

# The Bitcoin Standard – Lecture 1 (Money) • Study Notes

By Saifedean Ammous

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## Big Picture

- Money is a **medium of exchange**, not desired for its own sake but to trade for other goods.
  - It solves the **coincidence of wants problem** in barter by enabling indirect exchange.
  - Saleability (liquidity across scales, time, and space) determines what becomes money.
  - Hard money – difficult to produce and resistant to supply inflation – emerges naturally as the best store of value.
  - Gold historically fulfilled this role; Bitcoin now represents a superior digital alternative.
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## Core Claims

1. **What Is Money?**
2. A good bought only to exchange later, not for consumption or production.
3. Needed because direct barter rarely works in large societies.
4. **The Coincidence of Wants Problem**
5. Barter fails when goods don't match in:
  - **Scale** → apples vs. cars.
  - **Time** → I sell today, you buy tomorrow.
  - **Location** → goods in different places.
6. **Indirect Exchange**
7. People naturally adopt media of exchange (bananas, grain, metals, etc.).

8. Over time, the best solutions — highly saleable goods — dominate.
  9. **Menger on Saleability**
  10. Origin of money is **spontaneous**, not decreed by governments.
  11. Goods with higher saleability (easy to sell without loss) become money.
  12. **Saleability Dimensions**
  13. **Across scales** → divisible & combinable.
  14. **Across space** → portable, valuable per weight, durable.
  15. **Across time** → resistant to decay and inflation.
  16. **Hard vs. Easy Money**
  17. **Hard money**: difficult to produce → preserves value (e.g., gold).
  18. **Easy money**: cheap to produce → inflates supply, loses value (e.g., oil, fiat).
  19. Measured by **Stock-to-Flow Ratio** (existing stock vs. annual new supply).
  20. **Why Gold?**
  21. Indestructible, inert, portable, divisible.
  22. Stock-to-flow  $\approx 60$  → new supply insignificant.
  23. Silver once monetary, but corrosion & industrial use reduced its hardness.
  24. **Bitcoin's Role**
  25. First purely digital money with highest hardness.
  26. Emerged from the market voluntarily, not by decree.
  27. Solves coincidence of wants digitally across scales, time, and space.
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## Key Concepts & Mental Models

- **Medium of exchange** vs. **store of value** vs. **unit of account**.
  - **Coincidence of wants problem** → why money exists.
  - **Saleability** → core property that determines monetary adoption.
  - **Stock-to-flow ratio** → measure of monetary hardness.
  - **Spontaneous order** → money emerges from market choice, not government design.
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## Examples & Applications

- **Apples vs. Cars:** lack of coincidence of scales solved by intermediate goods.
  - **Bananas as Money:** possible, but spoilage destroys saleability across time.
  - **Oil:** stock-to-flow  $\approx 1$ , so price collapses with new production  $\rightarrow$  bad money.
  - **Gold:** centuries of dominance due to durability and hardness.
  - **John Law's Paper Money:** historical failure of top-down money design.
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## Quotable Ideas

- “Money is a spontaneous outcome, not a government decree.” — Ammous
  - “Hard money wins; easy money gets wiped out.” — Ammous
  - “Stock-to-flow is the best measure of monetary hardness.” — Ammous
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## Study Prompts

- Define money in terms of its three functions.
  - Explain the coincidence of wants problem in barter.
  - What makes a good highly saleable across scales, time, and space?
  - Contrast gold, silver, oil, and Bitcoin in terms of stock-to-flow.
  - Why does Menger argue money's origin is spontaneous, not decreed?
  - How does Bitcoin solve the coincidence of wants problem digitally?
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## TL;DR

Money arises as a **spontaneous market solution** to the coincidence of wants. The most **saleable goods** — durable, divisible, portable, and hard to produce — emerge as money. Gold dominated for millennia due to its high stock-to-flow ratio, making it the hardest money. Bitcoin now represents the hardest form of money ever created, solving coincidence-of-wants problems in the digital realm. Unlike fiat or easy commodities, Bitcoin is market-born, incorruptible, and poised to inherit the role of global money.

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# The Bitcoin Standard – Lecture 2 (Primitive Money) • Study Notes

By Saifedean Ammous

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## Big Picture

- Primitive monies illustrate how societies experiment with different goods before converging on the hardest form of money.
  - Rhinestones in Yap and glass beads in West Africa show how money can function without moving physically – but also how easy production destroys monetary value.
  - The lesson: **monetary goods survive only if their stock-to-flow ratio is high enough to resist inflation.**
  - Metals eventually outcompeted primitive monies because they are durable, uniform, and harder to inflate.
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## Core Claims

1. **Rhinestones of Yap**
2. Huge limestone disks used as money for centuries.
3. Ownership transferred by social consensus, not physical movement.
4. Similar to Bitcoin: ownership exists on a shared ledger, not in physical transfer.
5. **Salability of Rhinestones**
6. **Across space:** large stones stayed fixed, yet ownership worked anywhere on Yap.
7. **Across time:** strongest feature – limestone scarce on Yap, requiring dangerous expeditions to nearby Palau.
8. **Across scales:** limited divisibility; could not be easily broken into smaller units.

9. **Loss of Monetary Role**

10. Captain O'Keefe (19th c.) used modern ships to mass-produce stones cheaply.

11. Supply inflation destroyed their value → Yap stones lost monetary role.

12. Lesson: without scarcity, money collapses.

13. **Glass Beads in West Africa**

14. Rare locally → adopted as money.

15. Europeans flooded supply with cheap glass → Africans' wealth expropriated.

16. Another example of easy money collapse.

17. **Metals as Money**

18. Outcompeted primitive forms because they can be standardized (coined).

19. Iron and copper → too abundant, low stock-to-flow → lost monetary role.

20. Silver lasted longer but succumbed to industrial overproduction.

21. Gold won because of durability, indestructibility, and very high stock-to-flow ratio.

22. **Stock-to-Flow Framework**

23. **Industrial commodities:** stock-to-flow  $\approx 1$  → supply growth easily floods market.

24. **Gold:** stock-to-flow  $\approx 60$  → new production tiny relative to stock, resistant to inflation.

25. Key: not just rarity, but **indestructibility and accumulated stockpiles.**

26. **Why Not Platinum or Palladium?**

27. Also indestructible, but lack centuries of accumulated stockpiles.

28. Small base means new flow overwhelms stock → volatile, unsuitable as money.

29. Example: 1820s Russia tried platinum coins → failed quickly.

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## Key Concepts & Mental Models

- **Primitive money** → early forms like stones, shells, beads.
  - **Salability** → usefulness across scales, space, time.
  - **Stock-to-flow ratio** → ultimate measure of monetary hardness.
  - **Easy money trap** → high prices → easy new production → collapse.
  - **Difficulty adjustment** → Bitcoin's innovation preventing supply inflation.
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## Examples & Applications

- **Yap Stones:** Bitcoin analogy — consensus ledger, ownership transfer without physical movement.
  - **Captain O’Keefe:** demonstrates inflationary collapse of easy money.
  - **Glass Beads:** colonial exploitation through monetary debasement.
  - **Metals:** natural “protocol war” of money; gold won.
  - **Asteroid Mining Thought Experiment:** would increase stock-to-flow → strengthen gold’s role.
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## Quotable Ideas

- “Money is chosen not by decree, but by properties that resist inflation.” — Ammous
  - “The problem with easy money is always supply inflation.” — Ammous
  - “Gold is money not because it is rare, but because it is indestructible and has the highest stock-to-flow ratio.” — Ammous
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## Study Prompts

- How did Yap stones function as money without moving?
  - Why did Captain O’Keefe’s arrival destroy their monetary role?
  - Explain why glass beads in West Africa were demonetized.
  - Compare iron, copper, silver, and gold as monetary metals.
  - Why does indestructibility matter more than rarity?
  - Why do platinum and palladium fail as monetary goods?
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## **TL;DR**

Primitive monies like Yap stones and glass beads worked temporarily, but their low hardness made them vulnerable to supply inflation. Metals outcompeted them due to durability and uniformity, with gold ultimately dominating because it is indestructible and accumulates stockpiles across millennia. The stock-to-flow ratio is the key framework: easy money always collapses; hard money survives. Bitcoin inherits gold's role by combining indestructibility with difficulty adjustment, making it the hardest money ever created.

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# The Bitcoin Standard – Lecture 3 (Monetary Metals) • Study Notes

By Saifedean Ammous

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## Big Picture

- For ~2,000 years, the world's dominant monies were **metals**.
  - **Gold and silver** emerged as the leading monetary metals, with gold ultimately winning because of its hardness and durability.
  - The introduction of **coinage** standardized weight and purity, improving salability and enabling global trade.
  - The competition between gold and silver ended with the **demonetization of silver** in the 19th century.
  - Gold's high **stock-to-flow ratio** made it the hardest money prior to Bitcoin.
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## Core Claims

1. **Why Metals Became Money**
2. Metals are durable, divisible, portable, and widely recognizable.
3. Coinage increased trust and standardization, making trade more efficient.
4. Gold: most saleable across time and space.
5. Silver: most saleable across scales (smaller transactions).
6. **Gold vs. Silver**
7. Gold: indestructible, high stock-to-flow (~60), best long-term store of value.
8. Silver: useful for small denominations, but lower stock-to-flow (now ~3).
9. Industrial use and susceptibility to rust/decay weakened silver's role.
10. **The Fall of Silver**

11. Rise of banking, telegraph, and railroads enabled paper claims to replace physical coins.
  12. Once paper substitutes existed, gold-backed paper outcompeted silver-backed paper.
  13. Franco-Prussian War (1870s) was the tipping point: reparations demanded in gold → silver collapsed as money.
  14. Long-term result: demonetization of silver, destruction of Indian rupee relative to British gold-backed pound.
  15. **The Hunt Brothers' Silver Pump (1980)**
  16. Attempted to corner silver market by buying up supply.
  17. Price rose to \$50/oz → triggered massive new production and recycling (silverware melted).
  18. Supply expansion crushed price → silver exposed as “easy money” with no difficulty adjustment.
  19. **Gold's Unique Properties**
  20. Annual new supply ~1.5–2%, stable for centuries.
  21. Accumulated stock never decays.
  22. High stockpile size vs. flow prevents inflationary collapse.
  23. Still held by central banks today (~10x more than during gold standard).
  24. **Historical Lessons**
  25. Rome: prosperity rose with coinage, collapsed with debasement and inflation.
  26. Byzantium: the **solidus/bezant** coin held weight/purity for ~1,000 years, creating stability.
  27. Medieval Renaissance: Florence's florin & Venice's ducat fueled trade and capital accumulation.
  28. 19th–early 20th century: global gold standard created predictable, fixed exchange rates across nations.
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## Key Concepts & Mental Models

- **Saleability** → across time (gold), scales (silver), space (portable coins).
- **Stock-to-flow ratio** → ultimate measure of hardness.
- **Demonetization** → gradual collapse of silver as money.
- **Difficulty adjustment** → Bitcoin's key innovation preventing supply inflation.

- **Extent of the market** (Adam Smith) → grows with sound, uniform money.
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## Examples & Applications

- **Gold Coin ≈ Cow**: storing value over decades.
  - **Silver as “working man’s money”** vs. gold as “king’s money.”
  - **Byzantine Solidus**: 4.5g of gold, stable for centuries, still recognized today.
  - **Indian Rupee vs. British Pound**: silver vs. gold → long-term wealth divergence.
  - **Modern Central Banks**: still hoard gold while issuing fiat.
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## Quotable Ideas

- “Silver is the original shitcoin.” — Ammous
  - “Gold’s hardness is its difficulty adjustment: stockpiles never decay.” — Ammous
  - “Civilizations rise on sound money and collapse when it is debased.” — Mises (paraphrased)
  - “The bezant was the only altcoin worth respecting.” — Ammous
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## Study Prompts

- Why did coinage transform the role of metals as money?
- Compare gold’s saleability across time vs. silver’s saleability across scales.
- Explain how the telegraph and railroads undermined silver’s role.
- What killed silver as money after the Franco-Prussian War?
- Why did the Hunt brothers’ attempt to corner silver fail?
- How did the Byzantine solidus maintain stability for 1,000 years?

- Why is the 19th-century gold standard seen as a high point in monetary history?
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### **TL;DR**

Metals became money because they were durable, divisible, and portable. Gold emerged as the hardest money due to its indestructibility and high stock-to-flow ratio, while silver fell behind once banking allowed paper substitutes to replace small-denomination coins. The Franco-Prussian War sealed silver's demonetization, leaving gold as the global standard. History shows civilizations flourish with hard money and collapse with debasement. Gold was the best monetary technology before Bitcoin — which improves on it with built-in difficulty adjustment and incorruptibility.

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# The Bitcoin Standard – Lecture 4 (Government Money) • Study Notes

*By Saifedean Ammous*

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## Big Picture

- Government money did not emerge by decree — every form of state money began as **redeemable in market money** (gold or silver).
  - The suspension of gold redeemability during **World War I** marked the real birth of fiat.
  - Fiat enabled governments to finance wars, debt, and welfare states on an unprecedented scale.
  - The 20th century became the age of **permanent inflation, hyperinflation, and mass destruction**.
  - Central banking and Keynesian economics provided ideological cover for state control of money.
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## Core Claims

1. **No Pure Fiat Emergence**
2. No government has ever successfully declared a worthless token as money by decree.
3. State money always began as a claim redeemable in market-chosen money (gold/silver).
4. Fiat arises when redeemability is suspended, not when decrees are issued.
5. **World War I as the Turning Point**
6. In 1914, gold redeemability was suspended to finance war.

7. Wars lengthened and intensified because governments could now **print** instead of relying on gold reserves.
  8. Collapse of German and Austrian currencies coincided with their military defeat.
  9. **Contained Wars vs. Total Wars**
  10. Under gold: wars limited by available reserves → kings careful about waste.
  11. Under fiat: unlimited paper → 20th century wars became **total wars**, destroying civilians and economies alike.
  12. **Interwar Instability & Great Depression**
  13. Post-WWI currencies distorted by inflation.
  14. Britain tried to return to gold at pre-war parity → unsustainable arbitrage → collapse.
  15. US inflation to support Britain created 1920s bubbles → crash → Great Depression.
  16. Government interventions (Hoover/FDR) worsened depression, despite Keynesian myth of “stimulus.”
  17. **WWII & Keynesian Delusion**
  18. Keynesians claimed war spending = economic recovery.
  19. In reality: war destroyed wealth; prosperity came only after war ended and resources returned to production.
  20. Keynesianism became dominant despite being **morally bankrupt and empirically wrong**.
  21. **Bretton Woods (1944)**
  22. US imposed a pseudo-gold standard: dollar as reserve, redeemable in gold only for central banks.
  23. Gave US privilege to print dollars at will while others held devaluing reserves.
  24. Collapse inevitable → 1971 Nixon shock ended redeemability altogether.
  25. **Fiat Era: Inflation & Hyperinflation**
  26. 20th century = history of inflation, hyperinflation, and state theft.
  27. On average, government currencies grew ~30% annually.
  28. Stable currencies (USD, yen, Swiss franc) still inflate ~2–5% yearly → steady erosion of savings.
  29. **Central Banks Still Hoard Gold**
  30. If fiat were truly money, central banks wouldn't keep trillions in gold reserves.
  31. Gold remains the ultimate settlement asset — fiat is just state-issued **slave scrip**.
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## Key Concepts & Mental Models

- **Redeemability principle** → fiat only survives after suspending gold/silver backing.
  - **Gold standard vs. fiat wars** → resource-limited vs. unlimited carnage.
  - **Stablecoin analogy** → pegged currencies collapse if redemption is mispriced.
  - **Stock-to-flow in fiat** → most government monies are “easy money” with low hardness.
  - **Hayek’s Insight** → we need money “by some sly, roundabout way” that governments cannot stop → Bitcoin.
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## Examples & Applications

- **1914 Gold Suspension** → beginning of modern fiat.
  - **British Arbitrage (1920s)** → buy underpriced gold in Britain, sell abroad for profit.
  - **Great Depression** → fueled by inflationary bubble of 1920s, worsened by interventions.
  - **US Dollar at Bretton Woods** → backed by gold but redeemable only for states.
  - **Zimbabwe, Argentina, Venezuela** → hyperinflation = collapse of civilization’s division of labor.
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## Quotable Ideas

- “There has never been a pure fiat currency decreed into existence — money arises from the market, not government.” — Ammous
- “World War I was the true end of the gold standard.” — Ammous
- “War does not create prosperity; it destroys it.” — Ammous
- “Fiat money is slave scrip; gold remains the real money.” — Ammous
- “We shall never have good money again before we take it out of the hands of

government.” — Hayek

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### **Study Prompts**

- Why has no pure fiat money ever emerged by decree?
  - How did suspension of gold redeemability change the nature of war?
  - Why were wars shorter and more limited under the gold standard?
  - How did British monetary policy in the 1920s lead to collapse?
  - What role did inflation play in causing the Great Depression?
  - Why do central banks still hold gold despite claiming fiat is money?
  - How does Hayek’s “sly, roundabout way” foreshadow Bitcoin?
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### **TL;DR**

Government money is not money by decree; it is always born as a redeemable claim on market money. The suspension of gold in 1914 birthed fiat, enabling governments to wage endless wars, inflate, and plunder wealth. The 20th century became defined by hyperinflation, Keynesian ideology, and the destruction of prosperity. Despite fiat dominance, central banks still hoard gold, proving gold — not fiat — remains the true money. Hayek foresaw the solution: a monetary system outside government control. Bitcoin fulfills that vision.

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# The Bitcoin Standard – Lecture 5 (Money and Time Preference) • Study Notes

By Saifedean Ammous

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## Big Picture

- **Time preference** = the degree to which people value the present over the future.
  - All humans have positive time preference (we prefer something now to the same thing later), but it varies by circumstance.
  - Civilization advances when societies **lower their time preference**, delaying gratification to invest in capital, technology, and the future.
  - **Hard money** encourages low time preference because it holds value across time, incentivizing saving and long-term thinking.
  - **Fiat money** raises time preference, rewarding debt and consumption, eroding capital accumulation, and weakening family, culture, and innovation.
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## Core Claims

1. **Why Time Preference Exists**
2. Humans are mortal → life is uncertain → we discount the future relative to the present.
3. Time preference is universal, but its degree differs by person, society, and money.
4. **Measuring Time Preference**
5. Example: \$100 today vs. \$100 in a year.
6. If you only need \$101 to wait → low time preference (1%).
7. If you need \$150 → high time preference (50%).

8. **Humans vs. Animals**

- 9. Animals act impulsively based on instinct (food, sex, fight/flight).
- 10. Humans use reason to delay gratification, accumulate capital, and plan for the future.
- 11. Lowering time preference = what initiates **civilization**.

12. **Capital Accumulation**

- 13. Saving resources instead of consuming → investment in capital goods.
- 14. Example: fisherman builds boat instead of catching fish today → later catches 10x more fish.
- 15. Capital extends the **production horizon**, raising productivity.

16. **Civilization and Productivity**

- 17. Every technological leap (fishing rod → boat → massive trawler) reflects delayed gratification and long-term investment.
- 18. Capitalists are not exploiters but enablers of productivity – they delayed consumption to fund capital goods.

19. **The Individual Dimension**

- 20. Every choice is a trade with your future self.
- 21. High time preference = short-term thrills, debt, waste → bankruptcy (e.g., athletes who blow millions).
- 22. Low time preference = saving, investing, skills → long-term prosperity.

23. **Hard Money vs. Fiat**

- 24. Hard money → stable or appreciating → saving is rewarded → long-term planning.
- 25. Fiat → depreciating → saving is punished, borrowing rewarded → short-termism dominates.
- 26. Evidence: falling savings rates since fiat adoption; Switzerland (last on gold) retained high savings longest.

27. **Social & Cultural Effects**

- 28. Families: low time preference encourages building and investing in family for future care.
  - 29. Welfare states reduce incentives for family by replacing its functions.
  - 30. Innovation: most transformative inventions (steam engine, electricity, airplane) emerged under the gold standard, not fiat.
  - 31. Art & Culture: decline since 1914 parallels fiat money and rising time preference.
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## Key Concepts & Mental Models

- **Time preference** → discounting the future relative to the present.
  - **Capital accumulation** → productivity grows when consumption is delayed.
  - **Production horizon** → length of time for investment to yield returns.
  - **Every choice = trade with future self** → your life is shaped by past decisions.
  - **Hard money = low time preference; fiat money = high time preference.**
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## Examples & Applications

- **Fishing boat example** → delaying consumption leads to exponential productivity.
  - **Anneliese Elena (largest fishing trawler)** → decades of delayed gratification enabled massive productivity gains.
  - **Athlete bankruptcy** → high time preference ruins fortunes no matter how large.
  - **Wright brothers** → independent capitalists with savings under gold standard → airplane invention.
  - **Switzerland** → high savings persisted due to longer gold standard adherence.
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## Quotable Ideas

- “Lowering time preference is what initiates the process of civilization.” — Ammous
  - “Every decision you make is a trade with your future self.” — Ammous
  - “A high enough time preference will bankrupt you, no matter how much money you earn.” — Ammous
  - “The hardness of money determines the horizon of civilization.” — Ammous
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## Study Prompts

- Define time preference. Why is it always positive?
  - Why does lowering time preference enable civilization?
  - How does capital accumulation raise productivity?
  - Why does hard money encourage saving and long-term planning?
  - What explains falling savings rates since fiat adoption?
  - How do fiat incentives affect family, culture, and innovation?
  - Compare the Wright brothers' independence with today's debt-financed innovators.
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## TL;DR

Time preference is the key concept linking money, productivity, and civilization. Humans naturally value the present over the future, but the ability to **lower time preference** through reason and hard money fuels capital accumulation, innovation, and cultural flourishing. Hard money stabilizes value, rewarding saving and long-term planning. Fiat money erodes value, rewarding borrowing and consumption, leading to high time preference societies that undermine families, culture, and innovation. Bitcoin, like gold before it, lowers time preference and fosters civilization's growth.

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# The Bitcoin Standard – Lecture 6 (Capitalism’s Information System) • Study Notes

By Saifedean Ammous

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## Big Picture

- Prices are the **information system of capitalism**, distilling vast, dispersed knowledge into a single variable for decision-making.
  - Hayek’s “Use of Knowledge in Society” and Mises’ critique of socialism show why central planning fails: **without market prices, rational economic calculation is impossible.**
  - Sound money is essential for accurate price signals. Fiat money manipulation distorts interest rates, misallocates capital, and causes business cycles.
  - The foreign exchange system under fiat is a massive inefficiency, turning global trade into partial barter. Bitcoin eliminates this by restoring a single, neutral unit of account.
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## Core Claims

1. **Knowledge Problem**
2. Economic knowledge is decentralized; no single planner can know all.
3. Prices condense dispersed knowledge into actionable signals.
4. Example: copper price spike after Chile earthquake → instantly directs producers and consumers worldwide without central command.
5. **Role of Prices**
6. Allow individuals to act on **local knowledge** while aligning with global realities.
7. Entrepreneurs calculate profits/losses only in a common unit of account.
8. Without money and prices, coordination breaks down.

9. **Mises' Critique of Socialism**
  10. Socialism = no private ownership of capital → no market for capital goods → no economic calculation.
  11. Stock market existence is litmus test: if capital can be bought/sold, society is capitalist.
  12. Socialism fails not just due to incentives but due to **calculation impossibility**.
  13. **Capital Market & Interest Rates**
  14. In a free market, interest rate = expression of **time preference**.
  15. Lower time preference → more saving → more capital → lower interest rates.
  16. Historical trend: interest rates have declined with civilization, interrupted by wars/insecurity.
  17. **Fiat Distortion**
  18. Central banks monopolize credit, set artificial rates.
  19. Artificially low rates signal more capital than exists → leads to **malinvestment** (Austrian Business Cycle Theory).
  20. Recessions = liquidation of projects that never should have started.
  21. Switzerland pre-1970s gold standard: virtually zero unemployment, no recessions → proof of sound money stability.
  22. **Global Trade & Partial Barter**
  23. Multiple fiat currencies reintroduce barter-like inefficiency.
  24. Foreign exchange market = \$5T/day, ~25x world GDP, mostly wasted churn.
  25. Businesses forced to speculate in FX just to trade goods.
  26. Gold standard eliminated this; Bitcoin promises to again.
  27. **Bitcoin's Fix**
  28. Neutral, apolitical, global money.
  29. Removes FX costs, restores global unit of account.
  30. Returns prices to accurate reflection of time preference and scarcity.
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## Key Concepts & Mental Models

- **Knowledge Problem (Hayek)** → no central planner can know all.
- **Economic Calculation (Mises)** → requires prices in a common unit of account.
- **Time Preference & Interest Rates** → interest reflects society's orientation to future.

- **Malinvestment** → projects started under false monetary signals.
  - **Partial Barter** → fiat FX system = regression away from true free trade.
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## Examples & Applications

- **Copper market after Chile earthquake** → price instantly coordinates supply & demand globally.
  - **Swiss gold standard era** → near-zero unemployment due to absence of monetary cycles.
  - **Mises' builder parable** → false signals = projects started that can't be finished.
  - **Foreign exchange inefficiency** → \$1860T/year FX trade = misallocation of global resources.
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## Quotable Ideas

- “Prices are the information system of capitalism.” — Ammous
  - “Socialism fails not because men are lazy, but because calculation is impossible.” — Mises
  - “Interest is the measure of a nation’s morality.” — Böhm-Bawerk (quoted)
  - “Adding more fiat currencies is regression to barter.” — Hoppe
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## Study Prompts

- Why can no central planner match the knowledge of the price system?
- How do prices coordinate entrepreneurs’ decisions?
- Why is a stock market proof of capitalism?
- How does time preference determine interest rates?

- Explain malinvestment using Mises' builder analogy.
  - Why does fiat turn global trade into partial barter?
  - How does Bitcoin solve the FX inefficiency?
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### **TL;DR**

Capitalism's genius lies in prices, which transmit dispersed knowledge across society. Hayek showed why central planning fails; Mises demonstrated that without private capital markets, rational calculation is impossible. Sound money underpins accurate price signals. Fiat money distorts them, causing malinvestment, recessions, and massive global trade inefficiencies. Switzerland's gold standard prosperity proves the case. Bitcoin fixes this by restoring a single, hard, neutral money that aligns global coordination with reality.

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# The Bitcoin Standard – Lecture 7 (Sound Money & Individual Freedom) • Study Notes

By Saifedean Ammous

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## Big Picture

- **Should government manage money?** Ammous' answer: absolutely not.
  - Governments left the gold standard not for better money, but to finance **wars**.
  - Keynesian economics arose as an **excuse** for abandoning gold, not a discovery of superior theory.
  - Fiat money enables **permanent inflation, endless wars, and bloated states**, while sound money protects freedom.
  - Hard money disciplines governments, rewards saving, and empowers individuals to take responsibility for their lives.
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## Core Claims

1. **Government Control Motivated by War**
2. Gold standard was abandoned in 1914 to finance WWI.
3. Officials admitted gold was better money but suspended it to print for war.
4. Intellectual justifications (Keynesianism) came later as cover.
5. **Keynesian Economics as Excuse**
6. Keynes' *General Theory* (1936) turned "aggregate expenditure" into the driver of the economy.
7. Introduced fuzzy concepts like **animal spirits** to justify state spending.
8. Claimed recessions come from insufficient spending → solution: government printing and spending.

9. Created the **Phillips Curve** idea (trade-off between unemployment & inflation), disproven by stagflation in the 1970s.
10. **Why Fiat Is Destructive**
11. Government printing leads to:
  - Endless wars (open checkbook).
  - Inflation (hidden tax).
  - Growth of welfare/warfare states.
  - Erosion of savings and family structure.
12. “Slave scrip” that empowers government at expense of citizens.
13. **War & Fiat Money**
14. Under gold: wars limited, costly, often short.
15. Under fiat: total wars, conscription, civilians targeted.
16. 20th century = century of **total war + total state + fiat money**.
17. Dictators and genocides in modern times all relied on fiat-financed regimes.
18. **Liberalism vs. Liberality** (Jacques Barzun’s *From Dawn to Decadence*)
19. **Liberalism**: individuals free, responsible for actions.
20. **Liberality**: individuals shielded from consequences, relying on state nannyism.
21. Fiat accelerated the shift from liberalism → liberality → nanny state democracies.
22. **The Bezzle**
23. Fiat economies sustain **malinvestment and waste** because credit props up unproductive firms.
24. People end up working meaningless jobs with no real productivity.
25. Interest-rate arbitrage becomes more profitable than real production.
26. Explains rise of megacorps and decline of mom-and-pop shops.

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## Key Concepts & Mental Models

- **Keynesian Aggregate Expenditure** → spending drives economy (false).
- **Phillips Curve** → fake trade-off between unemployment & inflation.
- **Cantillon Effect** → early receivers of new money benefit, late receivers lose.
- **The Bezzle** → accumulated waste and fake activity financed by fiat.
- **Liberalism vs. Liberality** → responsibility vs. state dependency.

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## Examples & Applications

- **WWI suspension of gold** → true start of fiat era.
- **Stagflation of the 1970s** → destroyed Keynesian Phillips Curve.
- **IBM & Enterprise Blockchain** → fiat jobs producing nothing of value, funded by easy credit.
- **Macy's Credit Cards** → businesses pivot to financialization, not production.
- **Walmart/McDonald's vs. Mom & Pop** → interest-rate arbitrage kills small shops.

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## Quotable Ideas

- “Governments didn’t abandon gold to improve money, they abandoned it to fight wars.” — Ammous
- “Keynes’ *General Theory* is not science; it is a just-so story.” — Ammous
- “No genocide was ever financed under the gold standard.” — Ammous
- “Fiat is slave scrip; sound money is freedom.” — Ammous
- “Democracy is a mass delusion of people voting themselves a free lunch.” — Ammous

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## Study Prompts

- Why was the gold standard suspended in 1914?
- How did Keynesian economics serve as an excuse for fiat?
- Why does fiat make endless wars possible?
- Explain the difference between liberalism and liberality.
- What is “the bezzle” and how does it distort modern economies?
- How does the Cantillon Effect explain inequality under fiat?

- Why are small businesses crushed in fiat economies?
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### **TL;DR**

Governments abandoned gold not for economic progress but to fund wars. Keynesianism then provided intellectual cover, turning inflation and government spending into policy tools. Fiat money empowers states at the expense of individuals, creating inflation, endless wars, nanny states, and corporate bezzles. Sound money disciplines governments, lowers time preference, and restores freedom. Civilization flourishes only under hard money — fiat corrodes it.

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# The Bitcoin Standard – Lecture 8 (Digital Money) • Study Notes

By Saifedean Ammous

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## Big Picture

- Bitcoin is the world's first form of **digital cash**: money that is both digital and final settlement without counterparty risk.
  - The key breakthrough is **digital scarcity**, made possible by **proof of work** and the **difficulty adjustment**.
  - Unlike fiat or commodities, Bitcoin's supply cannot be inflated no matter how much effort or cost is expended.
  - Bitcoin merges the **finality of cash** with the **convenience of digital payments**, replacing central banks with software.
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## Core Claims

1. **Why Digital Money Matters**
2. Most money today is already digital (bank databases).
3. Bitcoin goes further: the *currency itself* is digital, scarce, and final.
4. Software can now serve as money, not just as a ledger of paper money.
5. **Cash vs. Credit**
6. **Cash** = final settlement, no counterparty risk (historically gold).
7. **Credit** = requires trust in a third party (banks, governments).
8. Bitcoin enables **cash-like settlement** in the digital realm: disintermediated, irreversible, final.
9. **Verification, Not Trust**

10. Bitcoin is a **verification machine**: every node replays and verifies the entire chain.
  11. Motto: *"100% verification, 0% trust."*
  12. Proof of work makes producing blocks costly but verifying them nearly free → strong asymmetry against fraud.
  13. **Difficulty Adjustment: The Breakthrough**
  14. Every ~2,016 blocks (~2 weeks), Bitcoin adjusts mining difficulty.
  15. No matter how much hashpower enters, new supply remains fixed.
  16. Prevents the "easy money trap" of every other monetary good (gold, silver, fiat).
  17. More mining = more security, not more coins.
  18. **Why Bitcoin Is Different**
  19. Other commodities: rising price → more supply → price crashes.
  20. Fiat: governments always expand supply via debt and printing.
  21. Bitcoin: fixed schedule → increased demand raises price and security, not supply.
  22. Creates a **virtuous cycle**: higher price → more miners → stronger network → more trust → higher price.
  23. **Bitcoin as a Firm**
  24. Functions like a decentralized software company competing with central banks.
  25. Miners = capital expenditure; hodlers = investors.
  26. Holding bitcoin = funding the network's security and growth.
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## Key Concepts & Mental Models

- **Digital scarcity** → for the first time, information is scarce.
  - **Cash vs. credit payments** → final vs. reversible settlement.
  - **Verification machine** → Bitcoin as trustless auditing system.
  - **Difficulty adjustment** → supply stays fixed, security rises.
  - **Speculative demand** → early holders rewarded, bootstrapping adoption.
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## Examples & Applications

- **Gold vs. Bitcoin** → verifying gold requires labs; verifying Bitcoin requires running a node.
  - **Panama Canal analogy** → limited digital real estate: only so many bitcoins exist.
  - **Stock-to-flow comparison** → Bitcoin out-hardens gold with declining issuance.
  - **Speculative hodling** → early adopters fund network growth by holding scarce coins.
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## Quotable Ideas

- “Bitcoin is digital cash: final settlement in the digital realm.” — Ammous
  - “Bitcoin is a verification machine: 100% verification, 0% trust.” — Ammous
  - “Difficulty adjustment is the magic sauce that makes Bitcoin work.” — Ammous
  - “With Bitcoin, more demand doesn’t inflate supply — it strengthens security.” — Ammous
  - “Bitcoin is the closest thing we have to artificial intelligence: an organism securing its own survival.” — Ammous
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## Study Prompts

- Why is it counterintuitive to imagine software as money?
  - What is the difference between cash and credit payments?
  - How does proof of work make fraud costly and verification cheap?
  - Why is difficulty adjustment Bitcoin’s key innovation?
  - How does Bitcoin avoid the “easy money trap”?
  - Why can Bitcoin be compared to a decentralized software firm?
  - What is speculative demand, and how does it bootstrap adoption?
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## TL;DR

Bitcoin introduces **digital scarcity**: money that is both digital and strictly limited in supply. By merging cash-like finality with digital transferability, Bitcoin disintermediates central banks and payment processors. Its breakthrough is the **difficulty adjustment**, ensuring supply stays fixed no matter how much effort goes into mining. Rising demand strengthens security instead of inflating supply, creating a self-reinforcing cycle of growth. Bitcoin is not just digital money—it is a new monetary organism, the hardest money ever created.

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# The Bitcoin Standard – Lecture 9 (What Is Bitcoin Good For?) • Study Notes

By Saifedean Ammous

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## Big Picture

- Bitcoin's primary function is as a **store of value**, the first asset in history with a **strictly limited supply**.
  - Unlike commodities (gold, oil, silver) or fiat, Bitcoin cannot be inflated by more production or political decree.
  - This unique scarcity makes Bitcoin the hardest money ever created.
  - Understanding scarcity correctly means shifting from a fixed-resource view to an **opportunity cost and productivity** perspective.
  - Bitcoin's fixed supply means it channels economic effort into **productive goods and services** rather than money production.
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## Core Claims

1. **Strict Scarcity: Bitcoin's Superpower**
2. Every resource humans have ever used can be increased with more time and effort.
3. Bitcoin alone is immune: no matter how many miners or machines, supply remains fixed.
4. This makes it uniquely suited as a long-term store of value.
5. **Opportunity Cost vs. Fixed Resources**
6. Economists often mistakenly think scarcity is about fixed quantities of resources.

7. In reality, limits come from **time and trade-offs**, not from Earth's stock of resources.
  8. Example: deepest mine is 3.5 km vs. Earth's 12,742 km diameter — we've only scratched the surface.
  9. **Reserves & Production Dynamics**
  10. Oil example: despite constant consumption, **proven reserves have grown faster than production**.
  11. Shows that scarcity is relative: human ingenuity and technology expand supply.
  12. Resource prices trend downward in real terms as productivity rises.
  13. **Technology > Resources**
  14. Wealth comes not from natural resources but from **ideas and productivity**.
  15. Singapore: rich without natural resources, proof that prosperity is built on human ingenuity.
  16. Progress is driven by technology, not resource endowment.
  17. **Stock-to-Flow & Monetary Goods**
  18. Low stock-to-flow = high inflation = wasted effort on money production.
  19. High stock-to-flow = stability, encourages productivity.
  20. Bitcoin's stock-to-flow rises over time → eventually surpassing gold → ultimate store of value.
  21. **Fiat vs. Bitcoin Costs**
  22. Critics call Bitcoin mining "wasteful."
  23. But fiat is far more wasteful: it channels massive resources into rent-seeking, debt, and unproductive sectors.
  24. Bitcoin's cost secures hard money → lowers systemic economic cost long-term.
  25. **Distribution & Inequality**
  26. Complaints about early adopters are envy-driven, not economic reasoning.
  27. Early miners took risk and delayed consumption → they earned their rewards.
  28. Bitcoin equalizes by removing monetary privilege: no one can inflate supply at others' expense.
  29. **Store of Value & Medium of Exchange**
  30. These two functions are inseparable: storing value across time inherently means exchanging value with your future self.
  31. Bitcoin already fulfills both, even if it isn't used for everyday retail payments.
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## Key Concepts & Mental Models

- **Strict scarcity** → Bitcoin's defining property.
  - **Opportunity cost** → true driver of scarcity.
  - **Reserves vs. production** → technology keeps expanding supply of natural resources.
  - **Stock-to-flow** → framework for understanding money hardness.
  - **Rent-seeking vs. production** → fiat rewards the former, Bitcoin the latter.
  - **Unit of account evolution** → Bitcoin becomes more stable as liquidity grows.
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## Examples & Applications

- **Oil reserves graph** → more exploration = more reserves, not depletion.
  - **Singapore prosperity** → built on productivity, not resources.
  - **Early adopters** → risk-takers who mined when Bitcoin was ignored and ridiculed.
  - **Fiat waste** → bloated academic economics, financial speculation, government boondoggles.
  - **Bitcoin mining cost vs. fiat cost** → short-term energy vs. long-term systemic waste.
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## Quotable Ideas

- “Bitcoin is the only liquid commodity strictly limited in supply.” — Ammous
- “Scarcity is not about running out of stuff; it's about what we give up to get it.” — Ammous
- “Bitcoin is the cheapest way to buy the future.” — Ammous
- “Every morning an early miner held his coins, he earned them again.” — Ammous
- “Fiat rewards rent-seeking; Bitcoin rewards production.” — Ammous

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## Study Prompts

- Why is Bitcoin the first strictly scarce asset in history?
- Explain the difference between resource scarcity and opportunity cost.
- What does the oil reserves graph reveal about human productivity?
- How does technology drive wealth compared to natural resources?
- Why is stock-to-flow critical for monetary goods?
- Compare Bitcoin's mining cost to fiat's systemic cost.
- Why are store of value and medium of exchange inseparable?

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## TL;DR

Bitcoin is the first and only **strictly scarce asset** in history. All other resources can be increased with more effort; Bitcoin cannot. This makes it the hardest money, uniquely suited as a store of value. Scarcity should be understood in terms of opportunity cost, not fixed resources — human ingenuity expands supply of everything but Bitcoin. With its rising stock-to-flow, Bitcoin channels effort into productive goods rather than money printing. Early adopters earned their place by taking risks, and Bitcoin eliminates monetary privilege permanently. It is the cheapest way to buy the future.

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# The Bitcoin Standard – Lecture 10 (Bitcoin Questions) • Study Notes

By Saifedean Ammous

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## Big Picture

- The final lecture expands on questions surrounding Bitcoin's role, resilience, and misconceptions.
  - Key themes: **individual sovereignty, settlement, scaling, volatility, energy use, decentralization, privacy, and altcoins.**
  - Bitcoin's uniqueness lies in its immutability, neutrality, and resistance to state or corporate control.
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## Core Claims

1. **Individual Sovereignty**
2. Inspired by *The Sovereign Individual* → Bitcoin weakens state power by undermining inflation.
3. True liberation comes not from isolated transactions but from removing government's ability to print.
4. Without fiat's printing press, states cannot fund wars, drug wars, or mass surveillance at scale.
5. **Global Settlement**
6. Even in a "worst-case scaling scenario" (≈350k tx/day), Bitcoin could host ~850 central banks settling daily.
7. Unlike the dollar system (one "full node": the Fed), Bitcoin settlement is apolitical and decentralized.
8. **Volatility & Monetary Role**

9. Volatility ≠ disqualification. Gold also had volatility yet became money.
10. Demand for Bitcoin is monetary demand → appreciation continues regardless of short-term swings.
11. Mises: the value of money should be free from state control, not pegged to industrial use.
12. **Energy Use**
13. Energy = progress. From horses → cars → airplanes, every leap required more energy.
14. Bitcoin consumes energy to secure money free from state control — not “waste,” but civilization’s upgrade.
15. **Decentralization & Immutability**
16. The 2017 SegWit2x/New York Agreement failed because **no one controls Bitcoin.**
17. Immutability of the 21M supply cap is credible because consensus cannot be coerced.
18. Bitcoin is a living example of **spontaneous order.**
19. **Scaling**
20. On-chain settlement = apex of security.
21. Second-layer and off-chain solutions (Lightning, custodians, physical devices like OpenDime) will handle everyday payments.
22. Layered scaling mirrors historical gold banking.
23. **Altcoins & “Blockchain Tech”**
24. Altcoins are all centralized projects → not credible money.
25. Blockchain only matters if nobody controls it.
26. Every altcoin has failed the neutrality test; only Bitcoin is decentralized enough to be money.
27. **Privacy & Crime**
28. Bitcoin is not ideal for crime: transactions are public and traceable.
29. The real criminal money is the US dollar, supported by banks engaged in laundering.
30. On-chain privacy coins trade off verifiability for anonymity — a losing proposition.
31. Privacy is more realistic on **second-layer solutions**, not base layer.
32. **Linux Analogy**
33. Bitcoin = Linux of money → the infrastructure, not necessarily consumer-facing.
34. Banks may persist, but as service layers atop Bitcoin, not as fiat issuers.
35. Fiat cannot coexist long-term with Bitcoin because sound money wins by default.

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## Key Concepts & Mental Models

- **Sovereign Individual thesis** → Bitcoin = final blow to nation-state inflation.
- **Worst-case scaling** → 850 central banks settle daily, still superior to fiat.
- **Energy as civilization** → higher energy use = higher productivity.
- **Immutability** → rules cannot be changed without unanimous consensus.
- **Spontaneous order** → Bitcoin evolves by human action, not design.
- **Neutrality test** → real blockchain = no one in charge. Only Bitcoin passes.
- **Second-layer privacy** → true path to anonymity without sacrificing supply verifiability.

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## Examples & Applications

- **Gold standard vs. fiat drug wars** → fiat enables wasteful state projects like prohibition.
- **SegWit2x failure** → corporations and miners couldn't force a rule change.
- **Lightning Network** → everyday transactions off-chain, final settlement on-chain.
- **Ethereum rollback (DAO hack)** → proof of centralization and control.
- **Linux analogy** → Bitcoin as monetary base layer, banks as user interfaces.

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## Quotable Ideas

- “Government without a printing press is far less capable of interfering in people’s lives.” — Ammous
- “Bitcoin has no counterparty risk, no reliance on third parties, uniquely apolitical.” — Ammous
- “Energy consumption is not waste — it is how civilization advances.” — Ammous

- “The 21 million supply cap is credible because no one can change the rules.” — Ammous
  - “Altcoins exist only because small groups promote them — none pass the decentralization test.” — Ammous
  - “Privacy is better achieved off-chain; on-chain privacy sacrifices supply auditability.” — Ammous
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### Study Prompts

- How does Bitcoin advance the thesis of *The Sovereign Individual*?
  - Why is undermining government inflation more important than isolated censorship resistance?
  - What is the “worst-case” scaling scenario and why is it still superior to fiat?
  - Why is Bitcoin’s energy use not wasteful?
  - How did SegWit2x prove Bitcoin’s decentralization?
  - Why can altcoins never compete with Bitcoin?
  - Why is second-layer privacy more realistic than on-chain privacy?
  - Explain the Linux analogy for Bitcoin vs. fiat banking.
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### TL;DR

The final lecture reinforces Bitcoin’s role as **apolitical, immutable, decentralized money**. Its energy use is not waste but progress; its volatility does not prevent monetization; and its immutability is proven by failed attempts to change it. Altcoins fail the neutrality test, while fiat enables wars, inflation, and surveillance. Bitcoin, like Linux, is the underground infrastructure of a freer economy. Privacy will emerge via second layers, while Bitcoin itself becomes the neutral global settlement layer. Sound money prevails, fiat fades.

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