Referee report on

„The Impact of the Basel III Liquidity Coverage Ratio on Macroeconomic Stability: An Agent-Based Approach". By Boyao Li.

E-journal: Economics.

The submitted paper investigates the possible impacts on macroeconomic stability that the liquidity coverage ratio (LCR) might have. The LCR is a micro-prudential tool introduced in the most recent Basel accord: Basel III. The LCR's main objective is to improve banks' short-term resilience against liquidity risk. The author seeks to provide an analysis of how the implementation of the LCR requirement could affect the economy as a whole. For that purpose, the author presents a stock-flow consistent (SFC)/agent-based computational economic (ACE) model, in which four types of agents are represented; Households (HHs), Firms (FIs), Banks (BAs) and a Central Bank (CB). The setup of the model also provides four markets in its artificial economy; Credit, Deposit, Goods and Interbank Market. Although the main aim of the submitted paper was studied in a similar manner in Krug et al (2015)[1], the presented model has some extensions and innovations that are worthwhile to consider[2]. Nevertheless, the design of the model's dynamics and initial setup have a few significant flaws, which render the presented results invalid. Additionally, the research design to determine the possible impacts of the LCR on macroeconomic stability is inappropriate. Finally, the comprehensibility of this work is impaired by incorrect terminology and grammatical errors.

A SFC model is based on an accounting framework, in which every transaction in the artificial economy should be recorded using the double-entry bookkeeping method, which ensures that the basic accounting equation holds at all times, i.e. total assets equal total liabilities (external liabilities + equity) in every single balance sheet at every time step. For that reason, a SFC model must explicitly define how every possible type of transaction affects the balance sheet components of all types of agents in the model. In the presented work is not possible to determine if the basic accounting equation holds at every time step and if all the transactions follow the double-entry bookkeeping system[3]. In fact, although more than 60% of the firms default in the simulation, because they cannot pay back their loans, no bank defaults and there is no mention of any losses in the banking system.

Another two examples for some of the fundamental flaws found in the model are: 1) income and net profit are incorrectly defined. The FIs' income includes the investment done at time t-1, investment is not an income, the capital gain, dividends or interest payments obtained from the investment are income. From the FIs' net profit is subtracted an expression that the author named periodic

[1] Krug, Sebastian, Lengnick, Matthias and Wohltmann, Hans-Werner. (2015), The impact of Basel III on financial (in)stability – An agent-based credit network approach-. Quantitative Finance, 1-16.

[2] E.g. FIs' loans are created by a credit demand depending on the FIs' income, in contrast with the methodology used in Krug et al. (2015), in which firms' loans are the result of a credit offer, in which a bank randomly chooses a household/firm and offers a credit.

[3] E.g. in the initial setup it is not mentioned how the equity of every agent is determined, neither is the cash and fixed property of FIs set, without this information is impossible to determine if total assets equal total liabilities in the balance sheets. Another example regarding the transactions is that the accounting of the transactions generated by the consumption of the households is not explained in the dynamics of the model: is the HH after consuming decreasing its cash and its equity? The FI is increasing its cash after consumption, but what about the liability side?

repayment flow, which is neither a cost nor an expense of the firm. And 2) the argument that supports the choice of interbank repayment algorithm used is inappropriate; that the repayment algorithm minimizes the banks defaults should not be a reason for implementing it in the model. For the purpose of a meaningful model, an appropriate interbank repayment algorithm should mimic as well as possible the possible repayment patterns of the real banking system.

For the analysis of the LCR's impact on the artificial economy, the author defines two scenarios: one under the LCR framework and another ("*benchmark scenario*") in which the liquidity buffer[4] is kept constant after t=100 (the whole simulation lasts 1500 time steps). In the simulation setup the banking system suffers an exogenous shock at time t=100, caused by an abrupt increase in the current level of the LCR. Although having two scenarios is a good idea to structure the analysis of the results, none of the scenarios seems to represent appropriately what would happen in a real economy. In the LCR framework scenario the LCR is suddenly increased "*in response to liquidity shortages or stressful economic conditions*", but no stressful economic conditions have occurred in the artificial economic model in the presented work at time t=100. Additionally, increasing abruptly the level of the LCR to provoke stress in the banking system is not pertinent to the aim of the presented work, if any stress provoked by the LCR were to occur in the model, it should be an endogenous result, but not an exogenous shock. On the other hand, the setup of the *benchmark scenario* that produces a decrease in the liquidity buffer right after the exogenous shock on LCR and subsequently develops in a constant liquidity buffer is not supported by empirical evidence.

Finally, the incorrect use of some terminology and the frequent grammatical errors are a considerable obstacle to fully understanding the model, results and conclusions presented in the submitted paper.[5]

Additional comment:

The following segment of the presented paper needs to be quoted as it is an identical copy of an extract from the BCBS 238 (2013)[6]:

"The denominator, *the total net cash outflows, is defined as the total expected cash outflows minus the total expected cash inflows in the specified stress scenario for the subsequent 30 calendar days. The total expected cash outflows are calculated by multiplying the outstanding balances of various categories or types of liabilities and off-balance sheet commitments by the rates at which they are expected to run off or be drawn down. The total expected cash inflows are calculated by multiplying the outstanding balances of various categories of contractual receivables by the rates at which they are expected to flow in under the scenario, up to an aggregate cap of 75% of the total expected cash outflows*."

[4] In the model the liquidity buffer is defined as the liquid assets reserved to meet the LCR.

[5] E.g. "In order to protect itself against bankruptcy, the firms do its best to pay off the debts due in present period, and repay the debts due in t +1 period, then due in t +2 period, etc. until the firm's currency has been dried up." E.g.2. "In our model, we set two agents are randomly and independently chosen in the two corresponding sectors to form a pair."

[6] BCBS 238 (2013). Basel III: The Liquidity Coverage Ratio and liquidity risk monitoring tools. Bank for International settlements. January 2013.