

Towards a first principles and evidence based theory of Bubbles

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June 2 2018

Outline

- 1 Bubbles: What are they and How to spot them
- 2 The perpetual money machine
- 3 Naturalization of bubbles
- 4 Conclusions

What is a bubble?

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What the *fundamental* value is we don't know!

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 - The process *resets* when the last greater fool becomes the greatest fool.
- Herding (mimicking) behaviors evolutionary advantageous but also have self fulfilling properties

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- Psychoanalytic interpretation (D.Tuckett): Uncertainty implies anxiety. *Phantastic objects: a mental representation of something (or someone) which in an imagined scene fulfills the deepest desires.*

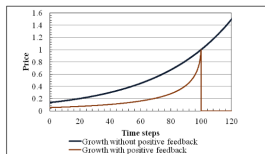
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- Ethnic: overpricing is higher and traders' errors are more correlated than in diverse markets (diversity facilitates friction)

Bubble hermeneutics



How to spot a bubble

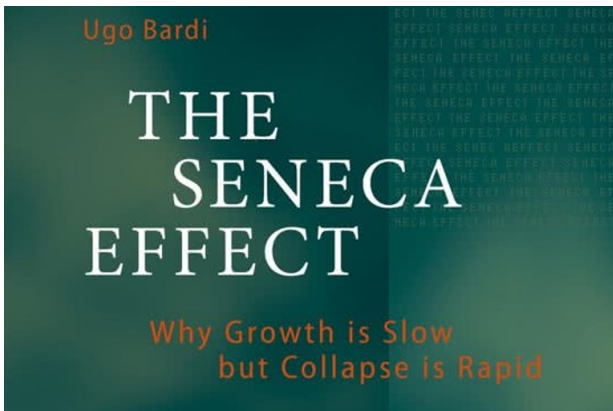


- Exponential versus hyperbolic growth
- Hyperbolic growth is deceptive, smooth slope at the beginning but reaches a critical point

Positive feedback mechanism drives the system to criticality (unsustainable trajectory)

Bubble hermeneutics

The path of increase is slow, but the road to ruin is rapid. Seneca



Thermodynamics of money



A perpetual motion machine produces work without the input of energy

It violates the first law of thermodynamics

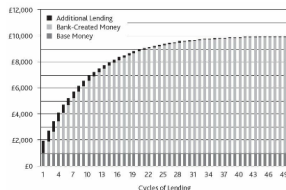
Money is not conserved

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- commodity theory of money: money backed by gold would be conserved (ignoring mining production)
- Walras' global conservation law, $\frac{dp}{dt} = D(p) - S(p)$, where D is total demand at price p and S is the total supply

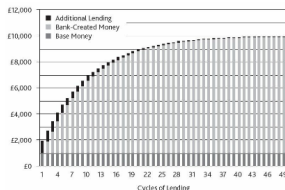
Money multiplier model



- Under this model banks are primarily intermediaries of money

*Fractional reserve banking:
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value greater than the value of
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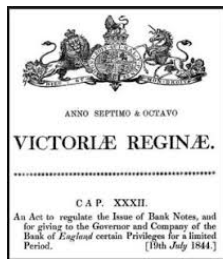
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*Fractional reserve banking:
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- Under this model banks are primarily intermediaries of money
- It follows: banks cannot start lending without first having money deposited with them

Money multiplier model



1844 Bank Charter Act:
banned the creation of
any new banks with note-
issuing powers and limited
the issue of new notes
by the Bank of England

- *cast iron* system limited the issue of new notes to the existing 14m in circulation. Beyond that, any new notes issued would have to be backed by additional gold and silver reserves
- End of private bank-note issuance and effective monopoly of the Bank of England on the printing of new notes

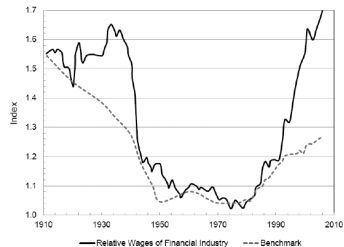
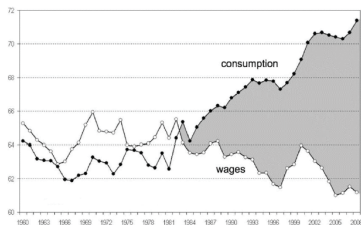
Money multiplier model

- However, 1844 Act exempted demand deposits
- 1844 Act failed to stop fractional reserve banking – the creation of new money by private banks.
- We still can not tell the difference between a fictitious demand deposit (loan issue), and a ‘real’ demand deposit (a customer depositing her salary)

Money multiplier model

- 1844 Act was again abandoned with little hesitation several times
- In 1914 BoE discontinued redemption of banknotes for gold coins
- FDR direct government money creation, gold confiscation
- 1931 Britain abandoned the gold standard
- 1971 USA found itself unable to live up to the promise to convert dollars into gold. Nixon cancelled the dollar convertibility into gold
- The promise to convert into gold worked only as long as it was not acted on

Post Bretton Woods

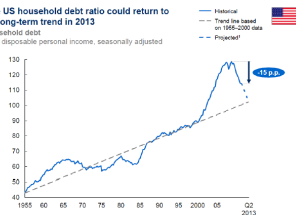


Sornette, 2012. The illusion of the perpetual money machine

Post Bretton Woods

The US household debt ratio could return to its long-term trend in 2013

Household debt
% of disposable personal income, seasonally adjusted



*US household debt as a
percentage of gross disposable
income*

- Steady growth of relative debt is considered the *normal* (2050 and of 180 percent!)
- debt-to-GDP ratio in the 60's percent level was the ratio of the Maastricht treaty (over 70% of countries do not comply with)

Naturalization of bubbles

- What analogies of hyperbolic growth we have in nature ?

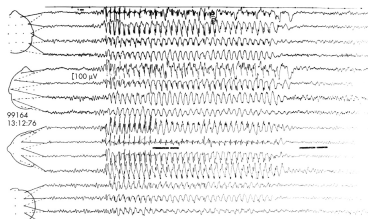
Naturalization of bubbles

- What analogies of hyperbolic growth we have in nature ?
- None, unless we look at pathological cases

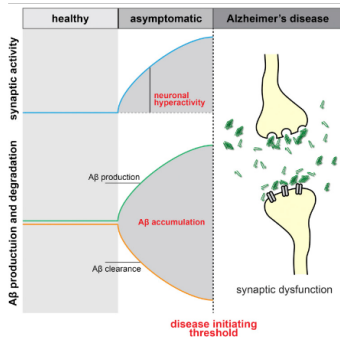
Homeostasis



- Homeostasis: *homeo*-similar, not single fixed set point (root)
- The ability of living organisms of function within an acceptable range
 - low water balance, kidneys slow down to reduce diuresis
 - food scarcity triggers hormones to break down sugars store in cells and deliver to blood flow
- Failure of Homeostasis causes death



- Epileptic seizure produces high synchronzation (spike and wave).
- Hyperconnectivity is a common network response to neurological insult. AD disinhibition



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 - Supplementary conscious mechanism is not essential for automated motor reaction

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- We actually can fit curves to this kind phenomena -positive feed back loops, not only postmortem-
- Focus on Criticality (SOC) rather than causality which ends up in hermeneutics (Status quo advantage)
- Comercial banks money creation is at the core of financial bubbles (perpetual money machine myth against the laws of physics)

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- Extended Homeostasis: We need better metacontrollers (regulatory bodies - politics) that *feel* the consequences

Thanks!