

Review of Discussion Paper 2013-32

Housing Market, Bubbles and Business Cycles in an Agent-Based Credit Economy

Abstract

The Authors build upon the famous EURACE model and develop an ACE macroeconomic model. The main features of the model are that it integrates a housing market and sector and that it features unique ways of financing of housing for households, i.e. mortgages.

Different levels of restrictiveness with respect to mortgage granting are set to analyze its impact on the economy. The authors find that stricter mortgage policies reduce volatility but also dampen growth.

General evaluation

Obviously, the research question is interesting and up to date. The model is developed in a clear and straight forward way. The authors carefully analyze the model output and finally reach their conclusion on a sound basis. Therefore the paper is worth publishing.

However, I have also some problems with the paper that I note down below in detail. None of the points is a major critique, they are only intended to make the paper easier to read.

Major Issues

I was confused directly in the abstract. It says there, that capital is fixed. But at the same time it says that the economy grows. How can both be the case? I think after reading the paper completely and going back to the abstract I still don't really understand this point. For me, a typical macro model with fixed capital has no growth.

There are some technical aspects of the model that should be linked to other ACE models with similar characteristics.

E.g. can you tell the reader (maybe in footnotes only) if there are other papers using the same method of profit distribution? Is the assumption that an equity fund provides firms with capital if they need it technically identical to distributing negative profits in case of loss?

Are there other authors using different units of time (days months, ...)? Typically there are just periods t .

Are there others using the methods of price, wage, ... adjustment?

Similar point: I am not clear about the relations of your model to Post Keynesian endogenous money. Can you clarify that? You could also use keywords like "Stock Flow Consistency" to directly give the reader an idea of the theoretical ancestors.

The production function (1) is stated as a Leontief function with capital. But capital plays no role for production because the parameter γ become infinity. I understand that this makes sense as a simplification and that you want to have capital as an asset in the balance sheet. But it is hard to understand what the amount of capital should be then. According to the production function an epsilon value would be enough. But the firm (I know from section 3.1) has more capital so that a significant number pops up in the balance sheet. It seems that you put capital in the production function to justify why you need capital. But this does not work because the production function more or less says that you don't need capital at all, only a tiny epsilon value.

Maybe you could simply use this function $q = A * K^a * L^b$. You could argue that you fix capital because there is no growth. Setting $\gamma = A * K^a$ and $b=1$ the function becomes $q = \gamma * L$. This does not change your effective modeling assumptions, but it looks a bit nicer. There is a fixed amount of capital added to the assets side but without the need of this strange infinity-parameter.

A second aesthetic suggestion: On p. 5 you write "Production takes place the last day of any month". This seems very unrealistic because production takes place the complete month in reality. I would write: "Production takes place the complete month and is finished at the end of the month, so that it become available for sale on day 1 of the subsequent month."

The price adjustment rule looks a bit strange. If a firm has low sales and consequently reduces production, it has to INCREASE prices. Typically one would suggest, that firms that have problems to sell, decrease their prices to sell more. Your assumption is counter-intuitive.

Additionally, together with households behavior, it might lead to strange aggregate results: Large firms have low prices while small firms have large prices. Consequently HH buy a lot from the former and less from the latter. In the next step the large firms produce more and decrease prices further. The small ones decrease production and increase prices. And so on ... You have no method that stops this vicious circle. In mainstream macro the marginal utility of the small firms goods would increase when amounts sold are low and HHs are willing to pay more.

Why is your model not bifurcating firms? You should also cite others that use the same price adjustment mechanism, that would make me believe more easily that it really works.

Your description of the production function of the construction firms differs from that of normal firms in wording. Is there really something different? E.g. why is there a $K(0)$ now? Does that mean capital is fixed? The zero makes it look as a function of time?

This is very confusing. If production works the same as for normal firms, use similar wording when explaining production of the different firms so that it is easier for the reader to see that.

On p. 8 you write "When a particular housing unit ...". Does that mean q^s is an element of the natural numbers only? Then there should be a ROUND() or something like that in equation (7).

Another problem with the production of houses is that when prices fall, construction firms reduce production. What happens with unfinished houses? Are they destroyed or is labor demand of construction firms yearly so that every house is always finished? If it is destroyed, is this also the case for very small decreases of house price? E.g. if house prices fall by 0.001% it would seem unlikely that firms destroy some of their unfinished houses.

I am struggling a bit with your time series of GDP and unemployment (figure 1). Unemployment is terribly large: sometimes above 40%. True unemployment rate in Iceland is about 5%.

GDP shows amplitudes of around 8% to 40% around the mean. This also seems very large compared to the 3-5% in reality.

I am clear that it is impossible to capture every empirical aspect. But you should at least comment on that. Do you have an explanation for these results? Is it simply a problem that is intended to be solved in future versions?

Presentation of results is a bit messy. It is troublesome to browse back and forth through the pages to look at all the figures. Maybe some of the time series can be put into the appendix if they are not referred to within the text. So that everything is more compact and the reader does not have to browse through the pages so much.

Minor Issues

P. 3: "We then and describe the most" the AND is wrong.

P. 4: "households decide whether to enter or not the housing market." whether or not to enter
"At the first day of any quarter, after the monthly ..." I don't understand this sentence. Can you reformulate it?

P. 5: "... and balancing of agents' accounts takes place." I don't understand this sentence. Shouldn't accounts ALWAYS balance?

P. 7: "Firms form expectations on expected sales" Firms form expectations on sales.

P. 8: "Here we define DPH as the change in housing price, as well as the current number of projects under construction, as." I was a bit confused here, because I don't see why you have to DEFINE that. Both are values that follow directly you only have to give it a name. Maybe just write: "Let DPH denote the change in house price and as the current number of project under construction"

P. 11: "Producers apply for credit first to their preferred bank randomly set at the beginning of the simulation, then if rationed make a second application to another randomly selected bank. For the sake of simplicity, we stipulate that loans are infinitely lived and are never paid back."

There are only two banks. So there is no RANDOMNESS if selecting one of the others.

Maybe the preferred bank can be called "main bank". Because preferred suggests that there is something better about that one. When I read "preferred" I wondered why it is preferred?

You explain how wages rise. But can they also fall? From Fig 7 it seems that maybe they can't. If this is true please tell the reader in section 2.2.

P. 12: You refer to a v^f in the middle of that page. Has v^f been defined before?

Eq. (13): Can you give a reference where this formula comes from?

P. 13: What relationship holds between beta and theta_high? I think you should require beta < theta_high. In the simulations that holds anyway. Please state that on p. 13.

Eq. (16): why is only one third of income disposable? What happens to the rest?

P. 15: "If the banks of the artificial economy require liquidity they can draw upon the Central Bank credit line at any time and without limit." Maybe add: "at an interest rate of r_{CB} " if this is correct.

P. 18: "according to Statistics Iceland is about". There is a word missing. You should also give the source of the numbers you use.

Figure(5): "Simulation paths for GDP and Unemployment". I think this is wrongly labeled.

P. 22: "causing a decrease in the housing price (figure 7)". Is that the right figure?

P. 22: "Figure 4 shows several time series related to firms. It is important to underline that the first crisis does not trigger any firms' bankruptcy in the model." I don't see that in the figure. Can you tell where that can be seen? Additionally, you should define before what you mean by "first crisis". First crisis = year 6?

P. 26: "The narrative of section 3.2 is again confirmed by looking at table 5." All results that are discussed after this sentence refer to tab 6. Maybe tab 5 can completely be put to the appendix. I think you never refer to the results in the text. It would be better to show only those results there that are really needed to understand the text because the tremendous loads of data you show in tab 4-6 are overwhelming.

It was a pleasure to me, reviewing this interesting paper and I am looking forward to read the final (published) version soon.