## Model Risk of Risk Models\*

Jon Danielsson Kevin R. James Marcela Valenzuela Ilknur Zer

## Abstract

This paper evaluates the model risk of models used for forecasting systemic and market risk. Model risk, which is the potential for different models to provide inconsistent outcomes, is shown to be increasing with market uncertainty. During calm periods, the underlying risk forecast models produce similar risk readings; hence, model risk is typically negligible. However, the disagreement between the various candidate models increases significantly during market distress, further frustrating the reliability of risk readings. Finally, particular conclusions on the underlying reasons for the high model risk and the implications for practitioners and policy makers are discussed.

**Keywords:** Market risk, systemic risk, Value-at-Risk, expected shortfall, MES, CoVaR, financial stability, risk management, Basel III

**JEL classification:** G01, G10, G18, G20, G28, G38

<sup>\*</sup>Corresponding author Ilknur Zer, Federal Reserve Board, 20th Street and Constitution Avenue N.W. Washington, D.C. 20551, USA, ilknur.zerboudet@frb.gov, +1-202-384-4868. The views in this paper are solely the responsibility of the author and should not be interpreted as reflecting the views of the Board of Governors of the Federal Reserve System or of any other person associated with the Federal Reserve System. The early version of this paper is circulated under the title "Model Risk of Systemic Risk Models". We thank the Economic and Social Research Council (UK) [grant number: ES/K002309/1], and the AXA Research Fund for its financial support provided via the LSE Financial Market Group's research programme on risk management and regulation of financial institutions. Valenzuela acknowledges the support of Fondecyt Project No. 11140541 and Instituto Milenio ICM IS130002. We also thank Kezhou (Spencer) Xiao for excellent research assistance. Finally we thank Seth Pruitt, Kyle Moore, John W. Schindler, an anonymous referee, and participants at various seminars and conferences where earlier versions of this paper were presented. All errors are ours. Updated versions of this paper can be found on www.RiskResearch.org and the Webappendix for the paper is at www.ModelsandRisk.org/modelrisk.

<sup>&</sup>lt;sup>†</sup>Jon Danielsson, Department of Finance and the Systemic Risk Centre, London School of Economics, Houghton St, London WC2A 2AE, UK. (j.danielsson@lse.ac.uk). Kevin R. James, the Financial Markets Group and the Systemic Risk Centre, London School of Economics, Houghton St, London WC2A 2AE. (k.james1@lse.ac.uk). Marcela Valenzuela, University of Chile (DII), Beauchef 851, Santiago, Chile. (mvalenzuela@dii.uchile.cl). Ilknur Zer, the Federal Reserve Board (ilknur.zerboudet@frb.gov).