

Bewaji Oluwasegun, Professor, Centre for Computational Finance and Economic Agents (CCFEA) University of Essex, UK;
Sheri Markose, Professor, Centre for Computational Finance and Economic Agents (CCFEA) University of Essex, UK

AN MULTI-AGENT MODEL OF RMBS, CREDIT RISK TRANSFER IN BANKS AND FINANCIAL STABILITY: IMPLICATIONS OF THE SUBPRIME CRISIS

For the study of RMBS within banking and the implications for financial stability from the process of credit risk transfer we apply the agent-based modelling (ABM) simulation technique. We design and develop a two-sector computational agent model using an insolvency risk constrained multi-period horizon model of profit maximisation with mortgage origination and securitization by banks on the one hand and the asset liability management activities of institutional investors who seek returns from equity and credit assets. The RMBS model for banks includes regulatory arbitrage from Basel capital adequacy, asset quality deterioration and default risk of loans. Our approach shows how the RMBS activity and the credit risk involved is incorporated into the portfolios of institutional investors and hedge funds who sought high return from the high risk tranche of credit assets. On this basis, we discuss the financial stability implications arising from the calibrations of two sectors where banking data relies on the FDIC data set and the default and coupon rates for credit assets come from the 2007 Citibank Report. Critical to issues such as whether there is an over supply of RMBS with an excessive high proportion of assets being securitized (typical rates of about 40–49 % being the case in the 2001–2002 for subprime originators) is found to lie in inappropriate coupon rates being paid on credit products based on high default RMBS and hence the costs of RMBS were not correctly factored. The implications of the passage of time for insolvencies to kick in can be observed in the agent based model. For instance, institutional investors with large portfolios of up to 38 % or more of credit assets with default rates in excess of 10 % could be insolvent by year 2. In such a case, the high Dutch Insurance Supervisory Board solvency margin of 30 % for institutional investors did not appear to fare any better than a lower one showing that the collapse of market value for RMBS backed credit assets from high default by mortgagees is the dominant determinant of systemic risk. In its fully developed form, it is possible for the agent based model to articulate various components of the financial sector. Future research aims to incorporate the CDO structures fully, add features like marking to market accounting, the short term market for commercial paper and an explicit role for regulatory authorities such as Central Banks.