

Complex Beyond Regulation

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Tipping Points Project

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Its sometimes said that one of the reasons why communism failed is that it became too difficult to accurately price *everything*.

Free market capitalism is better at pricing, the task is distributed throughout the system.

Complexity Killed Communism?

Something to think about:

The global financial system is so complex it is now beyond our skill to regulate.

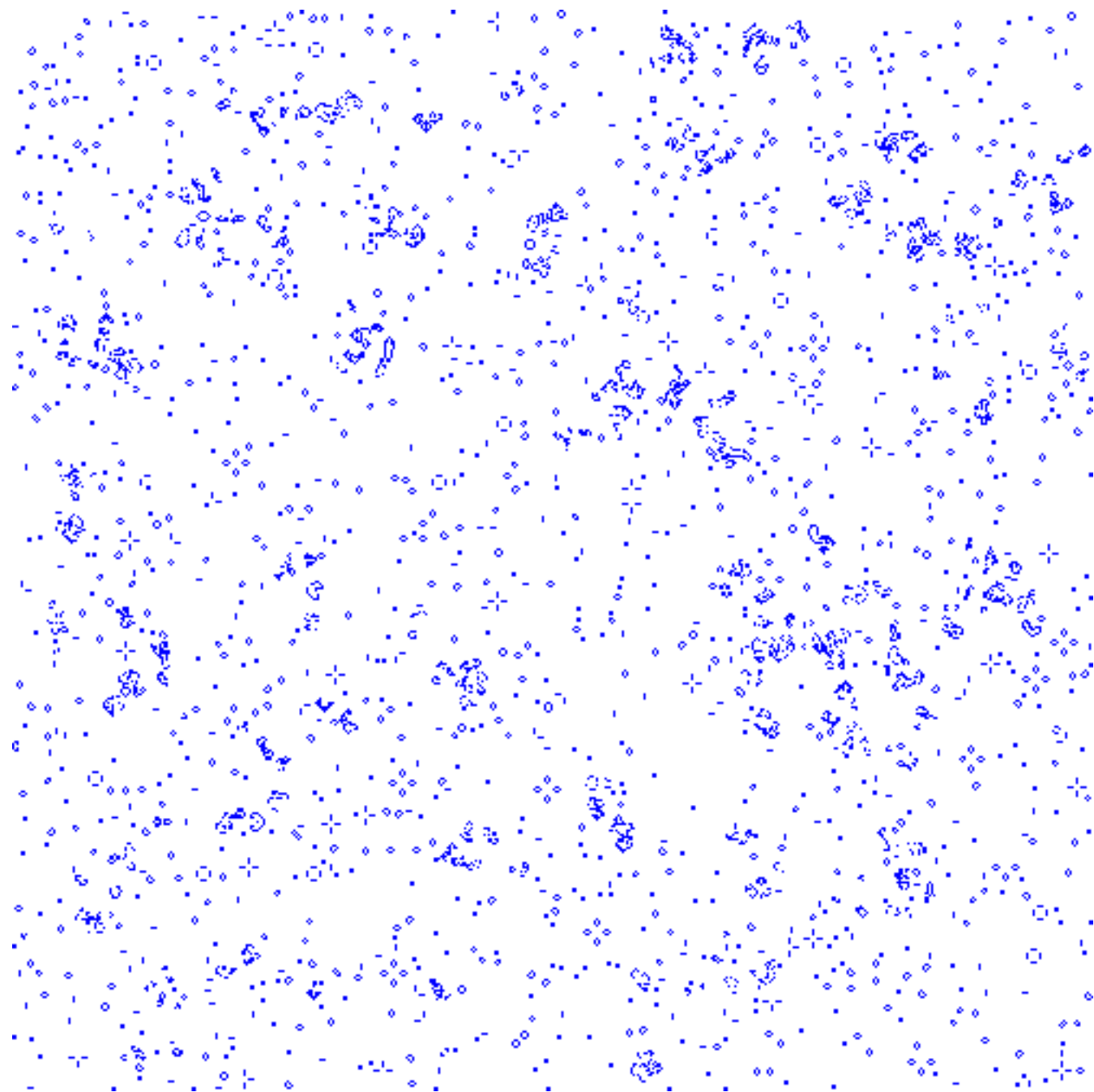
Oh Dear... How long until complexity kills capitalism?

A Complex System

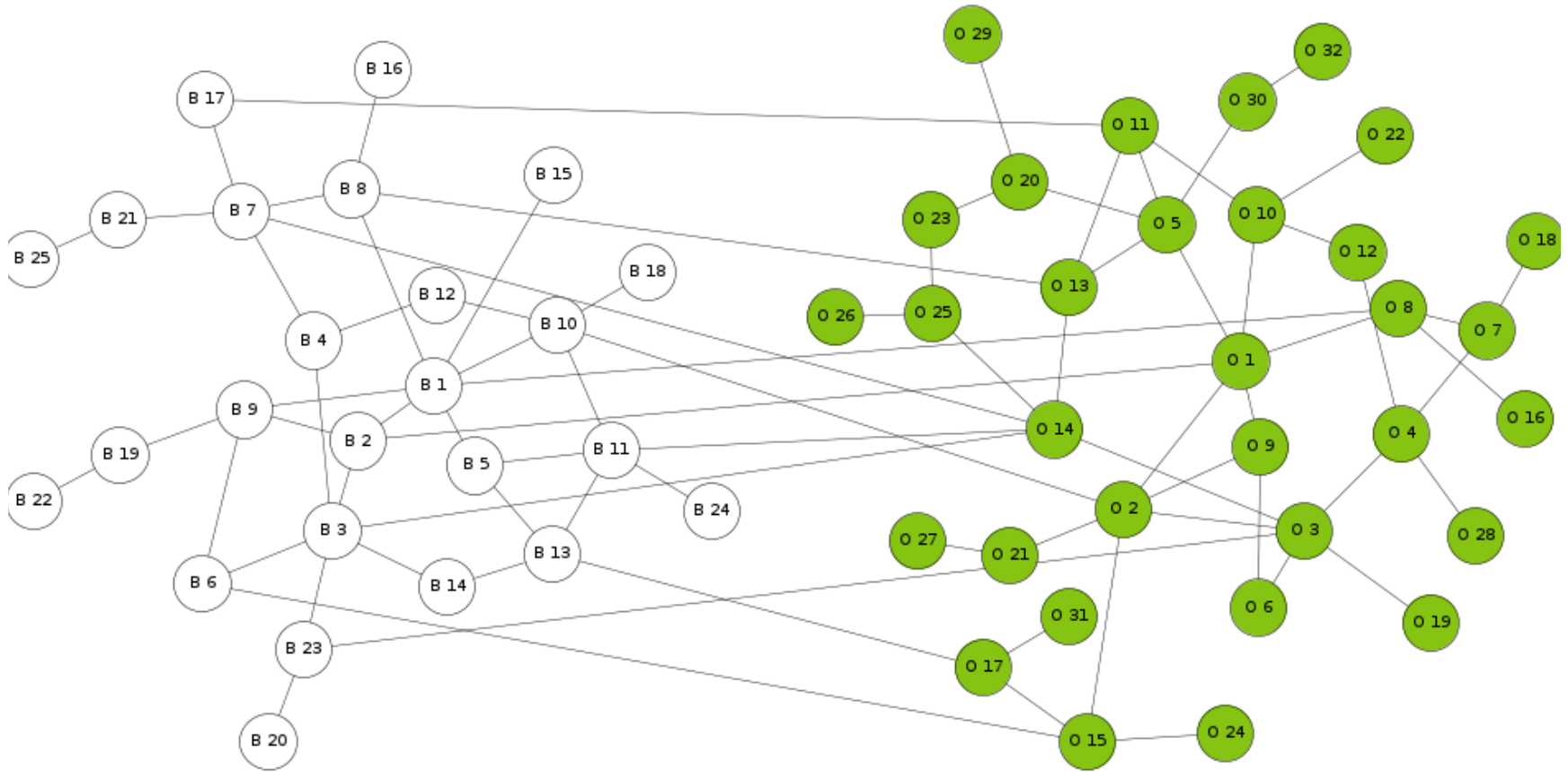
- Often described as greater than the sum of their parts.
 - “In the case of all things which have several parts and in which the totality is not, as it were, a mere heap, but the whole is something besides the parts...” -- Metaphysics, Aristotle
- Displays emergent properties.
 - System behaviours cannot easily be predicted by the rules governing the interaction of the parts.
- Can suffer from system inertia.
 - Damped – you push it and it doesn't move.
 - Regulated it and nothing happens.

Simple Complex System: Conway's Game of Life

- A complex system with only 4 rules governing cells in space.
 1. Any live cell with fewer than two live neighbours dies, as if caused by under-population.
 2. Any live cell with two or three live neighbours lives on to the next generation.
 3. Any live cell with more than three live neighbours dies, as if by overcrowding.
 4. Any dead cell with exactly three live neighbours becomes a live cell, as if by reproduction.



Global Finance is a Complex Network

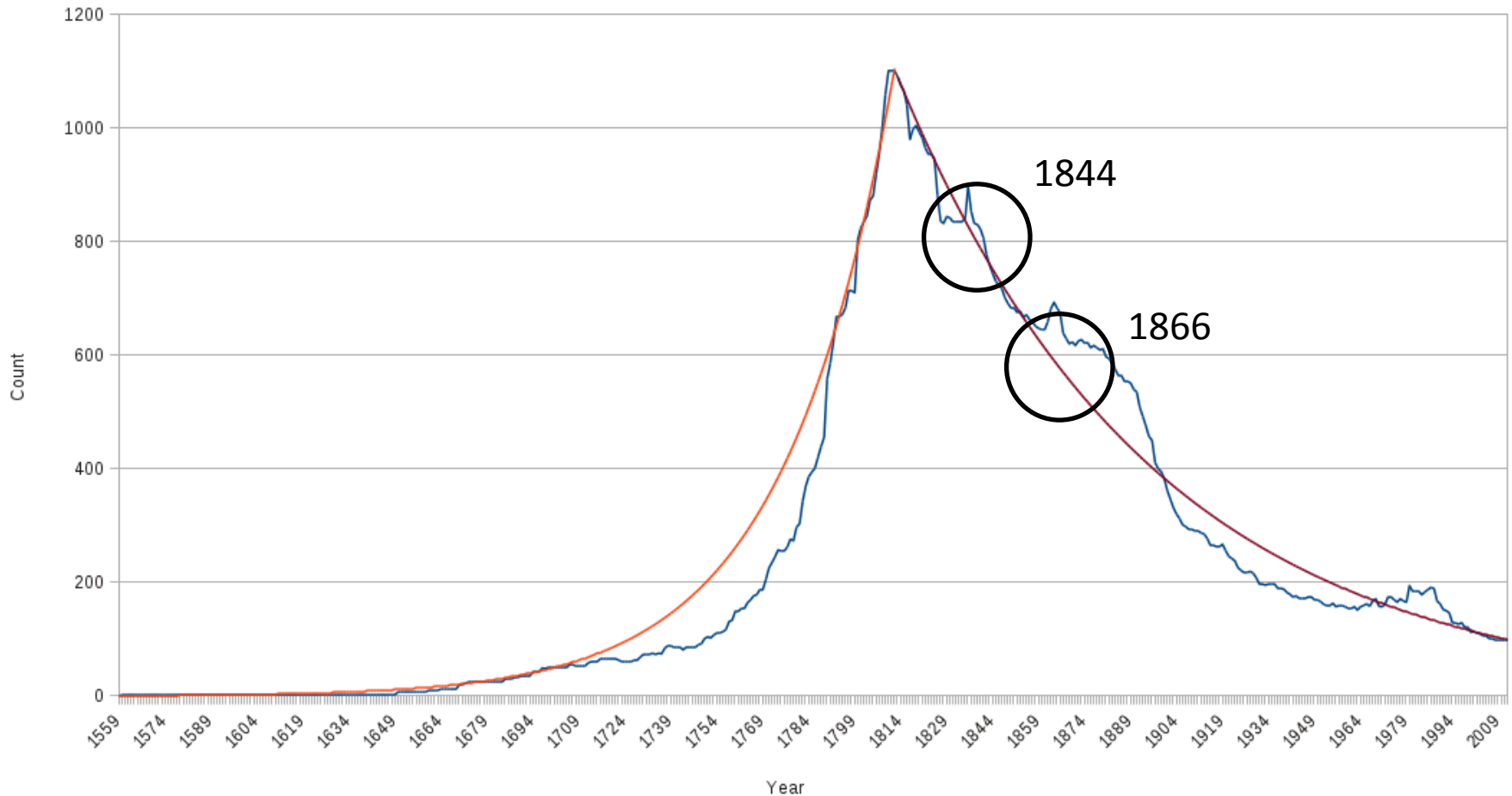


A network where we don't really know the extent of the connectivity, and the rules governing its behaviour are numerous.

Intervening in the Financial System

- Will regulatory interventions produce unwanted emergent properties?
- Will system inertia damp the effects of regulatory intervention?
- What about systemic effects?
- Could a crisis come from no-where?
- We don't understand the temporal aspects of complex networks; the system could have failed already...

Inertia/Momentum in the British Banking System



It is tempting to say that we can see this and other crisis related events in the data (1866), but they don't shift the population from its path. Blips might be nothing to do with the events.

Bank Failure in the US (almost a cascade)



What could we do about it?

- Massive simplification of the rules of the system.
- A Self-organising financial system.
- Better regulation.
- All of the above?

Massive simplification of the rules of the system.

- Would it require a globally enforced rule set?
- How do you go *back* to a simple system?
- How simple would the rules need to be in order for us to be able to model all the emergent properties?

– Remember the Game of Life

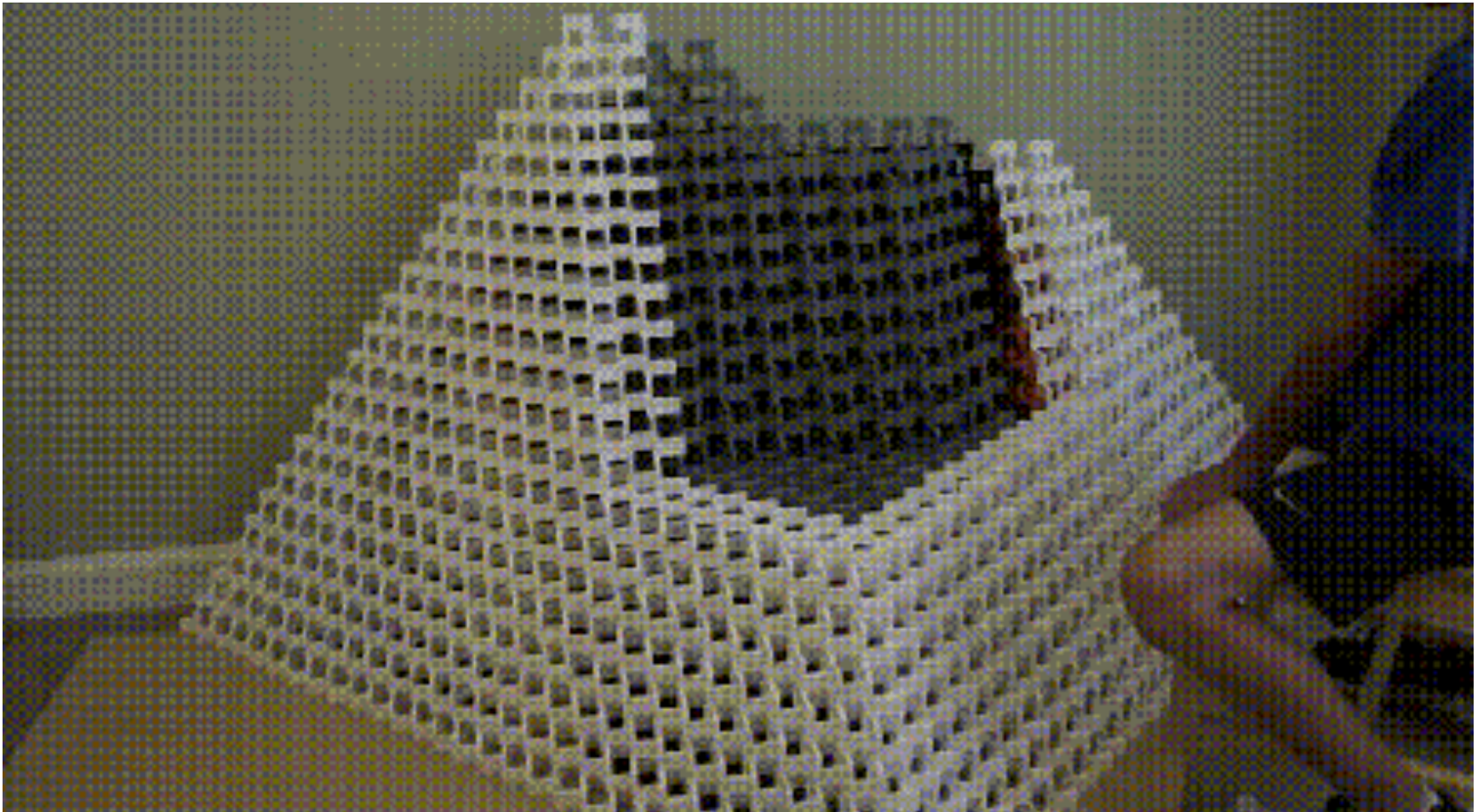
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Complex Adaptive Systems

- Ecological, immune, and self healing systems.
- Not quite the same as a free markets.
- Free markets – your success depends significantly on your ability to out compete your neighbours.
- Complex adaptive systems – your success is linked to the success of your neighbours.
 - Feedbacks

Just one more piece of regulation and
it will be perfect..!



Concluding Thoughts

- Is the global financial a complex system.
- How do you regulate a complex system?
 - Complexity Theory
 - Network Control Theory
- Do we need to engineer a financial system that is a self-organising(regulating) complex adaptive system.
- Or can traditional regulation work?