

IAQF & Thalesians Seminar Series

Agency MBS Prepayment Modeling Using Neural Networks



A Talk by
Joy Zhang



Advancing the Field of Quantitative Finance

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ABSTRACT

We apply deep neural networks, a type of machine learning method, to model agency MBS 30 year fixed rate pool prepayment behaviors. The neural networks model ("NNM") is able to produce highly accurate model fits to the historical prepayment patterns, as well as accurate sensitivities to risk factors. These results are comparable with model results and intuition obtained from a traditional agency pool level prepayment model built via many iterations of trial and error of many months and years. This example shows NNM can process large data sets efficiently, capture very complex prepayment patterns, and can model large group of risk factors that are highly non-linear, and interactive. We also examine various potential shortcomings of this approach, including non-transparency/"blackbox" issue, model overfitting, and regime shift issues.

BIO

Joy Zhang is an Executive Director and Head of Non-Agency Securitization Research at MSCI. Previously, Joy was a Director at Credit Suisse, responsible for mortgage collateral and regulatory modeling for securitized products trading. She also has worked as a senior developer at Goldman Sachs responsible for developing a firm-wide risk management system. Joy has an M.S. in Computational Finance from the Carnegie Mellon University and a Ph.D. in Chemistry from University of Kansas.