

Financial Network Systemic Risk Contributions*

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Abstract. We propose the *realized systemic risk beta* as a measure of financial companies' contribution to systemic risk, given network interdependence between firms' tail risk exposures. Conditional on statistically pre-identified network spillover effects and market and balance sheet information, we define the realized systemic risk beta as the total time-varying marginal effect of a firm's Value-at-risk (VaR) on the system's VaR. Statistical inference reveals a multitude of relevant risk spillover channels and determines companies' systemic importance in the U.S. financial system. Our approach can be used to monitor companies' systemic importance, enabling transparent macroprudential supervision.

JEL Classification: G01, G18, G32, G38, C21, C51, C63

1. Introduction

The financial crisis of 2007-2009 has shown that cross-sectional dependencies between assets and credit exposure can cause risks of individual banks to cascade, ultimately substantially threatening the stability of the entire financial system.¹ Under certain economic conditions, company-specific risk cannot be appropriately assessed in isolation without accounting for potential risk spillover effects from other firms. Indeed, it is not merely the size and idiosyncratic risk of a firm but also its interconnectedness with other firms that determines its systemic relevance. The latter is a firm's potential to increase the risk of failure of the entire system – which we denote as systemic risk.² There

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¹ For a thorough description of the financial crisis, see, e.g., Brunnermeier (2009).

² Bernanke (2009) and Rajan (2009) stress the danger induced by institutions that are “too interconnected to fail” or “too systemic to fail”, in contrast with firms that are simply “too big too fail”.