The Fiat Standard — Lecture 17 (Bitcoin Cost-Benefit Analysis) • Study Notes

---

Introduction

- In Chapter 12, Ammous analyzed **fiat's costs and benefits**.
- Here, he applies the same framework to **Bitcoin**.
- Key difference:
- Fiat economists assume truth is imposed top-down (central banks, academia).
- Real economics studies **why people voluntarily act** as they do.
- Fiat thinkers dismiss Bitcoin because it is not government money, but Bitcoin works in practice—usage grows, security increases, and adoption spreads.
- This lecture asks: **What are the costs of Bitcoin, and what are the benefits?**

Costs of Bitcoin

1. Electricity Consumption

- Estimated (2021): **100–150 TWh/year**.
- That's **a lot of electricity**, but mostly from **cheap, stranded, or waste sources**.
- Avg. global electricity: ~14¢/kWh.
- Bitcoin miners: ~2–5¢/kWh (sometimes less).
- In bear markets (2022), even miners at 6–7¢ were wiped out.
- Annual global mining cost ≈ **$2–6B**.

2. Mining Rewards as Security Budget

- Block subsidy + fees = miner income.
- By design, cost ≈ reward (difficulty ensures equilibrium).
- Total block rewards (2009–Jul 2021): ~**$29.4B**.
- Rough proxy for **total network security cost**.

3. Infrastructure Costs

- Facilities, ASICs, operations.
- Highly competitive: inefficient miners go bankrupt; efficient miners expand.
- Costs converge on block reward value.

Benefits of Bitcoin

1. Secure Savings

- Bitcoin converts energy + hardware → **inflation-resistant savings**.
- Market cap July 2021: ~$800B.
- Market cap Nov 2022: ~$350–400B.
- Cost ≈ $35B → Value ≈ $350–400B → **10x return**.

2. Long-Term Efficiency

- **Stock-to-Flow (S2F) ratio**:
- Security cost declines as a % of network value.
- New issuance shrinks → efficiency rises.
- Avg. Bitcoin has appreciated **~23x** from production cost to current value.

3. Global Money Transfer

- Bitcoin enables international settlement at negligible cost.
- Fees ≈ **0.02% of transaction value** (far cheaper than gold or fiat settlement).
- Example: gold settlement across continents = up to **1% of value**.
- Bitcoin: scalable batching, far cheaper.

4. Open Security Market

- No fixed "security budget."
- If demand rises → users pay higher fees → miners secure more.
- Example: Dec 2017 → avg. $50 fees, yet demand persisted.
- Bitcoin secures itself through **market incentives**, not central planning.

Comparison: Fiat vs. Bitcoin

- **Fiat**:
- ~14% supply inflation average.
- Managed by politicians and central banks.
- Finances war, bureaucracy, and political agendas.
- Settlement requires human intermediaries, armies, and banks.
- **Bitcoin**:
- Fixed 21M cap; predictable declining inflation.
- Decentralized, transparent monetary policy.
- Finances cheap, reliable energy investment (miners).
- Settlement: rules without rulers; proof-of-work consensus.

Analogy with Other Machines

- Every major technology **consumes more energy** but delivers higher efficiency:
- **Washing machine** vs. handwashing.
- **Airplane** vs. kayak.
- **Steel houses** vs. tepees.
- **Computers** vs. abacus.
- People choose the energy-intensive machine because the **output > input**.
- Bitcoin is no different: it consumes electricity but **produces superior monetary reliability**.

Key Takeaways

1. **Total costs**: ~$30–35B in energy + infrastructure.
2. **Total benefits**: Hundreds of billions secured; ~10x efficiency ratio.
3. **Stock-to-Flow**: ensures rising efficiency as issuance declines.
4. **Transaction fees**: minimal compared to fiat/gold; will adjust dynamically with

demand.

5. **Security model**: market-driven, not centrally planned.
6. **Bitcoin = technological upgrade** over fiat—like cars over horses, or computers over abacuses.

Conclusion:
Bitcoin is worth its costs. Its electricity consumption secures **hard money, global settlement, and inflation-proof savings**—a bargain compared to the destructive costs of fiat.
