A New Approach to Macroeconomic Thinking
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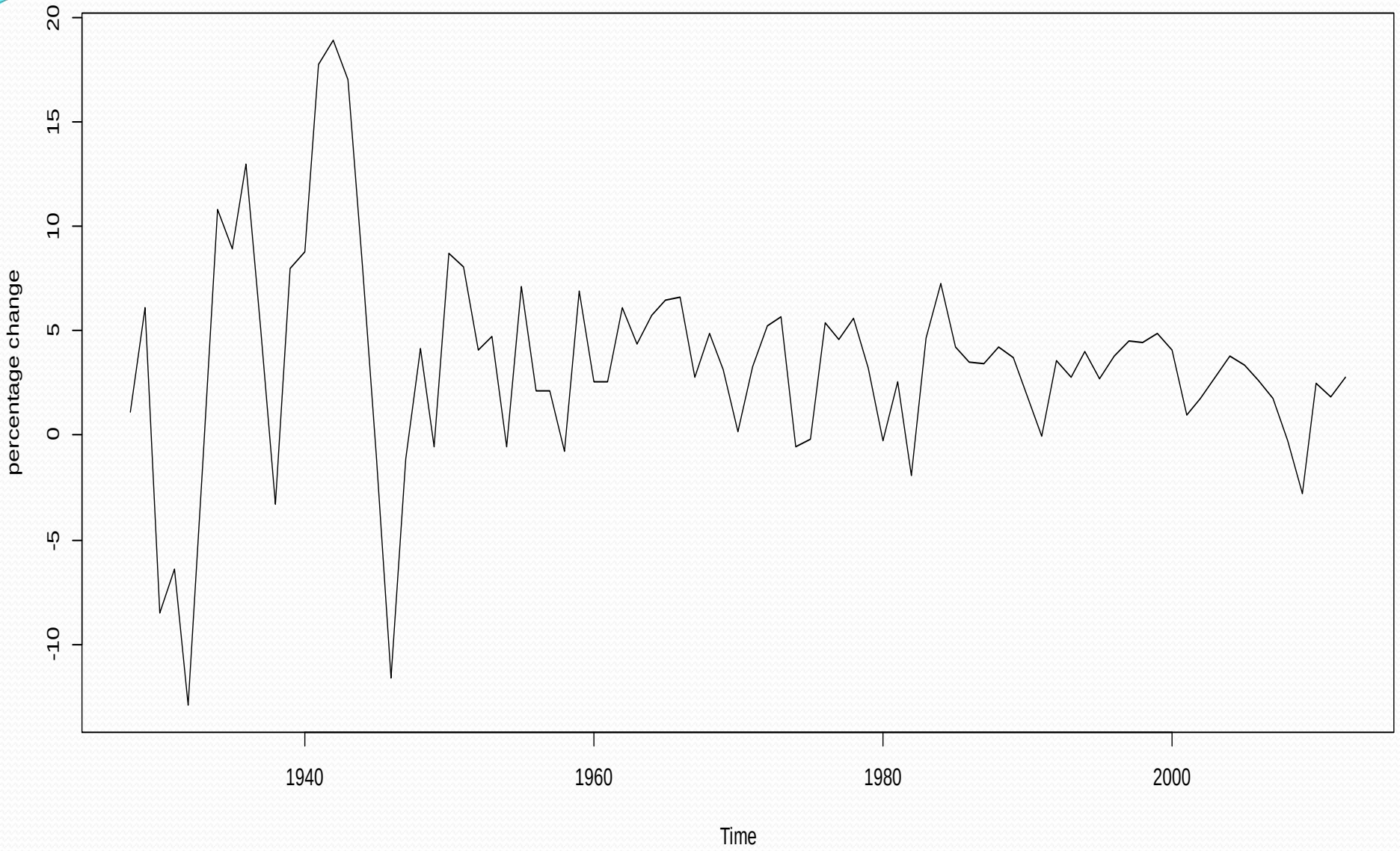
The ‘rational’ autonomous agent

- ‘The fundamental tool of neoclassical economics is an objective function that maps the space of all relevant decision variables into a real scalar’ Harstad and Selten, ‘Bounded rationality models’, *J. Ec. Literature*, June 2013
- Our task is to articulate a decision process that does not map all the variables into a scalar
- Agents (= “decision makers”) act independently
- Have fixed tastes and preferences
- Gather all relevant information on alternatives
- Match this to their preferences, and take the optimal decision
- Bounded rationality places some constraints on information gathering
- Behavioural economics (Kahneman) has made no theoretical impact

Annual percentage change in US real GDP, 1928-2012



Key features

- Slow but persistent underlying growth
- Fluctuations around the growth – this is the 'business cycle', the key theme of macroeconomics
- Auto-correlation function close to random noise, weak values at low order
- Weak concentration of power spectrum at frequency 5-12 years
- Most recessions are very short – 70 per cent only last 1 year, 90 per cent no more than 2 years
- The cumulative size of recessions has a very right-skew distribution
- The wait-time between recessions is also right-skewed

Existing models

- Explain none of these things!
- Fitting planes through n-dimensional data (econometrics)
- Dynamic stochastic general equilibrium models
- Robert Lucas, Presidential Address to American Economic Association 2003 “the central problem of depression-prevention [has] been solved, for all practical purposes”
- Olivier Blanchard, chief economist IMF, MIT Discussion Paper, **August 2008**, ‘The State of Macro’:
- “For a long while after the explosion of macroeconomics in the 1970s, the field looked like a battlefield. Over time however, largely because facts do not go away, a largely shared vision both of fluctuations and of methodology has emerged…… *The state of macro is good*….DSGE models have become ubiquitous.”

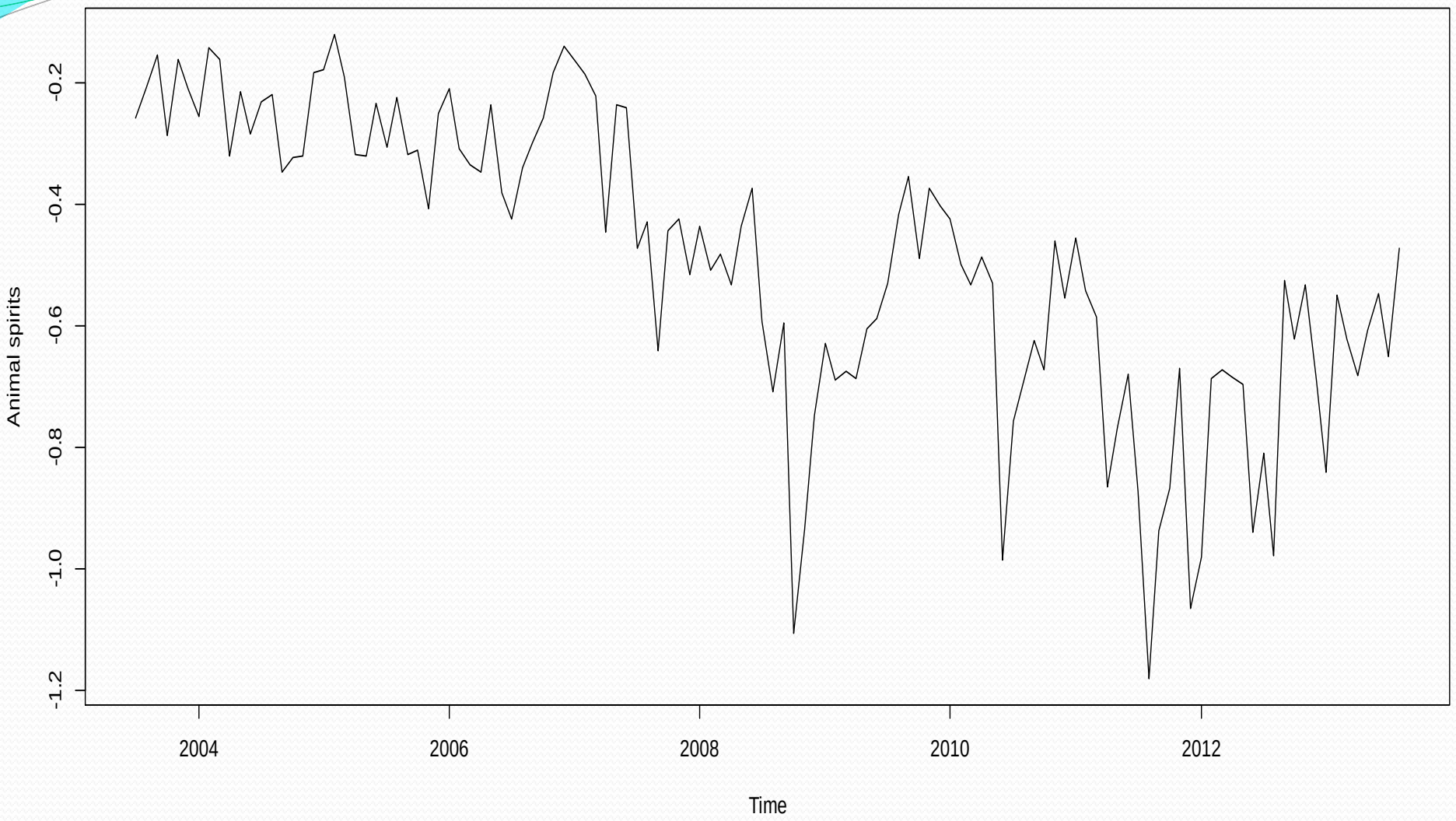
Examples of other things economists do not know

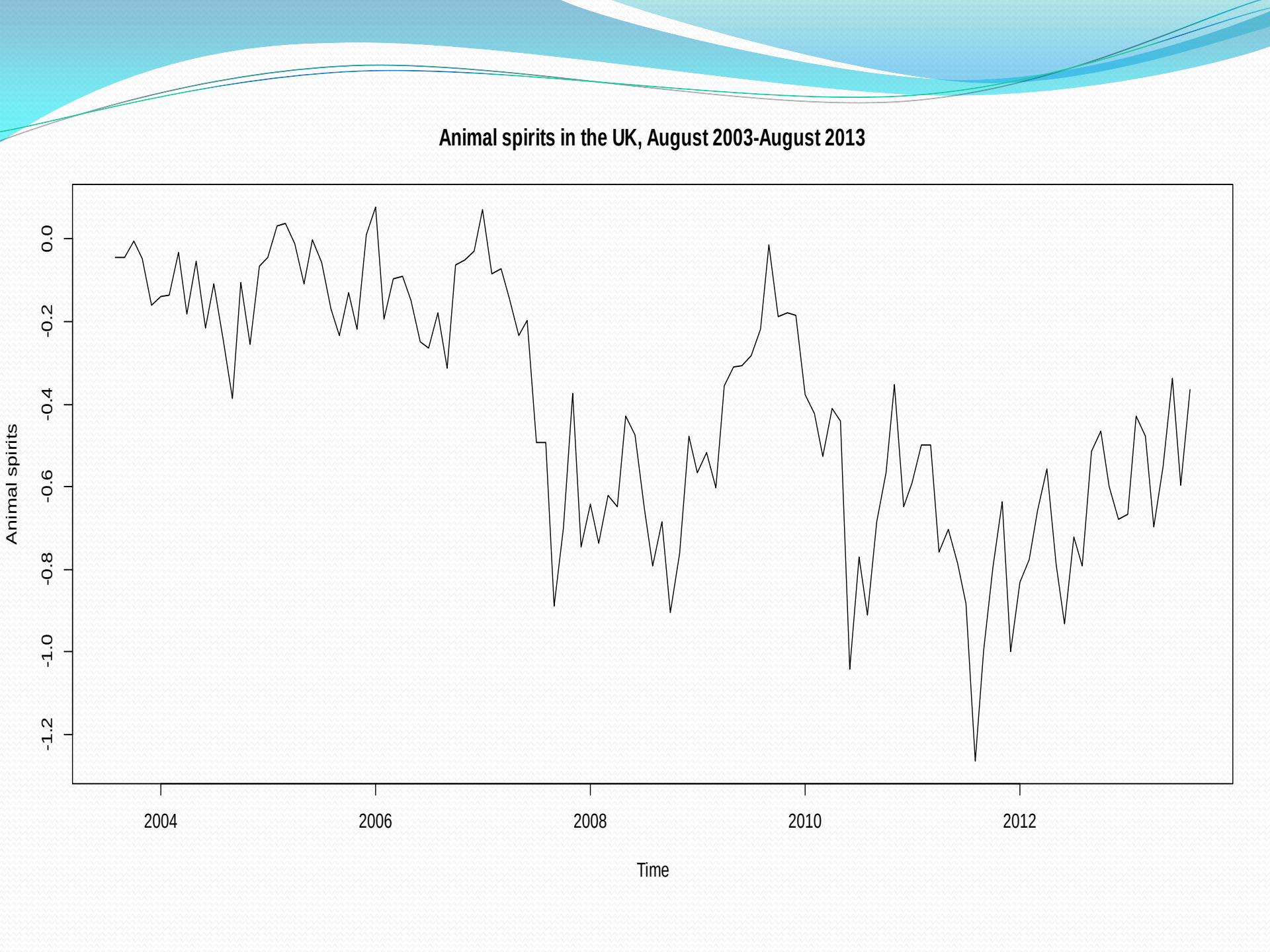
- Size of fiscal multiplier
- Is Ricardian equivalence operating?
- Why does the Eurozone crisis persist?
- Models do not capture *sentiment*
- *Mental states* remove the one-to-one correspondence between input and output

Keynes and expectations

- Clear distinction between short-run (chapter 5 of the *General Theory*) and long-run expectations (chapter 12 'The State of Long Term Expectation').
- Short-term expectations are formed by simple autoregressive rules
- Longer term are subject to inherent uncertainty
- (chapter 22) "the basis for such expectations is very precarious. Being based on shifting and unreliable evidence, they are subject to sudden and violent changes"
- Keynes refers to the "uncontrollable and disobedient psychology of the business world"; "waves of irrational psychology"; sentiment being generated as the "outcome of mass psychology of a large number of ignorant individuals";
- "The state of long-term expectation does not solely depend on the most probable forecast we can make. It also depends on the *confidence* with which we make this forecast
- In modern terminology, we have agents on a network which at any point in time are in one of k states of the world, where k is the degree of optimism/pessimism. There is some kind of threshold rule by which individual agents alter their state of the world according to the state of the world of their neighbours

Animal spirits in the US, July 2003-August 2013




Animal spirits in the UK, August 2003-August 2013
Animal spirits
0.0
-0.2
-0.4
-0.6
-0.8
-1.0
-1.2
2004
2006
2008
2010
2012
Time

The agenda

- Algorithmic text analysis to capture sentiment – animal spirits
- Network based models to capture the percolation/containment of sentiment
- [Ormerod (2002, 2004, *Physica A*) Two parameter model based on sentiment which captures the key features of the business cycle]