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VAR for VaR: Measuring Systemic Risk Using Multivariate Regression Quantiles*

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Abstract

This paper proposes methods for estimation and inference in multivariate, multi-quantile models. The theory can simultaneously accommodate models with multiple random variables, multiple confidence levels, and multiple lags of the associated quantiles. The proposed framework can be conveniently thought of as a vector autoregressive (VAR) extension to quantile models. We estimate a simple version of the model using market returns data to analyse spillovers in the values at risk (VaR) of different financial institutions. We construct impulse-response functions for the quantile processes of a sample of 230 financial institutions around the world and study how financial institution-specific and system-wide shocks are absorbed by the system.

Keywords: Quantile impulse-responses, spillover, codependence, CAViaR

JEL classification: C13, C14, C32.

1 Introduction

The recent financial crisis has brought to the forefront the importance of having sound measures of financial spillover. In the current debate, great emphasis has been put on how to measure whether an institution is of systemic importance. In particular, it has been argued that since the failure of a systemically important financial institutions could produce severe negative externalities on the whole financial system, the supervision of financial institutions should, among other things, take into account the spillover of risks within the system. The regulatory constraints imposed on firms should therefore also reflect their overall systemic impact.

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