Discussion on
Bubbles in a World Asset: the Case of Cryptocurrencies

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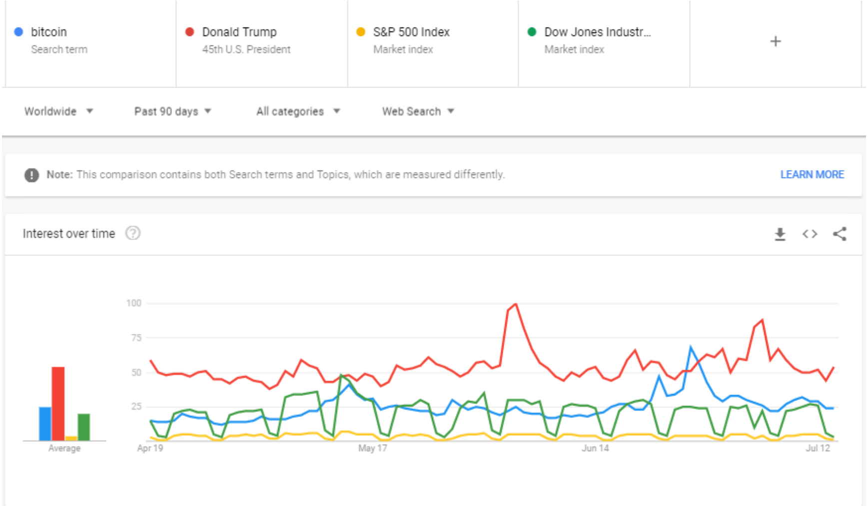
Overview

Popularity of cryptocurrencies



Cryptocurrencies: comparison with money

	Cryptocurrency	**Commodity money** Gold	**Fiat money** Currency
Fixed global supply	✓	✓	X
Non-zero fundamental value	X	✓	X
Medium of exchange	✓	✓	✓
Store of value	?	✓	✓
Unit of account	?	✓	✓

This paper

- Theoretical model to study rational bubbles in cryptocurrencies
- Two properties emphasized in the paper
  1. Fixed positive supply

Limited issue [1] **Unlimited issue**

Brand	Limit of issue	Already issued
Bitcoin	21 million	79%
Litecoin	84 million	63%
Ripple	100 billion	100%

Brand
Ethereum
Ethereum Classic
NEM

  2. Traded internationally with minimal transaction costs
- Results: oscillatory bubbly equilibrium dynamic is common for a wide range of parametrization, especially low asset's supply and large income inequality

[1] Data from October 2017

Model setup

- 2-country, 2-generation Overlapping Generation (OLG) model
- $e^i_{j,t}$: endowment of generation j in country i at time t when $i, j \in \{1, 2\}$
- m^i_t: bubble demand of country i at time t
- p_t: price of bubble at time t
- N^i: price of bubble at time t
- M: fixed supply of cryptocurrencies
- B: subjective discount factor
- π: probability of bubble bursting, i.e.

	$p_t > 0$	$p_t = 0$
$p_{t+1} > 0$	$1 - \pi$	0
$p_{t+1} = 0$	π	0

Model setup (cont)

- Agents choose consumption $c_{j,t}$ to maximize their expected utility functions

$$u(c^i_{1.t}) + \beta \mathbb{E}_t u(c^i_{2,t+1})$$

s.t. budget constraints and market clearing conditions

$$\begin{aligned} c^i_{1,t} + p_t m^i_t &= e^i_{j,t} \\ c^i_{2,t+1} &= p_{t+1} m^i_t \\ N^1 m^1_t + N^2 m^2_t &= M \end{aligned}$$

Model Implications

Proposition 1

For every price of bubble p_t, there is a unique bubble demand m_t^i such that equilibrium spending on bubble $p_t m_t^i$ exists

Proposition 2

If the following assumptions hold

1. Agents in both countries have relative risk aversion coefficient of more than one, i.e. $\frac{-cu^{''}(c)}{u'(c)} > 1$
2. Agents of both countries are prudent, i.e. $\frac{-u^{'''}(c)}{u^{''}(c)} > 1$

Then, there are three possible characteristics of the steady state dynamics.

1. The deviation of bubble price from its equilibrium value will be corrected over time and returned to its equilibrium
2. The deviation of bubble price from its equilibrium value will aggravate over time
3. The deviation of the bubble price will be constant over time

Numerical Parametrization and Experimentation

- The effect of amount of cryptocurrencies: the higher level of supply will lead to more oscillating. That is, the bubble will be more volatile and less suitable in transferring value over time
- The effect of endowment gap: the smaller wealth gap leads to more volatile cryptocurrency prices
- The effect of populations: the higher the population in any country, the more stable the bubbly equilibrium
- The effect of discount factor: the more oscillating the bubbly equilibrium
- The effect of the degree of risk aversion: the more risk averse, the more oscillating the bubbly equilibrium
- The effect of the probability of bubble bursting: the higher chance of bubble bursting, the more stable the bubbly equilibrium

Discussion

- Intuitions on comparative statics?
- Model validation: can the proposed model explain prices and volatility of cryptocurrencies?
  - It would be useful to see the price dynamics of the two bubbly equilibria
- Model calibration: what are the parameters needed to match the price dynamics of real-world cryptocurrencies?
  - Are the implied parameters realistic? Do they match with previous literature?
- Welfare analysis: policy implications?
- Behavioral bubbles: usually offer more insights on dynamics of bubbles
  - Extrapolation: Greenwood and Shleifer (2014), Barberis et al. (2015)
  - Overconfidence: Harrison and Kreps (1978), Scheinkman and Xiong (2003)
  - Natural expectation: Fuster et al. (2010)
  - Delayed overshooting: Gourinchas and Tornell (2004)