

On the Value of Virtual Currencies

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Summary

- Virtual currencies:
 1. a payment technology → consumption motives.
 2. a risky asset → speculative motives;
- → The exchange rate is affected by:
 1. the extent to which the virtual currency is utilized for payments.
 2. expectations of future exchange rates/future usage.
- The more established the currency:
 - the weaker the impact of speculators,
 - the lower the exchange rate volatility.

Model Basics I

- Two currencies: virtual (\mathcal{B}) and established (\pounds).
- The exchange rate is governed by a mechanical relation:

$$\# \text{ of pounds per } 1 \mathcal{B} = \frac{\text{\pounds value of } \mathcal{B} \text{ units used in real transactions}}{\text{supply of } \mathcal{B} \text{ available for payments}}$$

- How is the exchange rate determined?
 - Usage of \mathcal{B} for payments affects the numerator.
 - Speculation on \mathcal{B} affects the denominator.
 - Market clearing for virtual currency \rightarrow equilibrium exchange rate.

Model Basics II

- Usage of \mathcal{B} for payments:
 - A monopolistic network using \mathcal{B} , fee for access.
 - Consumers & merchants: derive utility from participating.
 - Utility \nearrow in the network size/rate of adoption.
 - \rightarrow numerator (\pounds value of \mathcal{B} units used in real transactions) increases in adoption rates.



Model Basics III

- Usage of B for speculation:
 - Speculators choose between
 - the risky currency (B)
 - risk-free bond (in \pounds).
 - Maximize mean-variance utility
→ holdings depend on
 - the price of the risky asset = exchange rate.
 - expectations of the risky asset's value = future exchange rate.
 - Speculators demand/holdings reduce the supply of virtual that is available for real payments (reduce the denominator).



Comments I: Too Many Model Ingredients?



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- E.g., heterogeneous consumers, merchants, monopolistic network.
- What is the role/advantage of the virtual currency?
- Can the network exist with the established currency?
 - Digital(-ized) established currency?
 - Why a monopolistic network? What's the difference to an intermediary?
- What is the role of the network?
 - Better able to trade worldwide & to reduce search costs?
- Agents' utility increases in the network size.
 - Why not compare the [monetary] costs of trading in established vs. virtual currency?

Comment II: Are There Missing Blocks?



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1. Which currency should prices be quoted in?
 - Model: “pegged” to the established currency.
 - Wouldn't a global merchant quote in the “global” currency (in the long run)?
 - Does it matter who bears the currency risk?
 - What about miners whose income is in virtual currency?
 - Will transaction fees be higher if miners bear the risk?
2. How do speculators form their expectations about future exchange rates?
3. Virtual currency → lower rent extraction by intermediaries.
 - → higher utility from consumption by end-users? higher welfare?
4. How do consumers acquire virtual currency?
 - Who from? Transaction costs? (As an aside: these are HUGE!).

Comment III: Timing Of Events?



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- Alice wants to buy an item that costs £100 or 1 \mathcal{B} .
- Alice doesn't have \mathcal{B} and wishes to buy it.
- Alice arrives at an exchange (run by ...? speculators?).
- Alice can't get \mathcal{B} b/c no-one wants to sell at the prevailing rate.
- Does the price for \mathcal{B} increase? Do merchants adjust their prices in \mathcal{B} ?
- Is the exchange rate then irrelevant (at least for Alice & merchants)?
- What is this simple timeline missing? What is the timing of events?

Is there a verdict on the Value of Virtual Currencies?

