pages - 151 -- 180

https://texasjournal.com/register/

### **Digital Money**

# **Overview of Digital Money**

# The Influence of Telecommunications on Money

- The telecommunication revolution has radically transformed how individuals and organizations manage payments and recordkeeping, promoting technological innovations but failing to create new forms of money until Bitcoin emerged.
- Bitcoin is recognized as the first functional digital money, offering solutions to existing monetary issues related to salability, soundness, and sovereignty with continuous operability for nearly a decade.

#### **Historical Monetary Innovations**

- Past monetary innovations, such as the introduction of metallurgy and gold-backed banking, had significant impacts on economic prosperity, contrasting with the failures of unsound monetary systems.
- The history of money highlights how societies benefitted from sound monetary standards while suffering under inferior systems.

# **Bitcoin: A Technological Solution**

- Bitcoin leverages numerous innovations to address the digital money problem, focusing more on its monetary properties than on its technical functions.
- It shifts the paradigm from intermediated payments requiring trust to a decentralized digital cash system with verified scarcity.

# **Bitcoin as Digital Cash**

# **Categories of Payment Methods**

- Cash payments are immediate and final but require physical proximity and trust, while intermediated payments involve third parties for execution, introducing risks and costs.
- Before Bitcoin, all digital payments were intermediated due to the inability to prevent doublespending without trusted authorities.

#### The Birth of Bitcoin

- Bitcoin is the first verified digital cash, eliminating the need for intermediaries and allowing for transactions without trust.
- The digital cash system overcomes the drawbacks of traditional payment methods, empowering individuals with genuine control over their funds.

# The Need for Peer-to-Peer Transactions

- Bitcoin offers a decentralized system that mitigates security vulnerabilities associated with intermediaries.
- It enhances user sovereignty, preventing political interference, surveillance, and fraud risks traditionally tied to intermediated payments.

# **Bitcoin's Unique Monetary Properties**

# **Key Features of Bitcoin**

- Bitcoin operates on distributed verification and consensus; each transaction is recorded anonymously yet securely on a shared ledger that prevents double-spending.
- The process of mining maintains the ledger's integrity, rewarding miners while disincentivizing fraudulent behavior through rigorous difficulty adjustments.

# **Understanding Proof-of-Work**

- Proof-of-work is essential for validating transactions and ensuring network security, requiring significant resource expenditure that prevents malicious attempts at tampering with records.
- The mining process ensures that verifying transactions holds inherent costs that keep the transaction record secure from illicit alterations.

# **Absolute Scarcity**

- Bitcoin embodies both digital and absolute scarcity—there is a finite amount of 21 million coins, establishing allocation based on demand rather than arbitrary expansions of supply.
- The inelastic nature of Bitcoin's supply inspires confidence in its potential as a stable store of value.

# Supply, Value, and Transactions

## **Bitcoin's Economic Model**

- Bitcoin supply expands at a predictable decreasing rate, with mechanisms programmed to adjust mining difficulty, limiting inflation and ensuring a capped total supply.
- The market price of Bitcoin has risen significantly as a response to limited supply, fostered by a reliable monetary policy.

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#### **Transaction Data**

- Bitcoin's emergence has resulted in exponential growth in network transactions, characterized by increased value and expanded user engagement despite ongoing volatility.
- As the network matures, transaction fees have risen, illustrating miners' selectivity fueled by market demand, with transaction values reaching considerable heights.

# **Stability and Future Predictions**

- With growing adoption, Bitcoin's volatility is expected to decline, attracting long-term holders and enhancing market liquidity.
- As Bitcoin continues to evolve, processes will likely stabilize, transitioning Bitcoin from its infancy into a globally recognized monetary asset.

# Appendix: Key Technologies Used by Bitcoin

# Hashing

• Hashing converts data into a fixed-size representation that is non-reversible, essential for secure transactions, verifiable identities, and maintaining the integrity of the Bitcoin ledger.

# **Public Key Cryptography**

• This cryptographic method safeguards ownership of Bitcoin through a pair of keys, where the public key is shared, and the private key remains confidential to secure transactions.

# **Peer-to-Peer Network**

Bitcoin operates on a decentralized network structure without a central authority, allowing equal privileges among participants, thereby reducing vulnerability to centralized failures.

Pages - 181 -- 210

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#### What is Bitcoin Good For?

### The Nature of Resources and Human Capital

# **Understanding Human Capital**

- The value of humans as a resource is highlighted by how population density leads to economic growth. More people generate more ideas, technologies, and economic output.
- Kremer's research points out that regions with higher populations typically exhibit faster economic progress compared to less populated areas.

#### The Role of Raw Materials

- Raw materials are not inherently valuable; rather, human effort and intelligence create their value.
- Humans are the essential resource, as their time and skills can enhance productivity significantly.

#### Bitcoin as a Store of Value

# The Dilemma of Value Storage

- Humans face challenges in storing the value garnered from their finite time, leading to the need for reliable mediums to hold value.
- The supply of different stores of value tends to be influenced by human creativity and input, making it a complex economic dance between supply and demand.

# **Bitcoin's Unique Features**

- Bitcoin introduces a strictly limited supply capped at 21 million coins, which inherently makes it a reliable store of value against inflation and debasement risks faced by traditional currencies.
- Bitcoin's divisibility (down to 100 million satoshis) allows for growth in its value perception without needing to increase its total supply.

#### **Adoption and Economic Potential of Bitcoin**

# **Bitcoin Adoption Rates**

- By 2018, Bitcoin had already gained millions of holders, demonstrating rapid adoption akin to that of reserve currencies.
- Bitcoin's stock-to-flow ratio is set to surpass gold's soon, indicating its potential as a superior store of value.

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# **Mining as Economic Production**

- The dynamics of Bitcoin mining reflect a balance where less effort goes into creating new coins, encouraging more focus on economic productivity in transactions.
- This contrasts with other currencies that can be easily inflated, allowing Bitcoin to solidify its role in economic exchanges.

# **Individual Sovereignty through Bitcoin**

#### **Bitcoin's Role in Economic Freedom**

- As a form of digital cash, Bitcoin provides unprecedented access to sovereign money and economic freedom.
- Users can transact without intermediaries, safeguards against government confiscation, or control.

# **Political Implications of Bitcoin**

- Bitcoin's technology offers a means for individuals to escape governmental financial control, echoing the themes in "The Sovereign Individual."
- The authors argue that as new technologies like Bitcoin emerge, they could disrupt traditional state powers, reducing the control governments have over individuals.

#### International Settlement with Bitcoin

#### Bitcoin vs. Gold in Payments

- Historically, gold served as the key medium for international settlement, but government confiscations have shifted the landscape.
- Bitcoin enables decentralized transactions free from the physical limitations and government controls associated with gold.

# The Advantages of Bitcoin for Global Transactions

- The cost and speed of Bitcoin transactions present a stark improvement over standard international payment systems fraught with delays and high fees.
- Bitcoin does not rely on centralized institutions, presenting a fairer approach to value transfer, with lower risk of counterparty issues.

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#### Bitcoin as a Global Unit of Account

#### **Potential for Stabilization**

- Bitcoin is less than 1% of global money supply, suggesting volatility, but potential exists for it to stabilize with widespread adoption.
- Should Bitcoin become a predominant medium of exchange, market dynamics could lead to stabilizing its value compared to other currencies.

### **Comparison with Gold**

- Unlike gold, Bitcoin lacks a diverse base of non-monetary demand, which may contribute to ongoing volatility.
- Despite its volatility, Bitcoin could serve as a stable unit of account if it reaches a critical mass of users and adoption.

# **Conclusion: Bitcoin's Future and Role**

# **Bitcoin's Undeniable Advantages**

- Bitcoin's strengths lie in its integrity, scarcity, and technological resilience against inflationary and governmental pressures.
- As Bitcoin evolves and matures, it positions itself to play critical roles in global economies, potentially reshaping monetary interactions and individual economic sovereignty.

# **The Choice Ahead**

The future role of Bitcoin hinges on its capacity to attract users as a stable store of value and facilitate transactions in a digital economy while facing competition from both traditional and emerging financial systems.

# **Bitcoin Questions**

### **Resistance to Change**

#### **Coordination Problem**

- Bitcoin's fundamental design has proven resilient against significant changes due to a coordination problem among users with adversarial interests who prefer immutability.
- Proposals that might benefit certain stakeholders, like miners, are unlikely to gain support from existing holders, leading to strong status-quo bias.

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#### **Attempts to Alter Bitcoin**

- Historical attempts to increase block sizes, such as bitcoin XT and bitcoin classic, have rarely gained traction due to majority node resistance.
- Gavin Andresen's involvement with bitcoin XT and later proposals failed to collect enough support from the network.

# **High-profile Forks and Their Outcomes**

# **Bitcoin Cash and Subsequent Forks**

- The creation of Bitcoin Cash in 2017 represented attempted forks aimed at increasing block sizes but resulted in a diminished value compared to Bitcoin.
- Technical issues with Bitcoin Cash, including mining difficulties, further complicated its viability compared to Bitcoin.

# **Implications of Forking**

- The failure of forks illustrates that significant changes to Bitcoin's consensus rules often lead to creation of less valuable and more centralized alternatives.
- Bitcoin's value primarily arises from its immutability, making successful forks unlikely if they change foundational rules.

# **Antifragility of Bitcoin**

#### **Concept of Antifragility**

- Bitcoin thrives on challenges; each thwarted attack reinforces its security and serves to showcase the network's resilience.
- The presence of a global team of volunteer developers is vital in maintaining Bitcoin's code integrity and responding to vulnerabilities.

# **Public Perception and Media**

 Hostile media coverage paradoxically enhances Bitcoin's profile, leading to increased interest and participation despite negativity.

# **Scaling Bitcoin**

# **Challenges of Transaction Capacity**

- Bitcoin's block size limitations currently constrain transaction throughput, necessitating solutions to prevent excessive transaction fees.
- Implementations like SegWit offer potential for increased capacity, but on-chain scaling presents inherent limitations.

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#### **Off-Chain Solutions**

- Off-chain transaction processing is emerging as a necessary solution. Techniques like CoinJoin may allow for increased transaction volumes without compromising Bitcoin's core architecture.
- Mobile USB wallets might facilitate transactions while preserving the integrity of funds stored offline.

# **Bitcoin and Crime**

#### **Misconceptions About Use for Illegal Activities**

- Bitcoin's public ledger undermines its perceived anonymity; most criminal actions involving
   Bitcoin have been traceable back to the perpetrator.
- Victimless crimes could utilize Bitcoin, but the transparency of the blockchain makes it ill-suited for high-risk activities involving identifiable victims.

### **Ransomware and Security**

- Ransomware exemplifies how Bitcoin can facilitate crimes, exploiting vulnerabilities in computer security rather than the currency itself.
- Increased awareness of security measures within organizations is an unforeseen consequence of these criminal activities.

#### Threats to Bitcoin's Existence

## **Economic Incentives Over Technical Attacks**

- Various avenues for potential attacks, such as the 51% attack and equipment compromises, underscore the intricacies of Bitcoin's design investing in its longevity.
- Economic incentives discourage individuals from attempting to undermine Bitcoin due to the long-term benefits of maintaining network reliability.

# **Future of Bitcoin Against Competition**

- Altcoins and alternative digital currencies cannot replicate Bitcoin's security, decentralization, or status as a sound money.
- The threat of better replacements remains, but despite innovation, Bitcoin's unique legacy maintains its lead among cryptocurrencies.

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#### The Role of Centralized Alternatives

- Centralized currencies will likely emerge, but they lack the immutable nature inherent to cryptocurrencies and will not compete with Bitcoin on the same level.
- The increasing comfort with custodial services will coexist with the demand for sovereignty and personal ownership that Bitcoin embodies.

# **Conclusion: Bitcoin's Position as Sound Money**

• Current political and economic structures promote the ongoing demand for decentralized and inflation-resistant currencies like Bitcoin.

The obstacles for competing with Bitcoin remain high, as inherent traits of the currency appeal directly to individuals seeking reliable monetary systems.

# **Bitcoin Questions**

#### **Altcoins and Their Limitations**

#### The Nature of Altcoins

- Altcoins are predominantly variations of Bitcoin's design, with no significant unique features or functionalities, leading to their identity as mere copies.
- The influx of numerous altcoins dilutes the overall brand value, making them difficult to differentiate in the market.

# **Challenges for Altcoins**

- Altcoins cannot compete with Bitcoin's trustless cash functionality and often mimic Bitcoin's features while lacking any meaningful innovations.
- Many altcoins have enriched their creators without delivering substantial enhancements to the original technology.

# **Blockchain Technology**

### Misunderstanding Blockchain

- The belief that blockchain can independently address significant economic or social problems stems from misconceptions about its functionality.
- Blockchain is misrepresented as an elusive cure-all, leading many to ignore the inherent complexities of its true application in Bitcoin.

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#### **Cargo Cult Science**

- The phenomenon of "cargo cult science" illustrates the misguided attempts of businesses to replicate Bitcoin's success without understanding its mechanisms.
- Blockchain technology adds inefficiencies compared to centralized solutions but serves to eliminate reliance on third-party intermediaries.

#### **Use Cases of Blockchain**

#### **Digital Payments**

- Current payment systems are centralized and efficient, while blockchain-based payments incur higher costs and delays.
- Bitcoin's blockchain is primarily beneficial for transactions cleared without intermediaries but fails to match the efficiency of centralized systems.

#### **Smart Contracts**

- Smart contracts aim to automate agreements but struggle with programming complexities and legal implications, evident from failures like the DAO incident.
- The promise of "code is law" is undermined by the reality that software developers maintain the ultimate control, questioning the independence of smart contracts.

# **Database Management**

- Blockchain can register the native currency transactions reliably, but it lacks efficiency for other assets unless tied to valuable cryptocurrencies.
- The reliance on third-party authenticity for asset links undermines trustworthiness in permissioned blockchains.

# **Challenges of Blockchain Adoption**

## **Economic Drawbacks**

#### Redundancy

 Blockchain's redundancy in recording transactions leads to unnecessary costs compared to intermediary systems, making it unattractive for traditional businesses.

# **Scaling Issues**

• The need for each node to maintain a full transaction ledger creates scalability challenges; larger transactions may require centralization, undermining the core principle of decentralization.

# **Regulatory Compliance**

• Blockchain technology's resistance to regulation complicates its application in heavily regulated sectors like finance and law.

# Irreversibility

 Once confirmed, transactions on a blockchain are difficult to reverse, presenting unique challenges for error management compared to traditional systems where intermediaries can rectify mistakes easily.

# **Security Concerns**

• Blockchain's security heavily depends on proof-of-work and processing power, which may pose risks if the incentives for verifiers are misaligned.

#### **Conclusion: Blockchain as Electronic Cash**

• Bitcoin stands as the primary and successful application of blockchain technology, proving that blockchain is best understood as a tool for creating decentralized electronic cash.

Other proposed applications of blockchain fail to enhance efficiency and are often redundant, reinforcing that without a currency, blockchain's utility remains limited.

Pages - 271 -- 300