

A Framework for Assessing the Systemic Risk of Major Financial Institutions

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In this paper we propose a framework for measuring and stress testing the systemic risk of a group of major financial institutions. The systemic risk is measured by the price of insurance against financial distress, which is based on *ex ante* measures of default probabilities of individual banks and forecasted asset return correlations. Importantly, using realized correlations estimated from high-frequency equity return data can significantly improve the accuracy of forecasted correlations. Our stress testing methodology, using an integrated micro-macro model, takes into account dynamic linkages between the health of major US banks and macro-financial conditions. Our results suggest that the theoretical insurance premium that would be charged to protect against losses that equal or exceed 15% of total liabilities of 12 major US financial firms stood at \$110 billion in March 2008 and had a projected upper bound of \$250 billion in July 2008.

Our methodology is closely related to but in sharp contrast with the Financial Stability Assessment Program (FSAP) conducted by IMF in recent years, the Supervisory Capital Assessment Program (SCAP) implemented by the U.S. regulatory authorities earlier this year, and the European-wide stress testing program sanctioned by the Committee of European Banking Supervisors (CEBS). These supervisory stress testing programs are primarily based on *confidential* banking information and adopt the *historical* stress scenarios as adverse as in the Great Depression era. In contrast, we rely on *public* banking information from the financial markets and use the *statistical* bootstrapping method to consistently assess the downside extreme outcomes. Therefore our approach is more applicable by the private sector in measuring and managing the systemic risk exposures of large complex banking institutions.

The concept of market-based stress testing and systemic risk assessment is an extension of the original idea by Merton and Perold (1993) that the capital of financial institutions is a risk-neutral concept reflected in current asset prices. Aït-Sahalia and Lo (2000) regard value-at-risk (VaR) as inherently a risk-adjusted quantity implied by financial markets. A recent paper by Heaton, Lucas, and McDonald (2008) explicitly argues that capital reserve is a risk-neutral measurement.

JEL classification: G21 ; G28 ; G14 ; C13

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References

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