

Comments on the paper

"Macroprudential policies in an agent-based artificial economy" by S. Cincotti, M. Raberto and A. Tegli

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The recent financial crisis has shown that something was going wrong with the banking system and many researchers and policymakers agree that capital requirements should focus on the contribution of each institution to systemic risk more than on the specific risk of each institution in isolation (Brunnermeier *et al.* 2009, Squam Lake Working Group 2009, and Adrian and Brunnermeier 2008). This new macroprudential perspective tries also to reduce the procyclicality of the previous banking regulation.

Macroprudential policies in a Eurace-Model

The paper tries to replicate in an artificial economy some of the measures proposed by the Basel Committee in order to analyze their impact on economic performance. Those measures include the creation of a capital buffer during upturns to be used during critical periods. The authors use as the "conditioning variables", those that would determine the level of capital requirements, the distance between the actual level of unemployment and its threshold and also the distance between the actual level of credit growth and its threshold. If I understood well, the mechanics of capital requirements works as follows: when the level of unemployment is higher than its threshold, capital requirements are set at its minimum level (k_{\min}), for lower levels of unemployment, capital requirements increase smoothly up to k_{\max} (when the unemployment rate is 0). On the other side, when the rate of growth of the aggregate credit is higher than its threshold, the level of capital requirements is set at its maximum (k_{\max}) while when it is below that threshold, it decreases smoothly up to its minimum level of k_{\min} as a function of the level of unemployment. The authors choose 25% as a threshold for the unemployment rate, 5% for the case of credit growth, 8% for k_{\min} and 12% for k_{\max} . Since the paper tries to replicate the economy using real values, a natural question that arises

is whether a 25% level of unemployment is a good threshold. Neither Spain nor Greece has attained such level of unemployment in the actual crisis and their banking system is already in a critical situation. Similarly, should all countries use the same threshold or not? This point has policy implications: should capital requirements be focused only on local economic conditions or should it consider conditions on partner countries? Probably, in a more and more integrated financial system, foreign conditions should also matter.

This work obtains very good results in terms of macroeconomic performance for the artificial economy. The dynamic regulation of capital requirements stabilizes the economy in the long run and improves the main economic indicators. However, in this model bank default risk is zero since the central bank is eager to inject money in order to prevent such event. Consequently, the difference between microprudential and macroprudential regulation for systemic risk disappear. The concept of systemic risk as the failure of a significant part of the financial sector vanished (Acharya, 2009). I believe that the introduction of an interbank market is necessary in this context to test the implications of different capital requirements configurations on financial stability and consequently on the real activity. Additionally, the simulations provide very high variability in the macroeconomic aggregates (for example, unemployment is higher than 40% four times in 30 years). A natural extension should include analyzing the sensitivity of the results to modifying the limits for capital requirements while keeping its dynamic configuration.

Future extensions should also consider the possibility of banking crises due to bank runs or bankruptcies. In line with previous comments, it would be interesting to analyze how different configurations for capital requirements affect the economic performance of differently concentrated banking systems.

References

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Reply to Comments

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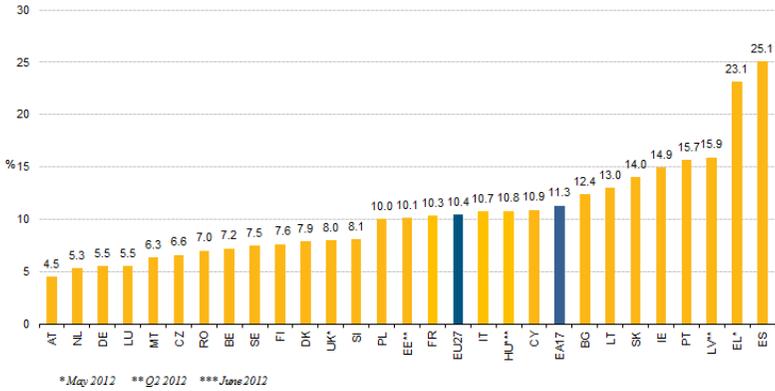
First of all, we would like to express our appreciation to Augusto Hasman, who carefully read our paper and indicated some important points that need to be discussed. This is of course an opportunity for us to clarify some aspect of the paper.

The first issue raised by the discussant concerns our choice of conditioning variables, *i.e.*, the economic indicators that should allow one to distinguish between good times and bad times. In particular, it is argued that a 25% level of employment is not a realistic threshold because neither Spain nor Greece has attained such a level, being their banking system already in a critical situation.

In this respect, it is worth noting that the threshold simply means that when the unemployment level is higher than 25%, banks are allowed to follow a looser regulation, with capital requirements at the minimum level (8%), in order to release the capital buffer that had been built-up during good times, *i.e.*, when unemployment was lower. The macro-prudential rule changes therefore in the range of unemployment rate between 0 and 25%, thus considering a rate of 25% higher enough to be assumed as a threshold. Unfortunately, according to the last Eurostat unemployment statistics (see Figure), such unemployment level seems realistic.

Furthermore, we agree with the discussant that different countries should probably use different thresholds (according to their historical levels of unemployment and to the structural characteristic of the economy) and that foreign conditions should also matter. However, stated that the current version of the model only considers a single country context, we have been inspired by the current range of unemployment levels in the European Union in order to set the 25% threshold.

Figure. Unemployment rates, seasonally adjusted, June 2012



Source: http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Unemployment_statistics.

Later in his discussion, Augusto Hasman suggested to introduce an interbank market in the model, along with the possibility for banks to go bankruptcy. He argues that, with banks always fueled by Central Bank liquidity, the difference between micro and macro prudential rules for systemic risk could disappear.

As regarding the bankruptcy of banks, we agree with the discussant. Modeling this aspect is in our research agenda as it would be useful so to further improve the model and to understand and test the fiscal effects of bailing out policies. Nevertheless, systemic risk is already a key factor in the current model, but on firms' side. In this respect, Figure 5 in the paper shows the financial fragility indicator and this is clear example of the evolution of systemic risk in the model. When it is too high, an economic crisis is probably around the corner.

As regarding the modelling of bank runs and banks' bankruptcies these are also in our research agenda and we think that investigating their effects on government debt and fiscal policy would be systemically relevant and worth to be considered.

Conversely, concerning the interbank market, although it would certainly enrich the model we think it would not constitute a fundamental improvement. This because during the peak of a crisis interbank markets cease to function and the central bank is always available to provide the necessary liquidity to guarantee the functioning of the banking system, as the recent events have clearly shown. Furthermore, because solvency and not liquidity is the key issue in a

banking crisis, in particular for what concerns their systemic effects and the sovereignty.

Finally, we would like to thank the organizers of the Workshop on "New advances in agent based modeling: economic analysis and policy" held in Paris June 19 and 20, 2012 at OFCE, Skema Business School for framing such a precious and stimulating event.