Report on „Money Creation and Financial Instability: An Agent-Based Credit Network Approach“

Summary

The authors develop an agent-based model of endogenous money creation after an exogenous cash injection from the central bank. Households and banks follow simple rules for holding cash and reserves respectively, which are the ones used in introductory textbooks to describe the money multiplier. The behavior of banks and households creates not only money but also an endogenous credit network. In an extension the author introduce an interbank market which makes endogenous instability possible. The interbank market can lead to systemic crises after the failure of individual banks. The conditional probabilities of bank failures are computed from Monte Carlo simulations.

Evaluation

The paper deals with the important topic of credit networks and financial instability and shows that systemic financial crises can arise endogenously. It applies the agent-based simulation methodology, which is a fascinating new tool ideal for the analysis of systemic effects of individual interaction. Presenting agent-based models to a general economic audience is important, because the methodology can only gain acceptance if its power is demonstrated with relevant examples. In order to promote agent-based computational economics as an alternative approach, it is necessary to stop talking about the flaws of other approaches and reflecting about its advantages at a general level. Instead, proponents must get started on doing relevant research. The present paper does this.

That said, the present paper does not go far enough. From my point of view, the authors concentrate too much on saying what DSGE model cannot do and provide too little constructive discussion of what the proposed model contributes to our understanding of financial crises. I would propose reformulating the Introduction, Section 2 and the Conclusions in order work out better what the insights from this model are (and less its advantages over standard theory).

Furthermore, I would suggest to de-emphasize the textbook money multiplier. Among academic macroeconomists, this simple textbook model is not very popular (see the discussion of Simon Wren-Lewis in his blog: http://mainlymacro.blogspot.de/2012/07/kill-money-multiplier.html).

The results in the baseline model are somewhat oversold and the discussion could be shortened. That the money supply converges to the equilibrium level from the money multiplier formula is not really surprising. While it is true that the model does not include explicit equilibrium conditions, it is hard to see what else could emerge from the assumptions of the baseline model. By assumption, agents will only stop adjusting their behavior when they hold cash, deposits, and reserves in the imposed proportions, which forces the agents into a state of mutually consistent plans, in other words an equilibrium.

The second part of the paper, in which an interbank market is introduced and analyzed, is the stronger and more interesting part. This part could be extended, for instance by a more systematic and formal analysis of the conditions for a systemic crisis. While the results from the Monte Carlo runs are interesting, the authors could do more, for example explore systematically how these probabilities depend on the parameters of the model.

Some detailed comments

Introduction

Page 1: Say what you do instead of saying what you do not do. What is the idea behind your endogenous bankruptcy cascades? What exactly is the potential contribution of the SFC?

Section 2:

- Formulate the whole section positively. What can you do with ACE? Not what can't you do with DSGE or other approaches.
- Aggregate variables are also derived from micro assumption in DSGE models. The particular feature of ACE is the interaction. This could be stressed more.
- Stability and uniqueness are often not shown in DSGE models.
- The "interesting question" (p. 2) could be framed more specifically with reference to the problem of the paper.
- The discussion of the problems of ACE is not necessary here. The points are correct, but a general discussion distracts from the main points of the paper.

Section 3:

- Do not stress the textbook model so much, few people really like it.
- HH are also firms and thus representatives of the real sector. I can accept this as a simplification, but given the high aspirations of the paper with "microscopic" foundations, this assumption seems inconsistent.
- Say what the central bank does, not what it does not do.
- You state: "Each agent can also possess claims on the cash of any other agent" (p. 4). Is this true? Can households have claims against other households?
- The CB has not assets and therefore must have zero or negative equity. This is very weird. It might be seen as an irrelevant theoretical abstraction, but at least some comments might be justified.
- Footnote 10: In Gaffeo et al. (2008) there is a positive interest rate.
- Page 8, stochasticity: Is there a non-zero interest rate or not?

Section 4

- The captions of figures 3 and 4 seem to be interchanged.

Section 6

- Is a more formal and systematic analysis of instability and systemic risk possible? What are the conditions for instability?
- What does it mean that interbank market is turned off? Is the model the baseline model then? This seems unlikely. Could you be more precise here?
- The general discussion at the end of the section on page 23 is not very helpful. You say: "For a deep understanding of the above phenomenon, it is inevitable to perform an individual and interaction based analysis". What does this mean? Your stated results are quite vague. Couldn't you be more specific on what can be learnt from your model? The general results can also be

understood at an intuitive level. What kind of deep understanding comes from the simulation results of the model?

Additional remarks

- The paper should be proofread by someone with a good command of English. There are many spelling mistakes and passages that sound very German. Some examples of misspelled words are: thread (p. 4), hight (p. 4), expect for equity (p. 5), dept (p.6), momentary base (p. 6), there (their) (p. 6), by (buy) (p. 6) … Furthermore, the grammatical gender of “household” is neuter, not masculine.
- It should be “adaptation”, not “adaption”.
- In the references, it should be “Gallegati”, not “Gallagate”.